

GREEN BANKING IN INDIA: A STUDY OF VARIOUS STRATEGIES ADOPT BY BANKS FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

Banks play a pivotal role in sustainable development of a country, and green banking today has become phraseology. Economists have used the term sustainable development in an attempt to clarify the balance between economic growths on the one hand and conservation and protection of environment on the other. Due to financial, economic and environmental changes, financial services market is re-shaping and an all-inclusive engagement of ethical proposal and values into banking practices is taking place. The world faces a great experiment of environmental deprivation during the course of economic development. Green banking practices mean encouraging environment-friendly practices and decreasing carbon print from day to day banking activities. Green banks or environmentally responsible banks do not only progress their own standards but also disturb socially responsible behaviour of other business. Green Banking is one form of banking from that the country and nation gets environmentally benefits. A green bank is a bank that promotes and enacts green technologies in bank operations both internally and externally to minimize carbon footprints and facilitates environment management.

Keywords: Green Bank, Sustainable Development, Green Approach Economic Development

1. Introduction



1.1 Sustainable Development:

“Earth provides enough to satisfy every man's needs, but not every man's greed.”

-Mahatma Gandhi

Sustainable development refers to “meeting the needs of the present generation without compromising the needs of future generation”. In the environment friendly society “Go Green” mantra has become relevant in each and every aspect of business. There is a wave of change with all business activities to not only focus on profit but also on people and planet. With the changing consumer expectation, stricter environment regulation, compliance requirements even the banking sector cannot escape this wave of change.

The present environment all over the world is facing major issue of climate change. The rise in global warming has more effect on

environment for change in climate, thus causing living life on the earth very harmful. The awful impact of recent floods, droughts, storms and excessive heat/temperature which a large number of people all the world have experienced, force us to think seriously about global warming and its impact and to do whatever we can to address this problem.

The concept of environmental sustainability started in 1969 with the establishment of the National Environmental Policy Act (NEPA, 2014) in the United States whose purpose is to maintain productive harmony between man and nature. After that an independent agency was established in 1970 “Environmental Protection Agency” (EPA) with the aim to protect the natural resources, human health and to preserve the quality of the environment. In order to conserve natural resources the three R's concept is going popularized that is REDUCE, REUSE and RECYCLE. So for the survival, continuous efforts should be made for the environmental management in a sustainable manner. This is not only for the business units especially manufacturing industries but also financial services/institutions like banks to play a significant role in sustainable development of the society.

1.2 Green Banking

Greening of bank is further reducing carbon footprints from banking activities, and this is mutually beneficial to the banks, industries and the economy. Green banking is a form of banking activity where the banks take initiative to do its daily activities as a conscious entity in the society by considering in-house and external environmental sustainability. The banks who do such type of banking activities are termed as socially responsible and a sustainable bank or green bank or ethical bank. Banking assumes a special niche due to its ability to influence the economic growth and development of the country. Banking sector can play a crucial role in greening the banking system by enhancing the availability of finance and serve the needs of a “green economy”. Banks in India especially the largest commercial bank State Bank of India has established several green banking initiatives.

Green banking means promoting environmental friendly practices and reducing carbon footprint from banking activities. To aid the reduction of external carbon emission, bank should finance green technology and pollution reducing projects. So today's business is all about being green. Sustainable development and preservation of environment are now recognized globally as a major issue to protect our planet from the ravages inflicted on it by mankind. Various global initiatives are underway to counter the ill effects of development that living beings encounter today, such as global warming and climate change.

2. Literature Review

World Food Programme (WFP) - “To allow for future generations requires that we preserve our remaining resources and that we heal or rehabilitate resources that have been treated carelessly in the past. To do these things systematically is to follow a path of environmentally sustainable development”.

In the same vein, the definition of sustainability advanced by **Pearce and Turner (1990)** makes theoretical sense- **“It involves maximizing the net benefits of economic development subject to maintaining the**

services and quality of natural resources over time”.

According to the World Commission, sustainable is “development that meets the goals of the present without compromising the ability of future generation to meet their own needs” (WCED, 1987:8). This pioneering definition implies a view of sustainable development as a case of inter- generational sensibility in respect of the use of natural resources.

Marzio, (2007), opined that definition of green banking is diverse, which includes green banking as similar to the ethical bank, where the bank has a social responsibility to the environment.

Goyal & Joshi (2011) in their study “A study of Social and Ethical issues in Banking Industry” highlighted social and ethical issues such as social banking, ethical banking, green banking and rural banking, which facilitates the achievement of sustainable development of banking and finance. They concluded that banks can act as a socially and ethically oriented organization by disbursement of loan only to those organizations which have environmental concerns.

Bhari (2011) emphasized that banks should consider before financing a project whether that project is environment friendly or not and its future implications on environment in future.

3. Research Methodology

The study is based on secondary sources of information books, journals, and other publicly available information like Magazines, Newspapers, Research Articles, Research journals, E-Journals and Websites. The methodology is content analysis. According to **C.R. Kothari,** “Content Analysis consists of analyzing the contents of documentary materials such as books, magazines, newspapers and the contents of all other verbal materials which can be either spoken or printed”. Research methodology is descriptive.

3.1 Objectives of the Study:

Objectives of the study are:-

- To know the history of green banking.
- To understand the concept of green banking
- To study the major challenges of green banking
- To study Green Banking and its associated advantages
- To study opportunities of green banking in India
- To study various strategies for green banking approach
- To study the benefits of green banking

3.1.1. History of Green Banking:

The concept of green banking was developed in the western countries. Green Banking was formally started in 2003 with a view to protecting the environment. Then the Equator Principles (EPs) were launched and were initially adopted by some leading global banks, such as Citigroup Inc, The Royal Bank of Scotland, Westpac Banking Corporation. In March 2009, Congressman Chris Van Hollen of USA introduced a Green Bank Act with the aim of establishing a green bank under the ownership of the US government. After introduce the Green Banking initial decision was to minimize the paper use in banking works because to make all kinds of papers need to cutting trees as raw materials (its minimize the green forestation) and for this reason naturally its reduce the Oxygen and increase the carbon-dioxide in airspace/ globe .There are two ways of green banking practices. One is in-house green banking; another is practice by the bankers in their business area. Green Banking is any form of banking from that the country and nation gets environmentally benefits. An orthodox bank becomes a green bank by directing its core operations toward the betterment of environment. The banking sector can play an intermediary role between economic development and environment protection by promoting environmentally sustainable and socially responsible investment.

3.1.2. Green Banking:

Green Banking means promoting environmental-friendly practices and reducing carbon footprint from banking activities. According to Indian Banks Association (IBA, 2014) “Green Bank is like a normal bank, which considers all the social and environmental/ecological factors with an aim to protect the environment and conserve natural resources”. Banks are constantly looking at ways to make their processes more productive and environment friendly with the use of technology, old methods are slowly giving away to newer & more efficient process. Green banking is like a normal bank which considers all the social and environmental factors; it is also called as ethical banks have started with the aim of protecting the environment. Green banking aims at improving the operations and technology along with making the clients habits environment friendly in the banking business. It is like normal banking along with the consideration for social as well as environmental factors for protecting the environment. It is the way of conducting the banking business along with considering the social and environmental impacts of its activities.

Recently, as a part of the ‘Green Initiative’, the Centre has suggested the NBFCs take proactive steps to promote day to day use of electronic payment systems, elimination of post-dated cheques and gradual phase-out of cheques in their business transactions. Similarly, the ministry of finance has directed all public sector banks, financial institutions and public sector insurance companies to take up e-governance. The one of the biggest reason for the global warming is more use and more wastage of paper, like in banks paper-work is more, this results in climate change due to cutting of trees, as the paper is made from tree. At the same time they give financial assistance to even unethical business which is against the environment. Therefore, the banking sector can play an intermediary role between economic development and environmental protection, for promoting environmentally sustainable and socially responsible investment, banking of this kind can be termed as “Green Banking”.

3.1.3. Challenges of green banking:

While adopting green banking practices, the banks would face the following challenges:

- **Reputational Risk:** If banks are involved in those projects which are damaging the environment they are prone to lose their reputation. There are few cases where environmental management system has resulted in cost saving, increase in bond value.
- **Diversification Problem:** Green banks restrict their business transaction to those business entities who qualify screening process done by green banks. With limited number of customers they will have a smaller base to support them.
- **Start-up face:** Many banks in green business are very new and are in start-up face. Generally it takes 3 to 4 years for a bank to start making money. Thus it does not help banks during recession.
- **Credit Risk:** Credit risk arises due to lending to those customers whose businesses are affected by the cost of pollution, change in environmental regulation and new requirements of emission level.
- **High operating cost:** Green bank requires talented and experienced staff to provide proper services to customers. Experienced loan officers are needed; they give additional experience in dealing with green business and customers.

3.1.4. Green Banking and its associated advantages:

1. Online Savings Account: Online savings account and mobile banking is the coolest way to bank green and support the environment. Green banking includes set up direct deposit to obtain your pay checks, receiving electronic statements from your bank and by paying bills online. All of these steps can extremely decrease the quantity of paper formed by your bank. Online banking and mobile banking are also greatly operative ways to retain track of your finances and to avoid late payment fees. One more green banking step you can ensue is to propose the company you work for sign up for a product called "Remote Deposit". Remote customers have to materially deliver each

cheque to their bank to make a deposit. Remote deposits also allow banks to easily clear cheques digitally.

2. Paperless Statements: Distribution of bank statements by mail is a best way to reduce the use of paper. All the banks having an option for customers to obtain their statements electronically from a secure log in option. Copies of banking records and statements can then be stored automatically by electronic means instead of in filing cupboards. Getting statements electronically decreases the chance of identity theft.

3. Use Direct Deposit: Most of the employers will provide employees the choice to receive their pay check electronically. Not only does this speed up the availability of your money and save you a trip to the bank, it also saves paper, lots of paper work etc.

4. Green Finance: Banks should finance environment friendly projects and environment friendly products such as solar equipment, recycled furniture, vehicle finance for low carbon emissions Vehicles, home finance for green buildings etc. With generous certain allowances in processing fee and concessional rate of interest.

5. Green Infrastructure: Green infrastructure contains IT infrastructure (Data Centres), green buildings with sufficient natural lightening and air, produce electricity for their own usage and waste.

3.1.5. Opportunities of green banking in India:

A Green Bank requires each of its functional units and activities to be Green-environmentally friendly and help to improve environmental sustainability. Several opportunities are available for banks to go green their functional units and activities. Key among them is:



1. Supply Chain Management(SCM)

SCM is the management of the flow of goods and services. It includes the movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point-of-consumption. Interconnected or interlinked networks, channels and node businesses are involved in the provision of products and services required by end customers in a supply chain.

- Adopt techniques and plans to minimize inventory and wasted freight.
- Adopt networked design using a carbon foot print.

2. Enterprise Resource Management(ERP)

ERP is a category of business-management software, typically a suite of integrated applications that an organization can use to collect, store, manage and interpret data from many business activities, including product planning, purchase, manufacturing or service delivery ,marketing and sales, inventory management, shipping and payment.

- It facilitates paper less transactions.
- Adopt techniques for workforce and parts optimization as well as intelligent device management.

3. Customer Relationship Management(CRM)

Customer relationship management is an approach to managing a company's interaction with current and future customers. It tries to analyze data about customers history with a company, to improve business relationships with customers, specifically focusing on customer retention, and ultimately to drive sales growth.

One important aspect of the CRM approach is the systems of CRM that compile information

from a range of different communication channels including a company's website, telephone, email, live chat, marketing materials, social media, and more. Through the CRM approach and the systems used to facilitate CRM, businesses learn more about their target audiences and how to best cater to their needs.

4. Sourcing & Procurement:

In business, the term sourcing refers to a number of procurement practices, aimed at finding, evaluating and engaging suppliers for acquiring goods and services. Outsourcing is the process of contracting a business function to someone else select vendors for sustainability rating for their products, services and operations.

5. Product Life Cycle Management:

In industry, PLC is the process of managing the entire lifecycle of a product from inception, through engineering design and manufacture, to service and disposal of manufactured products.

- Design and offer banking products & services in such a way that consume less resources and energy and thereby reduce carbon foot print.
- Implement effective systems for product end- of- life management that have minimal impact on environment.

6. Green Banking Services

Banks are developing new products and services that respond to customers demand for sustainable choices. Following are some of the options that banks should offer to their customers:

- Electronic and mobile banking facilitates customers to perform most of their bank needs anytime, anywhere.
- Automatic payments reduce the need to write and send cheques by mail.
- Paperless statements, product information guides and annual reports to customers and stakeholders.
- Offering and promoting mutual funds that focus investment in 'Green' companies.
- Credit cards and debit cards can be used while making the payment of various expenses without carrying money.
- Mobile banking is used for performing balance cheques, account transactions,

payments, credit appliances etc., via mobile phone or Personal Digital Assistant (PDA).

3.1.6 Strategies for green banking approach:

Indian Banks can adopt green banking as business model for sustainable banking. Some of following strategies little reflected in their banking business or must be adopted by banks.

1. **Carbon credit Business (CBS):** All Nations must reduce greenhouse gases emission and reduce carbon to protect our environment. These emissions must be certified by Certified Emission Reductions commonly known as carbon credit.

2. **Green Banking Financial Products:** Banks can develop innovative green based products or may offer green loans on low rate of interest. As Housing and Car loan segments constitute the main portfolio of all banks so they adopt green loans facility.

3. **Paperless Banking:** All banks are shifting on CBS or ATM platform providing electronic banking products and services. So there is a scope for banks to adopt paperless banking. Private and foreign banks are using electronics for their office but in PSU banks are still using huge paper quantity.

4. **Energy Consciousness:** Banks have to install energy efficient equipment's in their office. Banks have to transform this green banking in hardware, waste management, energy efficient technology products. Banks can donate energy saving equipment to schools and hospitals.

5. **Mass Transportation System:** Banks have to provide common transport for groups of officials posted at one office.

6. **Social Responsibility Services:** Indian banks can initiate various social responsibility services like tree plantation camps, maintenance of parks and pollution check up camps. The Financial Times and International Finance Corporation (IFC) is a member of World Bank Group launched Sustainable Finance Awards for institutions that are integrating social, environmental and corporate governance into their business operations.

3.1.7. Approaches of green banking for sustainability development:-

- **Biswas (2011)** revealed some strategies for the adoption of environmental management in the banking sector:-
 - Banks should do **Environmental Impact Assessment (EIA)** in which they design the environmental system to evaluate the risk involved before investing in different projects.
 - They should adopt the **Annual Reporting System (ARS)** in which they prepare an annual report on environmental risk guidelines for every project they invest or finance.
 - They should adopt an **environmentally sustainable technology** which minimizes risk; saves cost and enhance the bank's reputation.
 - Banks should begin implementing procedures like [-
- According to **Dharwal & Agarwal (2013)**, Banks can change their routine operations through recycling programs, paperless banking, using energy efficient resources, and support for community events for reducing pollution and so on.
- **Ginovsky (2009)** suggested, Use of paperless banking which results in reducing the carbon footprint from internal banking operations and It also leads to saving cost to the bank because through automation they can avoid the cost of storage of paper and also the cost of courier vehicle fuel consumption and emissions and Adoption of Green Street lending, which means offering low rate of interest to consumers and businesses for installing solar energy systems and energy saving equipment's like solar hot water systems, highly efficient furnaces, heat pumps and replacement windows.
- Making IT **infrastructure** (including data centre) and physical infrastructure (including buildings) greener and taking initiatives so that a bank could itself generate electricity for its own consumption.
- Engage with key stakeholders and create awareness of environmental issues and

- their impact on the economy, the environment and the society.
- Set **SMART** (Specific, Measurable, Attainable, Realistic, and Timely) green goals as the internal targets to reduce carbon footprint along with timelines.
 - Conduct energy audits and review **equipment's purchases** and disposal policies.
 - Revise the **green policy** as required by monitoring the progress regularly; watch industry trends and new developments, Banks can focus on green buildings across its branches to implement ecological friendly practices.
 - Banks can support projects ranging from community clean-ups to **national initiatives** on climate change, water, air, biodiversity and more.
 - **Greening Processes, Products, Services, and Strategies:** Making day-to-day business operations, banking products and services greener by following simple practices and making them environmentally friendly.
 - Banks can introduce **green funds for customers** who would like to invest in environment friendly projects.

- To go online, use of **green credit card**, save paper use energy efficient equipment in organization level, issue green loan by thoroughly verifying the projects.

4. Conclusion

To conclude the green banking is must for the sustainable development of any country. Worldwide the sustainability should be ensured so as to protect our environment. Banks plays a vital role in protecting the environment from ill effects currently it faces by following green strategies as given above in the study. To sum up green banking requires a paradigmatic shift in thinking about economics, business and finance. Its success would be greater if the world governments started to revise their economic paradigms from being 'monetary economics' to 'ecological economics' and begin to transform their accounting principles from purely being financial into ecological/operational energy accounting patterns. To go online, use of green credit card, save paper use energy efficient equipment in organization level, issue green loan by thoroughly verifying the projects. This can contribute greatly to sustainable development.

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ELECTRONIC WASTE IN MODERN ERA**Dr. P.B. Biradar¹, Ravi Shiradonkar²**¹HOD, Commerce Department, Vasantnaik College, Nanded²Research Student**ABSTRACT**

Growth of Information and Communication Technology in all sector has enhanced the usage of the electronic equipment exponentially. Faster up-gradation of electronics product, are forcing consumers to discard old products, which in turn accumulate huge e-waste to the solid waste stream. E-waste is growing in India at the rate of 10%.

As the 21st century looms ahead, it is clear to see that it has advancements that humanity may never have dreamed of and one of these shining developments is the well-recognized computer. Having the Latin meaning of 'computing' or 'reckoning' the computer is an invention that was called the 'MAN OF THE YEAR' in a survey carried out by an international magazine.

The computer system is not a simple machine. It is like a very modern and highly complex calculator. It can do all the functions at a speedy rate and also helps us to search and progress in our homes and businesses. A computer can therefore be called a calculator with a twist for not only does it perform fast calculations, but it also has other special characteristics. The computer has thoroughly changed the way we witness things, with its special auto correcting tools, which work with all languages, all logic and all subjects.

There was a time when computers were only heard of as a luxury. However today they are an unavoidable part of success and development. No longer are they owned only through theft and by the filthy rich, in fact computers are and will in the coming days and months be used to accomplish the brilliant goals of success and unparalleled development. For example, in India, the accurate knowledge and use of computers will bring change in a big and astonishing way. It will lead to the demolition of illiteracy, and lead to optimism, efficiency, productivity and high quality¹.

Keywords: Electronic waste.

1. Electronic Waste

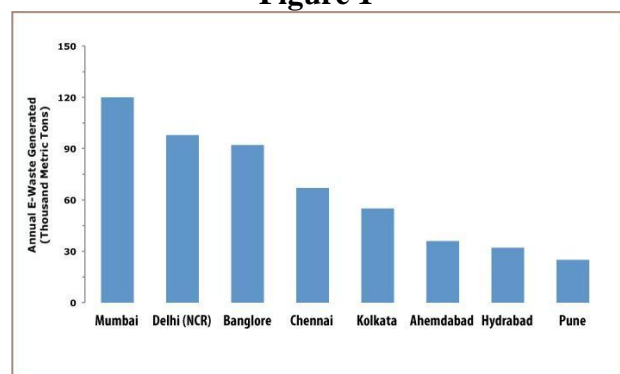
E-waste is emerging as a serious public health and environmental issue in India.^[1] India is the "Third largest electronic waste producer in the world"; approximately 2 million tons of e-waste are generated annually and an undisclosed amount of e-waste is imported from other countries around the world.

Annually, computer devices account for nearly 70% of e-waste, 12% comes from the telecom sector, 8% from medical equipment and 7% from electric equipment. The government, public sector companies, and private sector companies generate nearly 75% of electronic waste, with the contribution of individual household being only 16%.

E-waste is a popular, informal name for electronic products nearing the end of their "useful life." Computers, televisions, VCRs, stereos, copiers, and fax machines are common electronic products. Many of these products can be reused, refurbished, or recycled. There is an upgradation done to this E-waste garbage list which includes gadgets like smartphone, tablets, laptops, video game consoles, cameras and many more. India had 1.012 billion active

mobile connections in January 2018. Every year the number is growing exponentially.

According to ASSOCHAM, an industrial body in India the, Compound Annual Growth Rate of electronic waste is 30%. With changing consumer behavior and rapid economic growth, ASSOCHAM estimates that India will generate 5.2 million tonnes of e-waste by 2020.

Figure 1

Joon, Veenu; Shahrawat, Renu; Kapahi, Meena (September 2017). "The Emerging Environmental and Public Health Problem of Electronic Waste in India". *Journal of Health and Pollution*. **7** (15):1–7. doi:10.5696/2156-9614-7.15.1. ISSN 2156-9614. PMC 6236536. PMID 30524825.

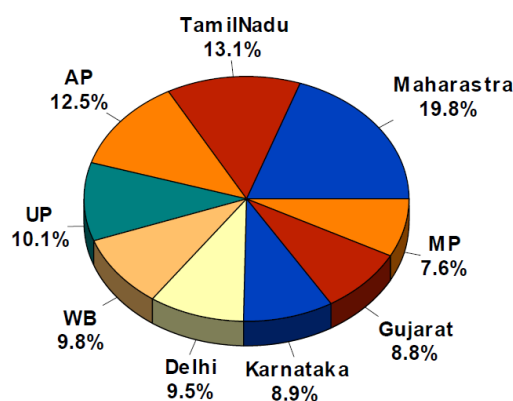
2. Sources of e-waste

Almost every used electronic items are considered as e-waste such as discarded cellphones, cameras, CD players, TVs, radios, drillers, fax machines, photocopiers, printers, toners, ink cartridges, batteries, re-chargeable batteries, digital calculators and clocks, CRT monitors, electric solders, computer mother boards, key board, industrial and house hold electronic machinery such as oven, fridge, sewing & washing machines, fan, air-conditioner, grinder, iron, heater, military and laboratory electronic equipment's, etc.

3. State and City wise Electronics Waste generation in India

In India, among top ten cities, Mumbai ranks first in generating e-waste followed by Delhi, Bangalore, Chennai, Kolkata, Ahmadabad, Hyderabad, Pune, Surat and Nagpur. The 65 cities generate more than 60% of the total generated e-waste, whereas, 10 states generate 70% of the total e-waste.

Figure 2



Electronic Waste and India, Dr. S. Chatterjee, Scientist-E Department of Information Technology Electronics Niketan, 6, C.G.O. Complex New Delhi-110 003, India.

4. Conclusion

Most of the e-waste is recycled in India in unorganized units, which engage significant number of manpower. Action Network is now working at their best to stop or control trans boundary e-waste movements, they also involved in conducting public awareness programs to enlighten the world community and opening research areas to find better methods or alternatives. E-waste differs from other streams of waste as it contains highly hazardous substances alongside valuable materials, as well as materials without current resale value. It is becoming an increasingly important resource for all economic units regardless of their size as well as for informal workers along the e-waste value chain who recover, repair, refurbish, reuse, repurpose and recycle UEEE, bring innovative services and products to the market and facilitate the transition to a circular economy.

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A FOCUS ON E-WASTE: EFFECTS ON HUMAN HEALTH AND ENVIRONMENT

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ABSTRACT

Today, e-waste, which is produced in enormous amounts by electrical and electronic gadgets, is a global environmental issue. E-wastes are thought to be dangerous because some parts of various electronic devices contain compounds that, depending on their density and circumstances, are hazardous. These materials' hazardous composition poses a threat to both the environment and human health. Its deadly compounds are combined with the soil, water, and air, posing harm to the biodiversity as a whole. The study's foundation is a survey of the literature on the subject of how electronic waste affects both the environment and human health. It was determined that there was a significant amount of e-waste generated without appropriate management practises. Furthermore, it has been proven that e-waste negatively affects both the environment and human health. E-waste, electrical and electronic equipment, or EEE, the environment, and human health are some index terms.

Keywords: Electronic, Pollution, E- waste, Environment, Human Health

1. Introduction

It's challenging to imagine a world without cell phones, GPS navigation systems, laptops, and other digital devices because technology has grown so swiftly in recent years. E-waste reduction has become a major concern for environmental activists, municipal and state governments, and even the United Nations due to the constantly growing amount of obsolete electronics being wasted. Electronic waste, also known as "e-waste," is increasingly a serious problem. India's waste management industry has a lot of space for expansion because currently only 30% of the country's recyclable garbage is recycled. A few of the many issues behind the nation's ineffective waste management include a lack of appropriate legislation for the collection, storage, and recycling, as well as outdated infrastructure.^[1]

E-waste, commonly known as "electronic garbage," is any abandoned electrical or electronic device. It is produced from the materials used in electronic devices used for data processing, including computers, computer hardware such speakers, keyboards, printers, etc., and such as CD players, DVD players, and televisions. Used electronics that will be recycled, resold, salvaged, or discarded are also regarded as e-waste^[2]. telephones, landlines, fax machines, and other communication devices, as well as domestic appliances such as a vacuum cleaner, a microwave, a washing machine, and an air

conditioner. India is the 5th position in the generation of e-waste. Source of E-waste is shown in Fig.1 and in Fig.2 shown in growth of E-wastes in India.

The scenario is concerning since India produces over 1.5 lakh tonnes of e-waste each year, and almost all of it ends up in the unorganised sector because there is currently no organised alternative. E-waste is responsible for 40% of the lead and 75% of the heavy metals discovered in landfills.^[3] E-waste has negative effects on human health in addition to the environment. Pollution and other environmental effects are thought to be responsible for about 23% of all deaths in the country.

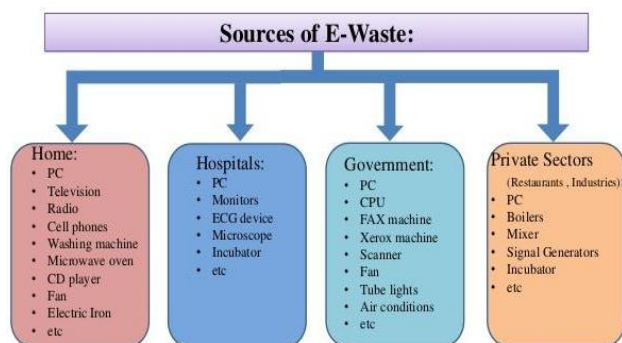


Figure-1



Figure-2

A) Health Impacts

Lead, cadmium, beryllium, and brominated flame retardants are only a few of the dangerous metals pollutants found in electronic equipment (see Table 1). Over 60% of e-waste is made up of metals like iron, copper, aluminium, gold, and other metals. Plastics make up approximately 30% of the garbage, while hazardous pollutants make up just about 2.80%. (10) Of the numerous harmful heavy metals, lead is the one that is utilised in electronic equipment the most frequently for a range of uses, posing a number of health risks owing to environmental contamination. [11] Lead gets into living things through food, water, air, and soil. Since children take more lead from their environment than adults do [12], their neurological system and blood are impacted, making them more susceptible to lead poisoning. It was discovered that the recycling of e-waste in China, one of the main e-waste destinations, has contributed to the increasing blood lead levels in children. [13] This was a result of the extremely rudimentary methods and procedures used during recycling activities. Numerous studies have documented the alarmingly high concentrations of hazardous

heavy metals and organic pollutants in samples of Guiyu, China's dust, soil, river sediment, surface water, and groundwater. Skin damage, headaches, vertigo, nausea, persistent gastritis, and stomach and duodenal ulcers were all common among the locals in the same places. [14] Further it was found that the blood lead levels of children were higher than the mean level in China, and there was no significant difference between boys and girls. [15]

E-waste recycling activities were discovered to be increasing the amounts of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/Fs) in both the environment and people. Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/Fs) were found in much higher concentrations in human hair, human milk, and placenta from the e-waste processing site than from the non-processing site. [16,17] Data on the effects of heavy metal exposure on humans in India are scarce. Many workers, including young children, are exposed to various e-waste disassembly tasks. Although the results of these studies cannot be applied universally to India, they are alarming enough to warrant replication in Indian workplaces. No information is provided regarding the effects of these employees on their health. They can be damaging their life because they lack the necessary information. In a different Chinese investigation, samples of human scalp hair were taken to determine the level of heavy metal exposure for workers at high-intensity e-waste recycling facilities. Metal concentrations of Pb, Cu, Mn, and Ba were found to be higher in exposed group hair than in control group hair. [18]

a. Sources of E-Waste and Effects on health & Environment :-

E-waste sources	Constituents	Health effects
Solder in printed circuit boards, glass panels, and gaskets in computer monitors	Lead	<ul style="list-style-type: none"> • Damage to central and peripheral nervous systems, blood systems, and kidney damage • Adverse effects on brain development of children; causes damage to the circulatory system and kidney
Chip resistors and semi-conductors	Cadmium	<ul style="list-style-type: none"> • Toxic irreversible effects on human health

		<ul style="list-style-type: none"> • Accumulates in kidney and liver • Causes neural damage
Relays and switches, and printed circuit boards	Mercury	<ul style="list-style-type: none"> • Chronic damage to the brain
		<ul style="list-style-type: none"> • Respiratory and skin disorders due to bioaccumulation in fishes
Galvanized steel plates and decorator or hardener for steel housing	Chromium	<ul style="list-style-type: none"> • Causes bronchitis
Cabling and computer housing	Plastics and PVC	<ul style="list-style-type: none"> • Burning produces dioxin that causes reproductive and developmental problems
Electronic equipment and circuit boards	Brominated flame-retardants	<ul style="list-style-type: none"> • Disrupt endocrine system functions
Front panels of CRTs	Barium, phosphorus, and heavy metals	<ul style="list-style-type: none"> • Cause muscle weakness and damage to heart, liver, and spleen
Copper wires, Printed circuit board tracks.	Copper	<ul style="list-style-type: none"> • Stomach cramps, nausea, liver damage, or Wilson’s disease
Nickel–cadmium rechargeable batteries	Nickel	<ul style="list-style-type: none"> • Allergy of the skin to nickel results in dermatitis while allergy of the lung to nickel results in asthma
Lithium-ion battery	Lithium	<ul style="list-style-type: none"> • Lithium can pass into breast milk and may harm a nursing baby
		<ul style="list-style-type: none"> • Inhalation of the substance may cause lung edema
Motherboard	Beryllium	<ul style="list-style-type: none"> • Carcinogenic (lung cancer)
		<ul style="list-style-type: none"> • Inhalation of fumes and dust causes chronic beryllium disease or berylliosis

Table 1: Various e-waste sources, their constituents and health impacts

B) Public health, Environment, and E-Waste:-

E-waste disposal is becoming a global public health and environmental concern, as electronic waste has become the world’s fastest-growing portion of the conventional municipal solid waste stream. E-waste is any electronic or electrical device that has been thrown, surplussed, obsolete, or broken. The majority of discarded electronic gadgets are kept in households because people do not understand how to dispose of them properly. This ever-increasing trash is extremely complicated in nature, and it’s also a rich source of commodities such as gold, silver, and copper that may be recovered and reintroduced into the manufacturing process. The global e-waste

management segment was worth \$49,880 million in 2020 and is expected to grow at a CAGR of 14.3% from 2021 to 2028, to reach \$143,870 million by 2028 – according to research conducted by allied market research. The market growth for rare metals, coupled with their rarity, has led to a sharp increase in their price.

In 2021, an estimated of 57.4 Mt of e-waste was generated globally. According to estimates in Europe, where the problem is best studied, 11 of 72 electronic items in an average household are no longer in use or broken. Annually per citizen, another 4 to 5 kg of unused electrical and electronic products are hoarded in Europe prior to being discarded. ^[23]

In 2021, less than 20 percent of the e-waste is collected and recycled. [24]

Source of e-wastes components	Constituent	Environmental effects
Electronics which includes wires, blenders etc	Copper	<ul style="list-style-type: none"> ● Open air burning which can release hydrocarbons into the air. ● Hydrocarbons can contribute to the greenhouse gas effect
Mobile phone and computer batteries	lead, barium, mercury, lithium	these heavy metals leach through the soil to reach groundwater channels which eventually run to the surface as streams or small ponds of water
Computer monitors	lead, arsenic, and cadmium	electronics are thrown in landfills, these toxins may leach into groundwater and affect local resources
Cathode ray tube used in TVs, ATM and video camera	Lead, barium and other heavy metals	these heavy metals leaching into the ground water and release of toxic phosphor
Chips and other gold plated components	Brominated substance, tin, hydrocarbons, heavy metals	Rivers acidifying fish and flora, contamination of surface and groundwater

Table-2 Effects of e-waste components on environment

C) Research on E-Waste Management:-

To evaluate the current state of India's e-waste management system, to determine the precise scope and amount of the issue in Indian cities, and to build links with the unofficial recycling industries, many more environmental epidemiology studies are needed. These studies will produce useful information that will aid in creating an e-waste management action plan. India needs to start monitoring diseases and the effects of e-waste on human health. The collection and recycling mechanisms must be improved in order to guarantee the sustainability of e-waste management systems. Establishing public-private partnerships would be ideal when opening buy-back or drop-off locations. Another method for guaranteeing the sustainability of waste management is to charge upfront recycling fees. [25]

Finding the best e-waste management technologies worldwide and successfully implementing them might be essential for a sustainable, futuristic growth. Many nations have adopted the Restriction of Hazardous Substances (RoHS) Regulations in the manufacture of these items in order to reduce the use of hazardous materials in electronic and

electrical equipment and to encourage the use of safer alternatives. There should be an increasing number of these safer alternatives that can be employed in electrical devices.

2. Suggestion

1. Don't throw the waste cell phones, dumped systems into the landfills. Properly, deliver them to the organizations where recycling is carried out.
2. Get the electronic goods from the vendors who can take back for recycling.
3. Take care of the lifetime of your hardware equipments and so that e waste can be efficiently decreased
4. Big Industries may buy recyclers that can be used for long time.
5. Citizens should turn their interests to use the recycled products
6. Support green engineering.

In industries management of e-waste should begin at the point of generation. This can be done by waste minimization techniques and by sustainable product design. Waste minimization in industries involves adopting:

- inventory management,
- production-process modification,
- volume reduction,

□ recovery and reuse.

3. Conclusion

E-waste are everywhere in our society at local and international level. It's caused by their irregular management. It needs reduced and reuse of the environmental impacts of technological artifacts by increasing their life spans and thereby reducing the demands for new equipments.

One of the world's most serious environmental challenges is the toxic nature of e-waste. The issue is getting worse due to the rising volume of e-waste brought on by a lack of knowledge and the necessary skills. There is an urgent need to develop a preventive strategy in

relation to the health risks of handling e-waste among these workers in India because a large number of workers in this country are involved in the crude dismantling of these electronic items for their livelihood and their health is at risk. These employees should receive the necessary training on the safe management of e-waste and personal safety.

There are various technical options for managing e-waste, but before they can be used in the management system, certain criteria must be met. These include legislation, a collecting system, logistics, and labour. This may require operational research and evaluation studies.

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EFFECT OF CLIMATE CHANGE ON AGRICULTURE**Ashwin N. Jadhao¹, Kunal N. Jadhao²**¹ Research Fellow, Matoshri Jr. College, Mahagaon, Yavatmal. (M.S), India² G.S. Gawande College, Umarched, Yavatmal (M.S), IndiaEmail: ¹ashwin.jadhao.89@gmail.com**ABSTRACT**

Climate change and agriculture are interrelated processes, both of which take place on a global scale. Climate change affects farming in a number of ways, including through changes in average temperatures, rainfall, and climate extremes (e.g. heat waves), changes in pests and diseases, changes in atmospheric carbon dioxide and ground - level ozone concentrations, changes in the nutritional quality of some foods and changes in sea level. Climate change is already affecting agriculture, with effects unevenly distributed across the world. Future climate change will likely negatively affect crop production in low latitude countries, while effects in northern latitudes may be positive or negative. Climate change will probably increase the risk of food insecurity for some vulnerable groups, such as the poor.

Climate change will impair farm production in many poor countries and regions. The accelerating pace of climate change, combined with global population and income growth, threatens food security everywhere. Agriculture is extremely vulnerable to climate change. Higher temperatures eventually reduce yields of desirable crops while encouraging weed and pest proliferation. Pests management become less effective, meaning that higher rates of pesticides will be necessary to achieve the same levels of control. Heat waves can cause extreme heat stress in crops, which can limit yields if they occur during certain times of the plants' life - cycle (pollination, pod or fruit set). Heavy rains that often result in flooding can also be detrimental to crops and to soil structure. Most plants cannot survive in prolonged waterlogged conditions because the roots need to breathe. The overall impacts of climate change on farming are expected to be negative, threatening global food security.

Keywords: Climate change rainfall, Co2 Temperatures, Crop Production heat stress

1. Introduction

As the scientific consensus grows that forceful climate change, in particular, increased precipitation and temperatures, is very likely to appear over the 21st century economic research has attempted to measure the possible effects of climate change on society. Due to universal climate change, one of the biggest effects is expected to be on agriculture and many impacts also expected. Agriculture production is directly dependent on weather and climate change. Possible changes in rainfall rates, change in temperature and CO₂ concentration are expected to significantly impact crop growth. Worldwide food production is considered to be little cautious with successful adaptation and adequate irrigation due to brunt of climate transformation (IPCC 1998). Global agricultural production should be promoted because of doubling of the CO₂ fertilization effect. Agriculture will also be impacted due to climate changes imposed on water resources (Gautam 2007). In north - western India, there is now a great problem about deterioration in soil fertility, promote salinity, change in the water table, degradation of irrigation water

quality and defiance many pesticides (Sinha et al. 1998 ; CGWB 2002 Northern Asia as well as Central Asia has been found increase in rainfall. Changes in both crop yields and requirement for irrigation water under short term climate scenarios are estimated through simulation models and this tool is also used for estimating likely effects of climate on crop yields. Small - scale farmers face a series of challenges, to which climate change will be risk multiplier. They include poor natural resource management (especially of water and land), limited land tenure security.

2. Methodology

Data and sampling design: The study is based on climatic and socio - economic data. Data of climatic variable like temperature and precipitation was obtained from Indian metrological department for the last twelve years (1999 to 2010). Unlike similar studies, we used annual climate data only and not monthly or seasonal data due to the small size and geographical location of the studied area and lack of significant variation in climate conditions over. The use of monthly or seasonal climate data led to high multi co- linearity in

the regression analysis. As a result almost all the monthly or seasonal climate variables were not found to be significantly different from zero. temperature and precipitation data was collected These seasonal definitions provided us the best fits of the data. On the other hand, data on desired socioeconomic aspects was collected from three districts and ten tehsils of arid region. A total of twelve villages were selected randomly from different agro - ecological settings of the arid region and were believed that they are the best representative of the whole region. Ten observations were made from each village. Villages were selected so that there was a differentiable variability in climatic conditions, i.e. temperature and rainfall in each village and also the prevailing agriculture techniques, crops and soils etc. Three type of farm size / type : small, medium, large were chosen for data collection. Survey contained the information such as household size, years of education, size of farm, type of soils, cost of inputs, wage rate, area under plantation, machinery used, crop yield, income and expenditure. Data was collected using a structured and detailed questionnaire. The research objectives were translated into questions. Detailed questions about farm revenue, farm costs, income and expenditures of the respondent were designed and asked. Data was collected by conducting a face - to - face survey among a representative sample of farmers. Questionnaire was designed in English language but communication with the farmer was done in local language for the ease of the farmers and exact reply was noted down instantaneously the data provide us with a relatively high quality measure for the dependent variable i.e. net crop revenue for each household and also some of the dependent variables.

3. Climate Change Affects on Agriculture In Different Ways As

1. Temperatures -

The net revenue affect certainly at a level through temperature or precipitate which is more harmful for the crops. In warmer climate some crops are growing faster and leading to high production and incomes. But when the temperature is vet low or high and prolonged, it

would be harmful for production (Mendelsohn et al. 1994). The temperatures in high mountain areas go down to extremely low in dry seas

2. CO₂ -

(Keeling et al. 1995) reported that the concentration CO₂ was 280 ppm in 1850 (pre - industrial period) SteadyState and also conclude that concentration of CO increasing at an estimation of 1.5 to 1.8 ppm in every y The CO₂ concentration would be doubled in year 2100.

3. Crop production and Livestock -

Dry season below temperatures would slow down or even damage crop growth that will decline crop production. The brunt trend of the average annual enthusiasm to the net income is dependent on seasons ; the marginal could be decisive or either adverse show that a 10C increase in temperature reduces wheat production by 4 to 5 percent. A report of the (IMF 2017) founds that for rising market economies a 10C rise in temperature would decrease agricultural production by 1.7 %. and a 100 millimeters decrease in rain would reduce growth by 0.35 %. Animals are also harmed due to climate change as well as harmful for the production of aquatic species (Mishra 2014). Livestock would be impressed in 2 steps due to climate variation : the amount and quality of forage from steppe may be damaged and there may be a direct impact on livestock due to greater temperatures (Richard et al. 1998). (Adams et al. 1998) reported that under

4. Water -

The water cycle will also be affected by climate change Also, increase in sea level will boost the hazard of stable or seasonal saline interference into groundwater and rivers which will have effects on the nature of water and its likely use of domestic, industrial and agricultural uses. Climate change will have several effects on agriculture (Gautam HR et al. 2012). There is now a great worry about a decline in soil fertility, raising salinity, change in the water table, degradation of irrigation water quality and resistance to many pesticides in north - western India Additional tortuous effects may increase from shift in runoff and groundwater recharge rates. which disturb water supplies, and changes in capital or

technological requirements such as irrigation methods and surface water storage

5. Soil

Agriculture in India is assumed to have a negligible effect on the overall increase in the number of greenhouse gases. This is attributable to the minimal use of fertilizers and low soil fertility levels in the country (Khan et al. 2009). Change in frequencies, types, and intensities of various livestock pests and crops ; the availability and limit of irrigation water supplies ; and the harshness of soil erosion changes because of climate change Due to extreme and unsuitable weather conditions in India, there exist high chances of soil infertility leading to a decline in the quantity and quality of the crop. Change in climate will affect the groundwater recharge, soil moisture, and frequency of drought or flood, and groundwater level in different areas. Increased soil temperature may also lead to an increase in autotrophic CO₂ losses from the soil caused by root respiration, root exudates, and fine - root turnover.

4. Conclusion

From the above it is clear that the occurrence of foods and droughts heat and cold waves are common across the world are common across the world due to climate change Their adverse Impact on likelihood of farmers is tremendous It is more so in India as our Economy is more dependent on agriculture. Interestingly, weather extreme of apposite in nature like cold and head waves and floods and droughts are noticed with in the same year over the same region or in different regions and likely to be heavy whole climates change is associated with increasing greenhouse gases and human include aerosols and the imbalance between them.

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THE CORROSION IN METALS AND ALLOYS: ITS TYPES, IMPACTS AND METHODS TO CONTROL IN INDUSTRIES AND CONSTRUCTION SITES.

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ABSTRACT

Corrosion in metals and alloys leads many problems which includes economical, health related and security related. The reason for corrosion in metals and alloys are various including physical, chemical, etc. To avoid the losses due to corrosion we can adopt selective methods and Techniques to prevent metals and alloys from corrosion are suggested in this paper.

Keywords: Corrosion, Metals and Alloys, Soil Corrosion, impact of Corrosion, Corrosion Inhibitors, Rusting, Types of Corrosion

1. Introduction

Corrosion is a natural phenomenon found in surroundings. All natural processes tend to the lowest conceivable energy states, much like water flows to the lowest level. As a result, certain chemical elements, including iron and steel, have a propensity to join with one another in order to get back to respective lowest energy stages. Steel and iron frequently combine with oxygen and water, most of which are present in most natural habitats, to form hydrated iron oxides (rust), which are chemically similar to the original iron ore. This process is done in order to return to lower energy states. Figure 1 illustrates the corrosive environment life cycle of a steel product.

There are several ways to characterise corrosion. Some definitions are relatively narrow and cover many different types of corrosion, while others are fairly specialized and deal with a particular type of corrosion. The broad meaning of corrode is to eat into or wear away steadily, as if by chewing, and comes from the Latin *corrodere*, which means "to gnaw to pieces"¹. For these reasons, corrosion can be described as a chemical or electrochemical reaction among a material a metal—and its surroundings that results in a degradation of the material and its qualities. The entire area in contact with the material is referred to as the environment.

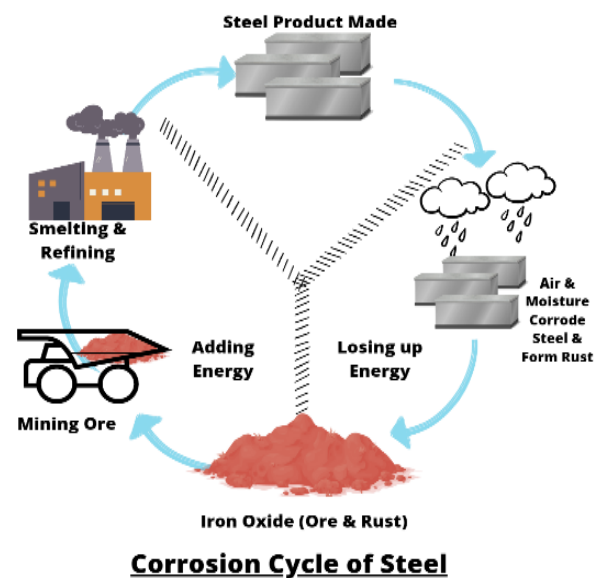


Figure 1: Corrosion Cycle of Steel

The following are the main components that make up the environment:

- Physical states include: (a) gas, (b) liquid, and (c) solid;
- Chemical states include: (a) components and (b) concentrations; and
- Temperature: High and Low

In some circumstances, additional elements may be crucial. The relative speed of a solution (due to flow or agitation) and mechanical loads on the substance, including residual stress inside the substance, are a few of examples of these variables. Aqueous corrosion, or corrosion in situations with water, is the focus of this article. However, the definition of corrosion provided here includes the

degradation of materials caused by a reaction with heated gases. As a result of the metal's interaction with the environment, corrosion refers to the deterioration of a metal. When a pier piling is described as being subject to marine corrosion, it signifies that the steel piling corrodes as a result of its interaction with the sea environment. There is seawater that has been saturated with air. The seawater's chemical composition as well as its temperature and velocity at the piling surface can be used to further describe the environment^{2&3}. It's important to think about a material combination and environment while discussing corrosion. Without knowing the environment to which the material will be exposed, the corrosion behaviour of the material cannot be defined. Similar to this, it is impossible to ocalizedze how corrosive or hostile an environment is without first knowing what kind of material would be subjected to it³. In conclusion, a material's corrosion behaviour depends on the environment to which it is exposed, and an environment's corrosivity depends on the material exposed to it.

The identification of both natural and artificial combinations in corrosion is helpful. Nickel in caustic surroundings, lead in water, and aluminium in atmospheric exposures are a few examples of natural or desired combinations of substance and environment. The interaction of the metal with the environment in these conditions typically does not cause detrimental or expensive corrosion concerns⁴. The blend makes sense in order to offer effective corrosion service. On the other hand, unnatural combinations create considerable corrosion problems to the metal as a result of exposure to an unfavourable environment. Unnatural pairings include lead with wine, stainless steel in chloride-containing environments, and copper in ammonia solutions (acetic acid in wine attacks lead)^{4,5,6}. It has been suggested that a corrosion issue, notably the storage of wine in lead-lined vessels, had a role in the demise of the Roman Empire.

Lead poisoning, caused by the Roman leadership consuming lead-contaminated wine, led to insanity and ultimately to their collapse. Another narrative about lead and alcohol originates from Benjamin Franklin's time.

Franklin wrote to a friend about one symptom, which was the "dry bellyache" with associated paralysis. Ingestion of lead from corroded lead coil condensers used to make brandy was the actual cause of this illness. Due to the severity of the issue, the Massachusetts government issued a statute banning the use of lead in the manufacture of alcoholic beverages in the late 1700's.

2. The Effects of Corrosion-

Corrosion has a direct impact on the usable service life of our assets, but it also has indirect consequences on our daily lives since it costs money to make and supply goods and services, which producers and suppliers then pass on to customers. At household, it's simple to spot rust on tools and weapons, charcoal grills, garden furniture, and vehicle bodies panels. Corrosion is prevented on such devices through preventative maintenance like coating. To replenish the corrosion inhibitor that prevents cooling system corrosion, automotive radiator coolant should be changed every 12 to 18 months⁷. All major home appliances, including water heaters, furnaces, ovens, washers, and dryers, have corrosion protection built in. The effects of corrosion on our life while travelling from house to work or school are significantly more severe. The corrosion of steel reinforcing bar (rods) in concrete can occur out of sight and suddenly (or appear to do so) end up causing failure of a highway section, the breakdown of electrical towers, and damages to buildings, parking structures, bridges, etc., resulting in major repair costs and attempting to put public safety at risk. For example, the 1967 unexpected collapse of the Silver Bridge over the Ohio River in Point Pleasant, hence due to corrosion fatigue claimed 46 lives and cost millions of dollars⁸. Corrosion in industrial plants, such chemical or electrical power plants, is undoubtedly the most hazardous of all. Corrosion can and can rise to plant closures. One of its innumerable direct and indirect effects would be this.

Some consequences are economic, and cause the following:

- Replacement of damaged equipment.
- Excessive design to accommodate corrosion.

- Preventative maintenance, such as painting.
- Equipment shutdown due to corrosion failure.
- The product contamination leads to permanent loss in it's working.
- Efficiency loss, such as when excessive design and corrosion products slow down the rate of heat transfer in heat exchangers.
- Loss of valuable products, such as those from corroded containers.
- Unable to use materials that would otherwise be desirable.
- Equipment damage close to the place in which corrosion problem arises.

Still other consequences are social. These can involve the following issues:

- Safety- For example in the case, a sudden failure in safety might also results in a fire, an explosion, the leakage of poisonous substances, or the collapse of a construction.
- Health- For example, pollution produced on by corroded equipment's leaking product or by the corrosion product itself could be harmful to one's health.
- The Depletion of natural resources, including metals and the fuels used to producing them
- Corroded material has an unpleasant visual appearance.

Of course, each of the social issues mentioned above has an economic component as well. It is obvious that there are numerous reasons to desire to prevent corrosion.

3. The Different Forms of Corrosion-

There are various distinct types of corrosion. Typically, classification is based on one of three criteria:

- Nature of the corrodent: Corrosion can be categorized as "wet" or "dry," with the former involving a liquid or moisture while the latter typically involving a reaction with high-temperature gases.
- Corrosion mechanism: Either electrochemical or direct chemical reactions are involved.
- Expression of the corroded metal: Corrosion can be ocalized, in which case only a small region is damaged, or uniform,

in which case the metal corrodes at the same rate throughout the entire surface.

Classification by appearance is based on detecting corrosion types through visual inspection with either the unaided eye or magnification, which is particularly beneficial in failure analysis. Attack morphology serves as the foundation for classification. Schematic representations of some of the most prevalent types of corrosion are shown in Figure 2.

On the basis of the way the corroded metal appears, eight different types of moist (or aqueous) corrosion can be distinguished. Which are:

- General or uniform corrosion
- Pitting corrosion
- Crevice corrosion, such as filiform corrosion, poulitice corrosion, and corrosion below tubercles or deposits
- Galvanic corrosion
- cavitation erosion
- Hypersensitivity and exfoliation are examples of intergranular corrosion.
- Dealloying, which includes graphitic corrosion and dezincification
- Environmentally induced cracking, such as hydrogen damage, corrosion fatigue, and stress-corrosion cracking

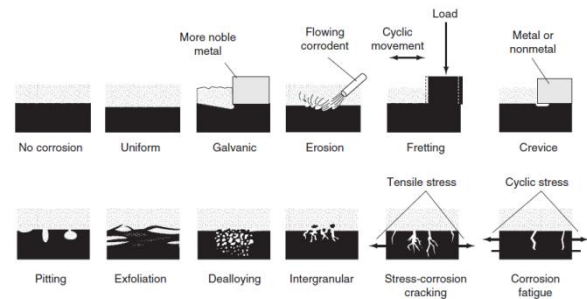


Figure 2: General types of Corrosion

The eight types of corrosion are all clearly distinct in theory, but in practice, certain incidences of corrosion fall into more than one category. The eight categories do not however seem to be a good fit for other corrosion scenarios. However, the research of corrosion issues can benefit greatly from this classification scheme. Further differentiation between locally microscopic attack and locally localised corrosion is necessary for completion⁹⁻¹¹. In the second scenario, trace amounts of metal are dissolved, and significant

harm can be done before the problem is noticeable to the unaided eye. Greater portions of corroded metal are impacted by macroscopic forms of corrosion, which can typically be seen with the bare eyes or with the help of a low-power magnifying instrument. Localized corrosion is categorised in Figure 3 into macroscopic and microscopic types.

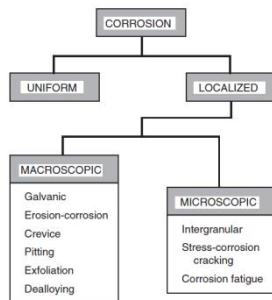


Figure 3: Forms of Localised Corrosion.

4. Corrosion Control Techniques-

There are five main techniques for the control of corrosion:

- Preference to Material-
- Paint coating
- Inhibitors
- Cathodic protection
- Design

Each is described briefly here in this article.

5. Preference to Material-

Every metal and alloy have its own distinct and inherent corrosion behaviour, which can range from the high corrosion resistance of noble metals like gold and platinum to the low corrosion resistance of active metals like sodium and magnesium. Additionally, a metal's ability to resist corrosion is highly dependent on the environment to which it is exposed, including the chemical composition, temperature, velocity, and other factors. The environment's corrosivity, a material's resistance to corrosion, and the rate of corrosion all typically have the following relationships:

$$\frac{\text{corrosivity of environment}}{\text{corrosion resistance of metal}} \approx \text{rate of corrosive attack}$$

As the corrosivity of the environment rises, corrosion rate will increase for a given corrosion resistance of the material. The rate of corrosion lowers as the material's corrosion

resistance rises for a given level of environmental corrosivity. The problem is to balance the corrosion resistance of the material with the environment's corrosivity to be at or below the predefined corrosion rate, which is frequently predetermined¹². Choosing the material for a given service often involves comparing the costs of the many candidate materials because there are frequently multiple competing materials that might meet corrosion requirements. When choosing an alloy, corrosion resistance is frequently just as crucial to take into account as its mechanical capabilities. A typical corrosion problem remedy involves replacing the deteriorated alloy with one that has higher corrosion resistance.

6. Coatings

There are two main categories of coatings for corrosion protection: metallic and nonmetallic (organic and inorganic). The purpose with either kind of coating is the same: to protect the underlying metal from corrosive agents.

Metallic Coatings-The idea of treating an active metal with a more noble metal makes use of the noble metal's higher corrosive resistance. Tin-plated steel is an illustration of this application. However, a more active metal can be used, in these conditions the substrate gets corroded preferentially or as a sacrifice¹³. Galvanized steel is an example of this system because the sacrificial zinc layer corrodes preferentially and safeguards the steel.

Organic Coatings- To separate the metal from the corrosive environment is the main purpose of organic coatings in corrosion protection. The organic coating may include corrosion inhibitors in addition to creating a barrier layer to combat corrosion. For a certain product or service situation, there are numerous organic coating compositions as well as a wide range of application procedures to choose from^{12,13}.

Inorganic coatings- Included in this are glass coatings and linings, chemical-setting silicate cement linings, porcelain enamels, and other corrosion-resistant ceramics. Inorganic coatings for corrosion applications function as barrier coatings much like organic coatings do. For applications requiring resistance to wear

and heat, some ceramic coatings, like carbides and silicides, are adopted^{13&14}.

7. Inhibitors

Other chemical species prevent corrosion in the same way that other chemical species (like salt) promote corrosion. Common inhibitors include chromates, silicates, and organic amines. Inhibition mechanisms can be quite complicated. The inhibitor is adsorbed on the anodic and cathodic sites in the case of the organic amines, which inhibits the corrosion current. Other inhibitors only have an effect on the cathodic or anodic process, respectively. Others encourage the development of shielding coatings on metal surfaces¹⁵. In closed systems, where the requisite inhibitor concentration can be more easily maintained, the use of inhibitors is preferred. The use of cooling towers has increased, which has sparked the creation of innovative water-treatment and inhibitor packages to prevent corrosion and biofouling. Inhibitors can be used as a protective coating's primer or as a coating itself. When the coating has a flaw, the inhibitor leaks out and stops the corrosion¹⁷⁻¹⁹.

8. Cathodic Protection

Cathodic protection inhibits the corrosion current from damaging a corrosion cell and directs it toward the metal structure that has to be protected instead. Corrosion or metal disintegration is thus avoided. Two application techniques, which differ depending on the source of the protective current, can be used to accomplish cathodic protection in practice²⁰. A power source is used in an impressed-current system to drive current from inert anodes to the target structure for protection. In a sacrificial-anode system, the cathodic-protection current is supplied by active metal anodes linked to the structure, such zinc or magnesium.

9. Design

The rational design principles can be used to overcome many corrosion issues and drastically cut down on the time and money needed for corrosion maintenance and repair. The corrosion frequently takes place in dead gaps or cracks where the corrosive medium becomes more corrosive. During the design phase, these spaces can be minimised or

avoided. The components can be designed to function at stress levels below the cracking threshold where stress-corrosion cracking is a possibility. Design can ensure optimum interchangeability of crucial components and standardisation of components where corrosive damage is anticipated²¹. The quantity of components that must be stocked is decreased via interchangeability and part standardisation. It is possible to plan ahead for maintenance and repairs and to offer simple access. Additionally, redundant equipment is placed for major components that are essential to the overall operation, like primary pumps or sizable fans, to allow maintenance on one unit while the other is in operation. A few examples of rational design concepts are these procedures.

10. Opportunity for Corrosion Control-

Users, manufacturers, and suppliers have a lot of options thanks to corrosion's enormous expenses. Opportunities exist to lower the costs associated with corrosion, the likelihood of failure, and to create new, bigger markets. Table 1 gives examples of these opportunities as well as the ways to put a plan in place to take advantage of them. Corrosion costs vary greatly amongst industries, however in the majority of sectors, significant savings are possible^{22,23}. Any cost-reduction effort must start by determining and quantifying the current costs of corrosion. Priorities can be set and the most fruitful cost-reduction projects pursued based on the study of the current state of corrosion control in the industry and also from this analysis²⁴.

In the producer's facilities and in its products, corrosion failure risk can be reduced. It is possible to evaluate both processes and goods to find the potential corrosion failure points. Once it has been discovered, the risk of failure can also be assessed from the viewpoint of how it will affect safety, product responsibility, how it will avoid regulation, and how it will impact goodwill^{25,26}. In cases where the risks are excessively high, technical adjustments can be made to minimize the risk. Evaluation might also point out areas where the industry needs to make technological advancements.

Opportunity	Examples	Implementation
Reduce corrosion costs	Lower maintenance and repair costs Extended useful lives of equipment and buildings Reduction of product loss from corrosion damage	Identify all corrosion costs by review of total processes, equipment, and buildings Quantify corrosion costs Implement plan to reduce costs
Lower risk of failure	Safety Product liability Avoidance of regulation Loss of goodwill	Review process and products for exposure to risk Evaluate risk and consequences of failure Lower exposure by technology change
Develop new and expanded markets	Coatings Alloys Inhibitors Corrosion monitors	Apply emerging technology Develop competitive advantage by more corrosion-resistant product Transfer existing technology to other industries

Corrosion-resistant products have a competitive edge thanks to rising consumer

awareness of the problem. Advances are being made in all corrosion control techniques, including material selection, coatings, inhibitors, cathodic protection, and design, through the application of current or developing technology to goods or services. The application of current technology to many industries offers market prospects.

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FISH NUTRIENTS IMPORTANCE AND THEIR IMPACT ON HUMAN LIFE**Ek Nath Pawade¹, Anil Shinde², Hanumant Jagtap³**^{1,2,3} PG Department of Zoology & Research Center, Shri Shivaji College, Parbhani (MS), India
Email: ¹pawade1nath999@gmail.com**ABSTRACT**

Fishes are good source of aquatic food. They have rich sources of macronutrients and micronutrients like proteins, lipids, vitamins and minerals. Fish food well balanced content of essential nutrients. Fish Portions contains immunoglobins that function as a defence mechanism against viral and bacterial infections. Fatty acids large sources of PUFAs in fish these useful in prevention of cardiovascular diseases and neural disorders. Iron helps in haemoglobin formation and helps to avoid anaemia. Selenium is essential for thyroid gland function. Calcium and vitamin D found naturally in fish help to avoid rickets and osteomalacia. Vitamin A helps in the maintenance of normal eyes and an immune system. In the present review suggested fish food is rich sources of macro and micro elements they also have a lot of benefits in the health of human.

Keywords: Fish Nutrients, Human Life

1. Introduction

India has a lengthy coastline around 8118 km and an economic zone of approximately 2.02 million sq. km. India's fishing industry provides a source of income for an economically backward populations of the country (Economic Review, 2016). So far, research in India on the use of excess fish has mostly focused on the manufacturing of fish meal. Fish is an important component of human diet (Tacon 2013). More than 50% of the Indian population consumes fish and in some states like Assam, West Bengal, Orissa, Goa, Kerala and other North-Eastern states more than 90% of the population consume fish (Das *et al.*, 2021). Fish nutrients are the substances that nourish the body, promote growth, maintain and repair body parts (Balami *et al.*, 2019). Nutrients can be divided into micro and macro nutrients, which both are energetic for good health. Macronutrients are portions, lipids, vitamins and very low amounts of carbohydrates, as well as numbers of micronutrients like zinc, selenium, iron calcium, phosphorus and copper. Selenium and zinc are trace elements. Fish is not only a good source of food, but it also has a high nutritional content, has played an important role in giving nutrients to several animals and peoples. Eating fish on a regular basis can also help avoid heart disease. It has been suggested that the longer lifespan of Japanese and Nordic populations they include lot of fish and seafood in the diet (Mohanty *et al.*, 2019). Fish oil also show

beneficial effects on the skin (Wolters 2005). Nutrition experts advise eating fish at least 2-3 times every week. Fish oil help to avoid a variety of health issues, ranging from mental disease to blindness (Parletta 2019). The health advantages of eating fish are becoming more well recognised. A study of the literature found a lot of information about the nutritional application of fish for human health. The purpose of this research is to provide information on the nutrients found in fish and their advantages to human health. Different nutrients found in fish each play a specific and vital role in human health. The information in this paper can be help people understand the advantages of eating fish and its nutritious value. It can also raise awareness of the nutritional value of fish in the prevention of various disorders.

2. Proteins

Fish is an rich source of quality proteins and it has greater effect than other sources terrestrial proteins, like meat and chicken. The unit cost of production of fish is much cheaper as comparison to the other sources of dietary proteins of animal origin. Animal protein not economically available to all people but fish proteins wide range of prices making it affordable to the common man. Because he has the option to choose from a fairly large number of fish species available. Fish proteins provides with 1/3 to 1/2 of one's daily protein requirement. Fish protein is mainly responsible for building and repairing muscle tissues,

improving immunity and blood quality (Mohanty 2019). Fish Proteins play the most significant role from the nutritional point of view. They provide important amino acids which are improves the overall protein quality of a mixed diet. They include essential amino acids such as tryptophan, cystine, lysine, methionine, and threonine which improves the digestibility. Aquatic protein contains essential amino acids and peptides much more than terrestrial meat protein such as lysine and methionine (Tacon & Metian, 2013; Pal *et al.*, 2018). If one or more of these essential amino acids are absent or in the intake diet, may lead to improper or no utilization of protein. As a result, it will Protein deficiency can cause stunted growth and development in children or loss of muscle mass in adults, fatigue, and nutritional edema, and even might be life threatening (Roy & shaikh, 2018). some other amino acids and particularly taurine, found especially in fatty fishes including sardines, plays beneficial role in limiting the complications of type 2 diabetes and decreasing glucose, insulin and insulin resistance (Madani *et al.*, 2012). Fish has health benefits with its high-protein, low-fat content. In particular, white-fleshed fish, is lower in fat than any other source of animal protein, and oily fish are high in omega-3 fatty acids. Since the human body must supply these essential nutrients, fish are an important part in the diet.

3. Fatty acid

Fats play significant role in hormone synthesis, circulation of vitamins and providing energy. There are mainly three types of fatty acids saturated fatty acids, monounsaturated fatty acids and polyunsaturated fatty acids (PUFAs). The SFAs and MUFAs are synthesized endogenously, but PUFAs cannot be synthesized by the humans from other components by any known biochemical pathways, and therefore must be obtained from the diet. Fish lipid contains high amount of polyunsaturated fatty acids (PUFAs) in two different groups which are namely omega-3-fatty acids and omega-6-fatty acids. Omega-3 fatty acids are found in foods such as fish and flaxseed and in dietary supplements, such as

fish oil. The three main Omega-3 fatty acids are alpha-linolenic acid (ALA), eicosapentanoic acid (EPA) and docosahexaenoic acid (DHA). ALA is found mainly in plant oils such as flaxseed, soya bean and canola oils while DHA and EPA are found in fish and other seafood (Morales *et al.*, 2015). contribution of fish to the global consumption of protein is ~6% (Tacon *et al.*, 2013), while the contribution to global EPA+DHA consumption is > 97% (Gladyshev *et al.*, 2015). The World Health Organization, as well as many national health organizations, recommended personal daily consumption 0.5–1.0 g of EPA+DHA (Calder, et al., 2018). It is well known that the main food source of EPA and DHA for human diet is fish. LC-PUFA are known to be essential components of human diet, which provide numerous health benefits, including prevention of cardiovascular diseases and neural disorders (Harris *et al.*, 2021). Omega-3 polyunsaturated fatty acids have a positive role in preventing certain human diseases, including cardiovascular ones (Gerling *et al.*, 2019). It was reported that a fish consumption of 1 to 2 servings per week could be protective against coronary heart diseases and ischemic stroke (Tilami & Sampels, 2017). Omega-3s are important components of the membranes that surround each cell. DHA levels are especially high in eye retina, brain and sperm cells. Omega-3s also provide calories and have many functions related with heart, blood vessels, lungs, immune system and endocrine organs.

4. Micronutrients

Micronutrients are essential vitamins and minerals for humans. They are needed in modest amounts and have a role in physiological activities throughout life. Minerals and vitamins are included in this dietary category.

5. Vitamins

Vitamins are low molecular weight substances play important roles in regulating the body functions. These are substance, which the body cannot synthesize and hence must be supplied through food for normal growth and development (Balachandan, 2002). Fish is a

rich source of essential vitamins, such as vitamins A, D and E, as well as vitamins B1, B2 and B3 and some amount other vitamins. The essential vitamins for human health are available of good amount in fish, but these amounts vary according to the fish species (Srivastava *et al.*, 2008). The rich amount of vitamin A and D store in liver of fish species. Lean fishes are a good source of vitamins B group. Vitamins A sources more readily available in fish as compare to other Plant food materials. The small *Amblypharyngodon mola* fish species is a very large source of vitamin A than many other species. Vitamin A is essential the normal growth of children and also helpful to treatment in many eye diseases (Pal *et al.*, 2018). Vitamins A needed to formation of bones and teeth. Fish are good sources of Vitamin D. Its helps to immune function. Vitamin D is not found in many foods which is concentrated in the marine food chain but can also be obtained from sunlight (Mogensen, 2001). Vitamin D allows calcium absorption and is involved in both calcium and phosphorus regulation in bones. Vitamin D is also involved in muscle strength and contraction, nerve conduction, cell differentiation, thyroid function, immunity, rennin and insulin production and skin condition (McManus and Newton, 2011). Vitamin D may also lower the risk of some cancers and cure skin diseases such as psoriasis. Fish is also a good source of the B vitamins and can provide a useful contribution to the diet for this group of vitamins, as does red meat. The B group of vitamins is responsible for converting food to energy in the cells of the body and they help with the function of nerve tissue. Vitamin B is important for enzyme functioning which accelerates chemical processes in the body. Vitamin D deficiency leads to rickets, osteomalacia and a low bone mineral density and increased cases of bone related disorder. It is also connected with diabetes (Holick 2008). Vitamin D deficiency causes osteopenia, osteoporosis and fractures in adults. Fish and fish oils contains vitamin D naturally (Holick and Chen, 2008). Vitamin K present in fish is responsible for the anti-hemorrhage factor. It also helps to prevent internal bleeding and

stimulates correct coagulation of blood. little Vitamin C which is important for proper healing of wounds, normal health of body tissues and aids in the absorption of iron in the human body.

6. Minerals

Fish is a good source of almost all micronutrients which are not widely available from other sources in the diets of poor people (Gladyshev *et al.*, 2018). Iron, calcium, zinc, iodine, phosphorus, selenium, and fluorine are among the minerals found in fish. These minerals are highly " absorbable" or readily absorbed by the body. The availability of selenium and iodine in marine fish is very important nutritionally. Selenium is a trace element that functions as an antioxidant. Selenium is hazardous to humans at high doses. However, selenium is a crucial vitamin for humans that works as a cofactor for reducing antioxidant enzymes such as glutathione peroxidase in the form of selenoproteins. This is also in charge of thyroid gland function. Low selenium levels have been linked to an increased risk of myocardial infarctions and mortality from cardiovascular illness, as well as an increased risk of cancer and renal disease (Cladis *et al.*, 2014) Iron is required for the creation of haemoglobin in RBCs, which aids in the delivery of oxygen throughout the body. This mineral deficiency can induce anaemia, reduced brain function, and poor cognitive ability and behaviour in newborns (Iaconisi *et al.*, 2018). Iodine is necessary for the hormone thyroxin, which regulates body metabolism, and it is also essential for growth and mental development in children. Iron is required for the creation of haemoglobin in red blood cells, which transports oxygen throughout the body. Calcium is essential for strong bones (formation and mineralization) as well as appropriate muscular and nervous system function. It is also necessary for the coagulation of blood. When little fish are eaten with their bones, calcium, phosphorus, and fluorine consumption is higher than when the fish bones are discarded. Calcium deficiency may be linked to rickets in young children and osteomalacia (bone weakening) in adults and

the elderly. Fluorine is also necessary for healthy bones and teeth. Zinc is necessary for most biological activities because it occurs with proteins in critical enzymes required for metabolism. Zinc is essential for growth and development, as well as immune system function and skin health. It is also required for the perceptions of smell and taste, as well as cell division, cell development, wound healing, and carbohydrate breakdown. Zinc deficiency has been linked to weak growth, skin problems, and hair loss, among other issues.

7. Conclusion

In this study observed fish food is rich sources of macro and micro nutrients because fish and fish products are a significant nutritional source they have rich combination of vitamins, Polyunsaturated fatty acids, proteins balance of amino acids, minerals, and other nutrients while still being low in calories. Fish not only have significant nutritional value, but they also have a lot of benefits in the health of human, people are still unaware of those benefits.

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EDUCATION AS A TOOL TO RAISE ENVIRONMENTAL AWARENESS IN PHYSICAL EDUCATION INDUSTRY

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ABSTRACT

The word "meditation" comes from the Latin root "meditatum" which means "to think". Meditation is a technique that calms the mind and leads to peace, happiness, bliss and self-realization. There are many meditation techniques in the world. Mantra-based meditation is a technique in which sounds, words, or phrases (called "mantras") are recited aloud or silently during meditation. Both experience and experiment show that the correct frequency and correct intention of the mantra sound has helped practitioners to oxygenate the brain, lower heart rate and blood pressure, cure many ailments, have calm brain wave activity and generate immunity. shows that it helps to achieve External mental disorders. In this work, the theoretical and experimental aspects of mantra-based meditation are scientifically analyzed. The main purpose of this article is to make more people, including the intelligentsia, aware of this wonderful gift from the Almighty, so that they themselves may practice meditation for their own benefit and, as a result, bring about peaceful vibrations in society. is to be able to bring A time of turmoil on the transmitting planet.

Keywords: Mantras, Social Environment

1. Introduction

Governments and corporations must take climate action to reduce their carbon emissions in response to the global climate catastrophe. It is important to keep in mind from a sporting aspect that athletes participate in sports primarily to compete, socialise, and have fun. Therefore, it's important to include environmental education and awareness in a clever and engaging manner. It is necessary to establish a foundation for understanding why environmental issues are significant in order to prevent role-players from becoming demanding. People have enjoyed sports as a kind of entertainment for aeons. Sports are a symbol of good health since the best games are played by players who are in top physical condition. Ironically, sports can also harm the environment, which is essential to maintaining good health. The use and exploitation of natural resources during sporting activities, whether they are being played or observed, has the potential to leave significant environmental "footprints"(Schmidt, 2006).

Among the most powerful people in the planet are those involved in sports. They may motivate others through their actions, both those who are actively participating inside the sports and those who are spectators. Sport may therefore play an important role in society by

implementing best environmentally friendly practices and promoting environmental awareness. People are more prone to emulate the behaviour of people or organisations they can identify with. The Ecological Ambassadors programme, for instance, uses the popularity of well-known sportsmen to increase global sustainability among supporters, attendees, marketers, the media, etc. Sports may also develop environmental activists. People who can devote their voices to environmental issues and are personable, well-spoken, and enthusiastic are needed for the Ambassador's programme (Matthee, 2017).

2. Corporate Social Responsibility (CSR) and Environmental Sustainability

The idea of corporate social responsibility (CSR) has gained widespread attention and a fresh resonance in the world economy. The emergence of globalisation and international trade, which has been reflected in greater company complexity and new demands for better transparency and corporate citizenship, has led to an increase in interest in CSR in recent years. Furthermore, despite the fact that governments have historically been solely responsible for improving the living standards of the populace, society's needs now outpace what governments can provide. In this setting, the importance of business in society is coming

under more and more scrutiny, and forward-thinking companies are looking for ways to stand out by participating in CSR (Jamali & Mirshak, 2006). Environmental management practises are being adopted by organisations, which shows that businesses are becoming more aware of their impact on the environment and are adopting management practises to mitigate or reduce that impact. The natural environment is also becoming more and more recognised as a pillar of CSR (Babiak & Trendafilova, 2011). Speaking of the health, sports, and physical education sectors, many large firms use CSR tactics to increase environmental awareness. Making preparations enables them to have a significant impact on society by raising environmental awareness.

CSR incentives are intricate, involving the interaction of numerous corporate and societal variables. The desire for legitimacy and the potential strategic or competitive gains that these kinds of actions could offer are two crucial factors that drive environmental practises in professional sport. We understand that professional sport organisations' efforts alone won't be enough to address environmental issues and challenges, but corporations working with other stakeholders will be crucial in finding solutions to the world's environmental issues (Babiak & Trendafilova, 2011).

Environmental sustainability initiatives and the encouragement of sport organisations to pursue recognized performance results can both be brought about by a mixture of social, functional, and political forces. These sustainability efforts can take many different forms, but they most frequently take the shape of operational procedures and formalisation through governance structures. Sport organisations' environmental operations can be changed by sports fans and communities. Sport professionals are capable of anticipating market trends and reacting to new pressures from various parties for example fans, community members (Todaro et al., 2022).

While studying about the environmental sustainability and awareness few questions arise such as How can we ensure that visitors enjoy themselves while minimising their carbon footprints? What level of environmental

understanding is required of the audience to accomplish this goal? How can we merge several ministries' environmental sustainability policies? How can athletic event attendees enjoy the protected natural areas while they are there, and how can these preserved natural areas accommodate the enormous number of visitors? How can visitors be accountable for the welfare of the community?

To fulfil the objectives of promoting values and the relevant skills about important issues so that stakeholders can acquire an ecological literacy, environmental education requires deliberate strategic planning (Saito, 2016).

3. Some internationally played sport and their impact on environment.

1. Skiing: The impacts of pollution on the environment worsen as the world's population increases. Despite the fact that skiing itself may not be hazardous for the environment, ski facilities and other skiing-related elements may. It's conceivable that some deforestation will take place in the quest to build the ideal ski resort. Skiing has a negative effect on hilly areas because trees must be cut down to make room for skiers and ski lifts. The absence of trees has an impact on the environment as well as the creatures who inhabit there. Skiing negatively impacts the ecosystem in this regard. Skiing may be environmentally damaging for a number of intriguing reasons, including the resorts' daily usage of water. Because of global warming, artificial snow must be created to top off the snowpack. This procedure uses a large amount of water daily, which is obtained by these resorts from local lakes and rivers (Simmance, 2022).

The excellent thing is that a lot of resorts are making an effort by including renewable energy sources like windmills and solar panels to complement the energy they consume.

2. Golf: Golf is typically regarded as a "outdoorsy" sport in comparison to other sports. Courses are frequently built in stunning natural settings, including as in the valley of beautiful mountains, in picturesque deserts, or with amazing ocean vistas, providing players the chance to

spend some time outside. However, they frequently have no positive impact on the environment. In truth, golf courses have an outrageously negative influence on the ecosystem, both during construction and thereafter. For instance, extensive land removal is necessary to build a golf course, which frequently results in deforestation. The Seattle Journal of Environmental Law claims that it is not uncommon for developers to completely destroy ecosystems. Additionally, a lot of greenhouse gases are released by heavy equipment when it clears this land. Waterways nearby may potentially be impacted ("As You Would Imagine, the Environmental Impact of a Golf Course Is Sky-High", 2022). Massive amounts of water and chemicals are needed to keep the grass green and deter pests, which also harms native habitats. The Audubon Cooperative Sanctuary Program (ACSP) for Golf Courses works to protect and conserve water for nearby bodies of water, maintain ecosystems, and protect the local flora and animals through educational and environmental activities.

3. Baseball: A baseball's use and disposal are both environmentally benign. Even Nevertheless, industry has the potential to be more environmentally friendly. Alternatives that are more environmentally friendly would be for companies to invest in an environmentally friendly production method that uses fewer resources and

produces less waste and pollution. The majority of the elements used to make a baseball are recyclable or biodegradable; it is the production processes itself that are harmful to the environment ("Environmental Impact of a Baseball", 2022).

4. Conclusion

From the current generation of sports fanatics, a new generation of environmentalists may be forming. The observations demonstrate how the environment is impacted, what issues come up during event planning, and what needs to be done to preserve and safeguard it. The environmental sustainability has been a subject of numerous debates, according to a review of the literature. However, many organisations and clubs today are utilising CSR tools and are conscious of the need to identify and implement changes for society and the environment.

In order to educate people about environmental sustainability through sport and with the incorporation of new tactics comparable to the findings, future studies should thoroughly study each individual component and question that arises.

Baseball pitches, golf courses, ski slopes, and a variety of other sporting venues and organisations ought to do everything in their power to minimise their negative effects on the environment, and we ought to endeavour to protect the original habitats.

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CORPORATE INITIATIVES IN INDIA TOWARDS ENVIRONMENT CONSERVATION AND SUSTAINABLE DEVELOPMENT

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ABSTRACT

Due to the production process in various industries huge effluents, fumes, gases mixes in environment, which affects badly on quality of water, air, forests, crops etc. Sustainable development focuses on balancing the line between our need and the needs to protect the environments in which we and others live. Many organizations came forward with initiatives for conservation and protection of environment. Corporate consider themselves as an integral part of society and accordingly act in a social responsible way by incorporating green issues in their business practices and contributing towards sustainable development through their corporate social responsibility (CSR) initiatives. The role corporation play in achieving sustainable development has to be understood. This study aims to discuss the initiative of the selected Indian corporate in the area of environmental pollution control, environment management and sustainable development. This study provides an initial understanding of current corporate practices for environment conservation and sustainable development.

Keywords: Corporate Social Responsibility, Environment Conservation, Sustainable Development, Industry, Initiatives

1. Introduction

Sustainable development is referred to as the idea that human beings should sustain by meeting their basic needs, while also making sure that the future generations are able to meet their basic needs. United Nations has developed its five- component i.e. People, Partnership, Peace, Planet and Prosperity, from which the goals of SD emerge.

The environment contains both renewable (air, water, land) and non-renewable (fossil fuels) resources. Economic activities generate waste which the environment absorbs through natural processes. The environment comprises abiotic components that aid the living of biotic components. The mountains, oceans, seas, landmasses and other scenery of the environment enhance the quality of life. So, concerted efforts are required to deal with the global environmental crisis. The concept of sustainable development, thereby, comes into play. Some of the measures that can be undertaken to control the crisis include **Pollution Control:** Air, water, noise, soil are some of the major forms of pollution plaguing the environment. **Forest Conservation:** Increased industrialization has come at the cost of deforestation. So forest conservation regulations must be seriously implemented.

Social Awareness: Until people are made aware of the graveness of the situation, the problem of environmental degradation cannot be dealt with. **Waste Management:** Solid waste management must be carefully managed in urban areas. **Water Management:** Rainwater harvesting and conservation of water can help with the long-term potent problem of scarcity of water. By considering these issues the corporate are working.

The idea of environmental conservation gains real momentum if we are able to conserve resources and use them in a manner that they are sufficiently available for the coming generation as well. The **United Nations Conference on Environment and Development (UNCED)** defines this using the concept of **sustainable development**. It explains sustainable development as a process that provides for the present generation without compromising on the needs of the future generations.

Environmental sustainable development implies meeting our current needs without jeopardizing the right and the ability of future generations to meet theirs. Opportunities should be identified and taken to reduce the production of wastes and the use of toxic materials, to prevent soil, water, and air pollution and to conserve and reuse resources,

as feasible. Environmental pollution with its health impacts is a key issue for sustainable environment (United Nations General Assembly 1987).

Sustainable development has become a wide-ranging term that can be applied to almost every facet of life on Earth, from local to a global scale and over various time periods. Long-lived and healthy wetlands and forests are examples of sustainable biological systems. Invisible chemical cycles redistribute water, oxygen, nitrogen, and carbon through the world's living and non-living systems and have sustained life since the beginning of time. As the earth's human population has increased, natural ecosystems have declined and a change in the balance of natural cycles has had a negative impact on both humans and other living systems. Prevention is the first priority within an environmental management hierarchy that includes prevention, recycling, treatment, and disposal or release.

According to the Economic Survey 2018-19 of Ministry for Finance and Corporate Affairs, India maintain its economic growth, by introducing and implementing various policies and measures relating to sustainable development, climate change, resource efficiency and air pollution.

The survey states that in adoption of 2030 global agenda, countries are moving forward for achieving a world free from poverty, gender inequality and economic inequality and thereby ensuring a healthy planet for future generations. India follows a holistic approach towards its 2030 Sustainable Development Goals (SDGs) by launching various schemes. The **Namami Gange Mission**- a key policy priority towards achieving the SDG 6 - was launched as a priority programme. Major components include sewerage project management, urban and rural sanitation, tackling industrial pollution, water use efficiency and quality improvement, ecosystem conservation.

Godrej Consumer Products Limited:

Godrej Consumer Products Ltd. (GCPL) spent Rs. 34.08 crores on CSR initiatives in financial year 2020-21. GCPL achieved zero waste-to-landfill and water positivity. The company

takes back the post-consumer plastic packaging waste equivalent to the plastic packaging it sends out. As part of Greener India, company adopting renewable energy technologies like solar, wind and biomass within our manufacturing operations. It also exploring rainwater harvesting techniques. Company reducing the amount of waste consumed in a process by adopting a 3R strategy (reduce, reuse and recycle).

MAHAGENCO (Maharashtra State Power Generation Co. Ltd):

MAHAGENCO strives to maximize power generation from all its Thermal, Gas, Hydro and Solar Power plants. It is working on conservation of natural resources through maximum recycling of resources. It has ash water recovery systems, recycling of Effluent from ETP/STP etc. MAHAGENCO has installed 130 MLD sewage water reuse & recycling project at Bhandewadi, which supplies treated sewage water of Nagpur city to Koradi supercritical Plant. Rainwater Harvesting and artificial lake formations are also practiced to support water criticality.

Wipro Limited:

Wipro spent Rs. 251 crores for CSR in the financial year 2020-21. It generates 42.6% (73.7 million units) of our total Energy Consumption from Renewable Energy. Three biodiversity projects completed by the company. Viz. Butterfly Park, Wetland Zone and Thematic Garden in Bengaluru and Pune.

ITC Limited:

ITC's Social Forestry program greened 30,439 acres of land. ITC's waste recycling programme, 'Well Being Out of Waste (WOW)', was responsible for collection of the quantum of dry waste collected during the year was about 70,900 MT from 1,067 wards. In total, the company spent Rs. 353.46 crores on its CSR initiatives in 2020-21. The company targeted 50% of total consumption by 2030 Meet 100% of purchased grid electricity requirements from renewable sources. To achieve 40% reduction in specific water consumption by 2030, company creating rainwater harvesting potential equivalent to over 5 times the net water consumption. The

company is trying to ensure 100% of the Company's packaging is reusable, recyclable or compostable. Company has target to promote Climate Smart Village approach in core Agri Business catchments covering over 3 million acres and supporting sustainable livelihoods for 10 million people by 2030.

Infosys Limited:

Infosys Limited has been undertaking most of its CSR initiatives through Infosys Foundation. In the year 2020-21, the company spent Rs. 325.32 crores on its CSR initiatives. Infosys is decreasing carbon emissions through energy efficiency and conservation while moving to renewable energy, minimizing waste going to landfills, and conserving freshwater along with water recycling. Infosys received the 2019 UN Global Climate Action Award. It also received 2020 Green Buildings Leadership Award by the US Green Building Council. The company 44% of energy needs met through renewable, they had 43% reduction in carbon emissions footprint since 2008 and 100% of wastewater reused and recycled. 12 Million sq. ft. of corporate real estate certified as the highest rated 'green' buildings.

Tata chemicals:

Tata chemicals have launched projects to conserve the environment. The Company spent Rs. 21 crores on its CSR programs in 2020-21. Under its greening programme the company has planted 1.15 lakh mangroves across various sites along with conservation of local plant biodiversity at Mithapur. Tata Chemicals has commissioned a solar photo-voltaic plant. Company teamed up with the Wildlife Trust of India and the Gujarat State Forest Department to launch the 'Save the Whale Shark Campaign' which has resulted in the rescue and release of 585 whale sharks.

Vedanta Limited:

Vedanta spent over Rs. 331 crores on social development activities in 2020-21. Vedanta has zero waste and zero discharge vision. Company recycled 94% of total waste and recycled 30.71 % of total water. The group has introduced measures to decrease its GHG emissions. Company has vision to produce some of the most low-impact metals

and minerals on the planet in keeping with overall vision of Zero Harm, Zero Waste, Zero Discharge.

Grasim Industries Limited:

Grasim Industries Limited has spent Rs. 84.66 crores in 2020-21 on CSR.

The company reduced 50% in water consumption by the pulp and fibre business. It also reuse output material. Grasim's VSF unit at Nagda is the lowest consumer of water globally.

UPL Ltd.:

UPL is a global provider of agricultural products and solutions. The company spent Rs. 100 crores on CSR in India. The company has installed 120 solar lights in Barmer- Rajasthan and 95 solar lights in Singhbara and Morena in Madhya Pradesh. UPL is supporting the Gandhian Village Project in Palitana of Bhavnagar district. UPL has partnered with Nature Club Surat and forest department to preserve the wildlife of Dang forest. It also planted over 3000 fruit trees. UPL has been working towards conservation of the Sarus crane which is categorized as vulnerable on the IUCN's (International Union for Conservation of Nature) Red List. Rural Sarus Protection Groups (RSPGs) have been formed. by 7%. It also commissioned 2 new solar installations that increased our renewable energy consumption by 19%. Company 22 locations are certified Zero Waste to Landfill.

Mahindra & Mahindra Ltd.:

Mahindra & Mahindra Ltd. invested Rs. 92.78 crore in various CSR projects across India during 2020-21. M&M actively undertakes initiatives to protect and restore water resources of communities to support sustainable development. To increase the groundwater levels, M&M entered a Private Public Partnership (PPP) with the Government of Madhya Pradesh in Bhopal, and with the National Bank for Agriculture and Rural Development (NABARD) in Hatta, benefitting 48 villages. M&M has also partnered with NABARD for a watershed project in Igatpuri, Maharashtra, covering 20 villages. M&M also initiated a climate-proofing project in 3 micro

watersheds to develop climate change resilient practices impacting over 3,453 beneficiaries.

JSW Steel Limited:

JSW Steel Limited spent an amount of Rs. 78.32 crores towards CSR expenditure. As 6-7% of total Greenhouse Gas (GHG) emissions by industry in India originate from integrated iron and steel manufacturing, company devised a strategy to help reduce emissions, which involves: progressively leveraging raw material quality improvements, enhancing energy efficiency, increasing steel-making via EAF process, and exploring possibilities in carbon capture and storage/utilization. Company having CO₂ injection system to save water daily. It has water sprinkler/wind net, dry and wet fog system in raw material handling areas at Salem to reduce fugitive emissions. At Dolvi, company mangrove restoration project has covered an area of 5000 hectors across 5 villages wherein company planted over 1 lakh nursery plants. Company bolstered water conservation and security by introducing dry steel-making technology. Company is building a 30 million m³ reservoir at Vijayanagar, and has installed a Zero Liquid Discharge facility at Salem on top of rainwater harvesting efforts in Dolvi.

Tata Power Company Limited:

Tata Power has spent Rs. 3.45 crore on CSR in 2020-21. Company use **30% clean energy**. **Company** switchover the energy efficient lighting likes CFLs and standardizing the AC temperatures to 24oC. It replacing the electric water heaters with solar water heaters at canteens. It also set solar based LED lighting in

selected areas; LED based street lighting. Company uses Electric Vehicles for internal transport within plant premises.

2. Conclusion

The environment is an important pillar within sustainable development. Researchers stressed the importance of a decoupling of economic growth from any negative environmental impacts that may result from that growth so that the latter can continue with no harm to the former. Economic and environmental performance must go hand in hand. Thus the two must be positively coupled as a healthy environment supports livelihood and wellbeing. This has been understood by the corporate and they brought the environmental policies. The basic understanding of the concept of corporate social responsibility (CSR) lies within the core belief that corporations have a moral obligation towards the community and the society from where they garner their success. CSR is a way of conducting business, by which corporate entities visibly contribute to the social good. Socially responsible companies integrate economic, environmental and social objectives with the company's operations and growth. Giving back to the society has followed by most of corporate. They have taken various initiatives for environment conservation, sustainable development. Clean energy, rain water harvesting, tree plantation etc. are some of it. The corporate focusing on 3 R viz. reduce, reuse and recycle, which will definitely help for environment conservation and sustainable development.

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ENVIRONMENTAL CHANGES IMPACTING HUMAN PHYSICAL HEALTH**Dr Manda V. Thengne**

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ABSTRACT

Environmental changes caused by human activity in nearly every aspect of life affect our health patterns. This development has caused several long-term health problems. Five children die every minute from malaria and diarrhea in developing countries. The assumption that economic growth is the only indicator of human progress is false. It is said that urbanization and industrialization bring affluence, but on the other hand, diseases occur due to overcrowding and deterioration of drinking water quality. disease is occurring. illness increases. Cities with heavy traffic lead to an increase in respiratory diseases such as asthma. The pesticides that improved the food supply in the Green Revolution have affected farm workers and all of us who consume agricultural products. Antibiotics promised a solution, but bacteria have developed resistant strains. and, in the process, there is a need for constant development of new antibiotics to find ways to alter its behavior. lots of drugs. Known to have serious side effects. Treatment can be as harmful as the disease itself (The World Health Report 2002). Development has therefore created several long-term health problems. Better medical care combined with declining infant mortality rates have increased life expectancy, resulting in unprecedented population growth and declining environmental quality.

Keywords: Corporate Social Responsibility, Environment Conservation, Sustainable Development, Industry, Initiatives

1. Introduction

Environmental issues affecting our health are one of the most important triggers for raising awareness of the need to take better care of the environment. Environmental changes caused by human activity in nearly every aspect of life affect our health patterns. This development has caused several long-term health problems. Five children die every minute from malaria and diarrhea in developing countries. Nature is a wonderful resource for our production and consumption patterns. Human behavior affects the flora and fauna of a particular region. Depending on the half-life of waste components, ecological and natural production values can be lost for very long periods of time. Environmental health as defined by WHO includes aspects of human health, including quality of life, determined by physical, chemical, biological, social and psychosocial factors in the environment.

Public health addresses threats to the general health of local populations. In general, it focuses on monitoring and controlling infectious diseases and promoting healthy behavior. Public health has ancient roots but is in many ways a modern concept. Governments needed some understanding of the causes of disease in order to develop public health policies and programs. It was recognized early on that contaminated water and poor waste

management contribute to the spread of vector-borne diseases. In Roman times it was well known that proper disposal of human waste was a necessary public health principle in urban areas (DFID/EC/UNDP/World Bank, 2002; World Health Report 2003).

Concern on Eco-values

Human behavior affects the flora and fauna of a particular region. In addition to its value as a resource for production and consumption, nature has its own value. If an animal of a particular species were to emerge in a particular area, this would not only be sad, but would have serious consequences for other animal populations. Under these conditions, flora and fauna reproduce. However, when yields exceed carrying capacity, it affects reproductive capacity and population size. This allows you to distinguish between specific species. Similarly, nature has the ability to transform waste into useful materials for use in the recycling process. Consider making compost that nourishes the soil and plants. However, when the composition and quantity of waste exceeds nature's transformative capacity, waste accumulates and nature becomes a waste belt (The World Health Report 2003).

Human physiology can adapt to weather changes within a certain range. However, short-term extreme weather fluctuations can

lead to serious health problems. Heat waves cause heat-related illness and death. Older people and those with pre-existing heart or respiratory conditions are more susceptible. The 1998 Indian heat wave caused many deaths. Climate plays an important role in infectious diseases carried by insects such as mosquitoes. These pathogens are sensitive to direct climatic effects such as temperature, rainfall patterns and wind. Climate affects their distribution and abundance through its effects on host plants and animals. Malaria transmission is particularly sensitive to weather and climate. Extreme weather conditions, such as heavy rainfall, can greatly increase mosquito populations and cause epidemics in desert and highland edges of malaria regions, where malaria transmission is erratic and populations rely on their inherent defenses. Lacks immunity. Thus, when weather conditions (rainfall and temperature) favor contagion. Serious epidemics occur in such areas. Malaria variability throughout the year is also associated with changes in precipitation associated with the El Niño cycle (Bharucha, 2005; Dora and Phillips, 2000).

Environment and health

Five children die every minute from malaria and diarrhea in developing countries. 100 children die every hour from indoor solid fuel fumes. Nearly 3,000 people die every day in road accidents in low- and middle-income countries. Every month in developing countries he kills nearly 19,000 people from accidental poisoning. It is often the result of exposure to toxic chemicals and pesticides in the workplace or home environment. Environmental disasters and related diseases kill millions of people worldwide each year (Smith et al., 1999; Fletcher, 2003-2004; The World Health Report 2002). But while victims share a common destiny, their problems are not necessarily relevant to today's political agendas and to the minds and actions of decision-makers. Many are attributed to several important risks. These include unsafe water and sanitation, vector-borne diseases, indoor solid fuel fumes, toxic hazards, global environmental change, and air pollution, traffic damage, and other forms of urban environmental degradation that

contribute to environmental degradation, including unsustainable development patterns that In addition to human suffering, developing countries bear the economic costs of lost productivity, strain on the health sector, resource degradation, and long-term social consequences (Jha and Whalley, 1999). . Faced with these harsh realities, policymakers in developing countries are grappling with rapid modernization and change. We face important development decisions that require careful consideration of environmental and health impacts.

Infection and diseases

Many infectious diseases are raging and recurring. As a result of the loss of effective control over diseases such as malaria and tuberculosis, these diseases have relapsed after decades of tight control. Other diseases hitherto unknown to science seem to have swept through our health and lives in recent decades. acute immunosuppressive syndrome (AIDS) and severe acute respiratory syndrome (SARS). Although these cannot be directly linked to environmental changes, they do affect the environment in which we live by forcing changes in lifestyles and behavioral patterns. For example, the SARS outbreak prevented people in some countries from traveling to other countries for several months, severely impacting economies, airlines, and the tourism industry (Pruss-Ustun et al. 2003-2005).

2. Conclusion

Environmental issues that affect our health are one of the main triggers to raise awareness of the need for better environmental stewardship. This development has caused several long-term health problems. Five children die every minute from malaria and diarrhea in developing countries. Much of the burden of environmental disease stems from several important risks. Bathing in the river does not jeopardize the use of the river as a source of drinking water if only a few people live along the river. Public health addresses threats to the general health of local populations. Nature is a great resource for our production and consumption patterns. Human behavior affects the flora and fauna of a particular region.

Depending on the half-life of waste components, environmental and natural production values can be lost for very long periods of time. Environmental health, as defined by WHO, encompasses aspects of

human health, including quality of life, determined by physical, chemical, biological, social and psychosocial factors in the environment.

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REBUILDING THE INDIAN ECONOMY: ENVIRONMENTALLY FRIENDLY AND SUSTAINABLE

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ABSTRACT

In today's mechanical age, we are passing through such a situation. Today there is a need to make the available knowledge related to environment practical so that the public can understand the problem easily. In such a difficult situation, it is necessary for the society to realize its duty and responsibility. In this way environmental awareness can be created in the society. In fact, living and non-living components together make up nature. When the economy develops the potential for rapid growth, many new challenges also arise. Natural resources and raw materials such as water, timber and minerals are used in industrial production and due to this industrial growth becomes the cause of environmental damage. It is very important for human beings to have a friendly and balanced environment. If we do not pay attention to environmental protection now, then the coming human life will be dark. We also have to take care of the economic environment. By saving the economic environment, we can make human life happy and secure. In the present paper studied transform India's current economy into an eco-friendly economy.

Keywords: *Electronic, Pollution, E- waste, Environment, Human Health*

1. Introduction

The existence of man is dependent on the existence of flora and fauna. We know the environment around us like trees, water, air and various natural factors. The environment is directly related to nature. In our environment, we find different types of animals, plants and other living and non-living things. All these together make up the environment. In today's mechanical age, we are passing through such a situation. Today there is a need to make the available knowledge related to environment practical so that the public can understand the problem easily. In such a difficult situation, it is necessary for the society to realize its duty and responsibility. In this way environmental awareness can be created in the society. In fact, living and non-living components together make up nature.

When the economy develops the potential for rapid growth, many new challenges also arise. We have to decide how the scarce resources will be optimally used from the point of view of economic growth and sustainable development. There is a lot of evidence that suggests that overall human welfare may also decrease due to such policies. Economic growth should be based on optimum use of natural resources and at the same time development should be kept environmentally balanced. Poverty alleviation and sustainable prosperity cannot be achieved without taking

care of the environment and natural resources. There is a correlation between the environment and economic growth. Environment and socio-economic development are intertwined in such a way that development cannot be imagined without their impact on the environment.

Natural resources and raw materials such as water, timber and minerals are used in industrial production and due to this industrial growth becomes the cause of environmental damage. Therefore, it is very important to strike a good balance between environmental protection and sustainability of the economic development agenda. Sustainable development in the environmental, economic and social spheres requires a balanced use of all dimensions. Development can be sustainable only if it preserves the natural balance. The environment can generally be divided into two parts. The first is the geographical and natural environment and the second is the artificial and social environment. Natural and geographical environment includes water, vegetation, livestock, mineral wealth etc.

The natural environment has a huge impact on our social and economic life. Artificial and social environment is created by our happy and prosperous life. In this way the economic environment includes the state of the economy, economic rules, beliefs, direction of economic development etc. Economic environment is related to the economic activities of human beings. It includes all the activities related to

earning money and spending it efficiently by human beings. It includes agriculture, industry, trade, commerce, transport, communication, insurance, banking, government income and expenditure and all other statutory economic activities. The economic environment does not remain static. The economic environment is also influenced by the internal and international conditions of the country. Economic prosperity and development depend on the environment. The economic environment is employment oriented. And it also helps in controlling the progress of the country. If the economic environment is unfavourable, then poverty, unemployment, hunger, public discontent have to be faced which blocks the development of any country. If the economic environment of the country is right and balanced, then the country will move forward on the path of progress and development. Public welfare schemes will also be run in the right direction. The happy life of human also depends on the balanced development of economic environment. Therefore, it can be said that the compatibility of the economic environment acts as a helper in taking forward the development of the country. It is very important for human beings to have a friendly and balanced environment. If we do not pay attention to environmental protection now, then the coming human life will be dark. We also have to take care of the economic environment. By saving the economic environment, we can make human life happy and secure.

2. Rebuilding the Indian Economy:

Between 1970 and 2015, India registered a six-fold increase in the consumption of goods. This figure increased from 1.18 billion tonnes to 7 billion tonnes. India will become the most populous country in the world by 2022 and it is expected that India's annual consumption of goods will double to 14.2 billion by 2030 due to population growth, urbanization, economic dynamism and the consequent increase in per capita resource consumption. Tons will be Presently, the resource collection in India is 1,580 tonnes per acre, which is 251% higher than the world average of 450 tonnes per acre. While Europe recycles 70% of its

consumption, India recycles only 20%. India is also the third largest country in terms of greenhouse gas emissions and India's contribution to the total emissions of the world is 9.2%. In a situation when India wants to become a major center of global production, we will see India's consumption of raw materials exceeding its domestic requirement. In such a situation, India's traditional economic approach will cause a lot of damage to the environment, which will have difficult economic and social consequences.

Maximum collection from raw material, finished goods is most important for an eco-friendly economy. Given that India currently recycles only 20% of its consumption, there is a lot of work to do in this matter and it provides new inventions and employment opportunities. Therefore, the journey from the current economic model to the eco-friendly economic model is full of environmental and economic benefits. According to the Alan MacArthur Foundation, having an eco-friendly economy would benefit US\$624 billion and reduce carbon emissions by 44% in 2050 alone (comparing to the current economic growth trajectory). Under the major economic changes announced in view of the Kovid-19 epidemic, an environment-friendly economic development model must be developed for the country in coordination with the Central Government and the State Governments.

Building an eco-friendly economy requires a multi-pronged approach involving active participation of government, industry and citizens. This requires a robust approach involving the participation of the central, state and local governments and must take into account the following aspects:

- Citizen awareness and distribution of resources across the population
- Tax incentives and financial support to make an eco-friendly economy more financially efficient
- Industry specific roadmap to transform key industries into an eco-friendly economy
- Technological inventions that enable and enable an eco-friendly economy
- Policy roadmap and coordination between central government, state government, local government and industries

3. Citizen awareness and sharing of resources

With the increase in per capita consumption, citizens should be aware of the impact of their consumption patterns on the environment. By doing this they will become responsible consumers. For example, 27.6 kg of carbon dioxide is emitted to make one kilogram of cloth. To make one kilogram of computer parts, 96 kilograms of carbon dioxide is emitted. Just as every food product mentions its calorific value, so should the carbon emissions from packaged products and polluting services such as airlines consume that product/service. Apart from this, the school curriculum all over India must make the children aware about the environment friendly economy and encourage them about the benefits of adopting the environment friendly economic development model.

India must also run a nationwide awareness campaign emphasizing the importance of segregating waste at the domestic level. Segregation of wet and dry waste is important for ascertaining the calorific value of wet waste and recycling dry waste. In India, 70% of the garbage is not treated and therefore to overcome the growing problem of landfills across the country, they should be segregated at an early stage.

4. Tax incentives and financial help

An eco-friendly economy requires significant investment in infrastructure and technology. A large part of this investment needs to be done by the state and local governments while some part by the private sector. To make such investments financially sustainable, the central government must provide funds to the state and local governments. Given that cities are most important for creating an eco-friendly economy, they should also be an important part of the central government's smart city mission. Private sector companies should be provided with special tax incentives to promote eco-friendly practices and reduce carbon footprint. For example, French car company Renault uses 33% recycled raw materials in all its cars in Europe. If a car manufacturing company in India does this then it must be provided with tax benefits. ITC has been ranked first

worldwide by Sustainlytics, a global ESG rating company, in recognition of its excellent ESG (Environmental, Social and Governance) model. There are many companies like ITC, Tata, Mahindra etc. which focus a lot on ESG method as their business strategy. Such companies must be given financial incentives so that they do more work and also persuade other companies to adopt eco-friendly business practices.

5. Industry Specific Based Roadmap

India needs to develop an industry specific roadmap. It needs to target the 10 industries that cause the most damage to the environment, while also providing opportunities for significant progress on the adoption of eco-friendly practices, such as: transportation, food and agriculture, plastics, packaging, metals and minerals, cement, textiles, automobiles, electronics and construction. Of these, governments at different levels play an important role in making the transport industry more sustainable by linking it to the proper disposal of food and other forms of wet waste. According to the United Nations, 25% of the food produced in India is wasted. These wasted food items could have been used to provide food to the hungry citizens. Foods that cannot be consumed also have significant caloric value which can be converted into energy. If collected in an organized manner, food waste as well as other forms of wet waste (agriculture waste, market waste etc.) can be converted into bio-CNG and used to generate energy for the public transport system. This type of public transport model is working in many cities of Europe such as Stockholm. There are also many cities that are working extensively to introduce a biofuel based public transport system. In view of the huge amount of food and agricultural waste in India, biofuel based public transport system can be introduced in big cities and this will be of great benefit to the environment.

It is estimated that by 2050, 70% of the buildings in India are yet to be constructed. In such a situation, linking the entire construction industry with an eco-friendly economic method is important for India's residential and urbanization roadmap. Similarly, it is important

for every industry to incorporate eco-friendly practices into their business and strategy. Developing and following an industry specific roadmap can be of significant benefit.

6. Technological Invention

There are a variety of digital, engineering and process technologies that need to be created and developed to successfully transition to an eco-friendly economic model. While the market will benefit from developing digital technology, the government must play a bigger role in promoting the development of engineering and process technologies needed to create an eco-friendly economy. Engineering and process technologies should be identified to develop robust eco-friendly models for production in 10 polluting sectors. Funding for their development should be arranged either directly by the government or such a model should be developed in which the private sector is attracted for investment.

7. Policy Roadmap and Coordination

To transform India's current economy into an eco-friendly economy, there is a need for strong policy roadmap and coordination between different government departments. The central government should take the initiative in this matter and develop this comprehensive and focused roadmap in close coordination with the state and local governments. Along with this, various other

rules issued by the Central Government like Plastic Waste Management Rules, E-Waste Management Rules, Construction and Demolition Waste Management Rules, Metals Recycling Policy etc.

While there is still an economic slowdown due to the lockdown, people living in Jalandhar and Saharanpur got a glimpse of the Himalayas after several decades due to the reduction in air pollution.

8. Conclusion-

During the last three decades, the Indian economy has registered a huge growth and this clearly shows the adverse relationship between environmental and economic well-being. The eco-friendly economic model of development links environmental and economic well-being in India. Many progressive cities and countries have adopted strategic motivation to build an eco-friendly economy. A number of reforms have been proposed to reduce the economic impact of the COVID-19 pandemic, making it imperative that environmental welfare is not sacrificed for economic growth. This period is the right time to walk on the path of eco-friendly economic development. Such an eco-friendly economic development that will not only become a way of life across India, but we should also be ready to take advantage of it when our per capita consumption reaches unprecedented levels.

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PHYSICAL EDUCATION AND ENVIRONMENT: ATTUNEMENT IN HEALTH**Saurabh A. Makde**

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ABSTRACT

Sports occupy a special place in modern life, with millions of people around the world watching and participating in their favourite games. Ironically, despite the relaxing and health-promoting benefits of exercise, it can also be harmful to the environment. To remedy this, professional teams and colleges across the country are transforming sport into a positive force for ecological change by adopting sustainable practices.

"When you build a stadium in the middle of a city and hold 80,000 people every day, the environmental impact is enormous." North Carolina University of Natural Resources. "Trash, water, and air pollution are indisputable. The challenge is to mitigate these negative effects. A significant impact of football matches is air pollution, mainly from transportation and tailgating. Two years ago, Bunds and Jonathon Casper, an associate professor at the School of Parks, Recreation and Tourism Management, conducted an air pollution study at his Carter Finley Stadium in North Carolina. The research ended with some interesting results.

Keywords: *Physical Education, Environment, Attunement, Health*

1. Introduction

This special issue, like many good ideas in the academic spirit, was conceived through a thematic symposium. At the 1st Critical Health Study (CHESS) Conference in Queenstown, New Zealand, in May 2018, we proposed, under the premise of a simple (and optimistic) conversation, 'Human health: Environmental Adjustment in Health Education' (Fitzpatrick et al., 2019). ; instead of whining that "the grass is (or could be) greener somewhere", "grow new grass". The goal was to expand the possibilities and practices of educational and embodied connections to environmental knowledge about place, space and nature in the fields of health, sport and physical education. (Trout, 2008 , p. 63) Or the concept of the environment and its focus on the body-mind-culture-nature connection to land and water in a deep sensory and even spiritual sense of caring for others. 'matching' (Brymer et al., 2010). At the time, Nicole was working on her Bluespace research, gathering data on how ideas about participating in national parks and green spaces are blending with discussions about health and fitness through advertising and her social media. was doing. Rosie has worked with Aboriginal elders in Australia in health, diet and nutrition education, sharing her knowledge of the environment with the community on field trips to gardens and farms. Through this practice with her future teacher,

an imaginary opportunity for attunement to the environment was realized and students were introduced to a new curriculum of learning tasks that integrated and leveraged the sustainability and Aboriginal skills of the Australian curriculum. created a cross-sectional assessment.

While we accept that a person`s surrounding conditions constitute part of what we are referring to as `environment`, we want to call for a more expansive and political approach to the concept. The Introductory paper of this Special Issue takes this up in more detail to examine how within the field of health and physical education the term environment is often used in a generalist sense to describe a particular context that could influence performance or participation. In Sport, Education and Society, articles have examined sports or athlete environments, or non-competitive environments (e.g. Dhillon et al., 2020), but few have examined the relationality of environment to pedagogy. The exceptions are Sanderud et al.`s (2020) work on Bildung and children`s perspectives on nature-play relationships in snow-covered playgrounds which examines the way movement memories are entangled in the geographical materiality of weather. Other examples include recent valuable scholarship on informal sport (O`Connor & Penney, 2021), exercise and the environment (Hitchings & Latham, 2017), eco-motricity (Pazos-Couto et al., 2021), outdoor

education (Dyment & Potter, 2015; Quay, 2016) and sustainability (Truong, 2017), all of which has included notions of the environment and nature as a unique and important (yet often marginalised) intersection with movement and physical education. This collection of literature explores both long-standing issues in the field, particularly those related to the marginalization of outdoor education, and recent empirical developments in tracking changing social and cultural practices of health and sport participation. pointing out. There are many other publications that complement this area that can be consulted for inspiration. For example, eco-friendly exercise and recovery and therapeutic landscapes (Olafsdottir et al., 2017), the natural environment and physical activity and health (Jansen et al., 2017; Merchant & Wiltshire, forthcoming), equity in children's health. issues, and research on access to green spaces. Space (Feng & Astell-Burt, 2017). Also, the Sustainable Development Goals (Barakat et al., 2016) and the framework of social, environmental and commercial determinants of health that address health equity, policy and promotion (Baum, 2007; Maani et al. ., 2020; Friel et al., 2011; Schwerdtle et al., 2020). The first article in this issue clarifies our position on environmental sustainability by outlining his four statements:

- We live in a world that is constantly changing and challenging established approaches to human and environmental health care (Patrick et al., 2015). Our attunement must focus on the premise that the environment shapes health and that human health depends on the natural world.

- Health, physical education, and environmental knowledge must be integrated through a holistic and participatory approach that recognizes changes in social and cultural practices in both the built and natural environments. This includes, among other things, a sensitivity to narrative and place ontology. In particular, indigenous peoples and indigenous land ontologies like country and practices like Dadiri or deep listening to build emotional relationships of 'love, compassion and solidarity' (Atkinson, 2002) (Renshaw & Tooth, 2017).

This Special Issue on environmental attunement introduces seven papers that interact with a variety of various insights and practices of nature-subculture and embodied connections to area throughout fitness, recreation and bodily schooling. We have organised the papers into 3 topics that discover opportunities for: (i) notions of the surroundings and `nature` in studies and exercise; (ii) opportunities and demanding situations of translating surroundings, sustainability and `nature` from coverage and curriculum files into exercise; and (iii) philosophical and theoretical hyperlinks to emplaced and embodied mastering – past-present-future. These are never distinctive topics and readers will comprehend different styles of theoretical and empirical opportunity in addition to essential geographical and contextual nuances that want to be explored in addition. Because of this, we are hoping that this series conjures up in addition submissions via an prolonged name for papers that interact with the demanding situations and the opportunities of ways we'd method the complicated environmental, ecological, political and cultural elements that form fitness, recreation and bodily schooling in modern times.

Sports are closely tied to nature. Healthy sports require a healthy environment. For many athletes, this proximity to nature is a source of motivation and inspiration.

Sports facilities, events, activities and the manufacture of sporting goods have an impact on the environment. Energy use, air pollution, greenhouse gas and ozone depleting emissions, waste disposal, waste use and impacts on biodiversity are all issues that the sport community must address. UNEP has been actively involved in work on sport and the environment for over ten years. UNEP is committed to: Use the popularity of sports to promote environmental awareness and care among the general public, especially young people. Promote the development of green sports facilities and the production of green sports equipment.

Six hours before each game, the researchers used fixed and mobile air quality monitors placed around the tailgate seat. Monitors

recorded relative humidity, ozone, temperature, and carbon dioxide levels. A spike in air pollution was recorded when fans gathered three hours before his start of the game. The main culprits are charcoal grills, old generators and especially idling cars. "It's kind of late to get to and from the event, so there's a lot of idling cars and clouds of air," Vans explained. We've seen a few games where it doesn't drop to low levels."

These pre-game pollutants were more than 20 times worse than acceptable levels for moderate air quality. Pollution levels also increased significantly as many fans left the game in their cars. Pollution inside the stadium does not appear to be affected by fan activity outside. The stadium itself produced excellent air quality. Both professional and college sports teams are working to reduce their environmental footprint by implementing

sustainable practices, including solar panels at their facilities.

2. Conclusion

Taken together, the contributions in this special issue have taken various theoretical and empirical approaches to the concept of environmental sustainability in the fields of health, sport and physical education. All central topics of reader sports education and society. As noted in the abstract, there are many important geographical and contextual differences and similarities beyond this original collection that can be explored further. Therefore, we are responding to this first edition by expanding the call for papers to address the challenges and opportunities of how we can address the complex environmental, ecological, political and cultural factors that shape health. , hopes to inspire more diverse submissions...sports and sports practice in today's world.

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EFFECT OF CHANTING MANTRAS ON SOCIAL ENVIRONMENT**Anjali Digambar Barde**

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ABSTRACT

The word "meditation" comes from the Latin root "meditatum" which means "to think". Meditation is a technique that calms the mind and leads to peace, happiness, bliss and self-realization. There are many meditation techniques in the world. Mantra-based meditation is a technique in which sounds, words, or phrases (called "mantras") are recited aloud or silently during meditation. Both experience and experiment show that the correct frequency and correct intention of the mantra sound has helped practitioners to oxygenate the brain, lower heart rate and blood pressure, cure many ailments, have calm brain wave activity and generate immunity. shows that it helps to achieve External mental disorders. In this work, the theoretical and experimental aspects of mantra-based meditation are scientifically analyzed. The main purpose of this article is to make more people, including the intelligentsia, aware of this wonderful gift from the Almighty, so that they themselves may practice meditation for their own benefit and, as a result, bring about peaceful vibrations in society. is to be able to bring A time of turmoil on the transmitting planet.

Keywords: Mantras, Social Environment

1. Introduction

Meditation is a technique for quieting the mind and reaching a state of consciousness quite different from the normal waking, sleeping, or dreaming states. It is a transcendental state of consciousness. During and after meditation, the mind reaches a state of restful wakefulness. Meditation is focusing on thoughts, sounds, objects, visualizations, or breath to increase self-awareness in the present moment, reduce stress, promote relaxation, improve personality and promote spiritual growth. It is a practice of aligning and relaxing attention and contemplation. Regular practitioners of meditation guide their journey towards peace, happiness, bliss and self-realization.

The word mantra comes from the ancient language Sanskrit. "Man" means spirit and "Tora" means liberation. A mantra is a transcendental sound combination intended to rid the mind of all anxieties of material life. Harnessing the causal energies of mantras can yield miraculous benefits. The ancient Hindu scriptures called the Vedas state that in the beginning there was Brahm, and that vibration was Brahm, and mantras serve to transform potential energy. A 'mantra' could be the name of a deity and could be called 'Om' or 'Brahm Nad' or any other word.

Mantra meditation is the process of using sounds, words, or phrases (called "mantras") that you say aloud or quietly to calm and focus

your mind. The purpose of mantra meditation is spiritual growth or relaxation of the mind. It is also known as 'japa' meditation, which means 'murmuring' in Sanskrit. A mantra meditator reaches a state of "quiet awakening" after performing this process. When everything is in a state of vibration and we are in a natural resonant vibration, we are in a state of health. Illness occurs. Therefore, chanting a "mantra" can release trapped energy, return to a natural state of resonance, and induce healing. The sound of chanting certain mantras has been found to synchronize the left and right brain hemispheres. Such chanting also helps oxygenate the brain, lower heart rate and blood pressure, and produce calming brain wave activity. There is Sound amplifies our prayers. Through positively intended and internalized sounds, you can create stunning effects. All the tones we produce are actually composites of tones. That is, the fundamental frequency and the geometric multiples of that tone, called overtones or overtones. These overtones are integer ratios such as 1:1, 2:1, 3:2. These vocal overtones form the "timbre" or timbre of a sound and affect how an individual voice sounds. It's a field with endless possibilities. Vocal overtones can create new neural synaptic connections in the brain. Harmonics can improve voice quality and hearing, change brain patterns, and even increase awareness.

Types Of Mantras (Sounds) Used In Mantra Meditation

As mentioned earlier, in mantra meditation hundreds and thousands of meaningful and nonsensical sounds are used by different people. Some of these sounds are universal or common to all (such as "Om" in Hindu philosophy), while others are suitable for particular individuals. Some meditation initiators require that the "initiated" keep this mantra secret and not reveal it to anyone.

The Om Mantra

Everything in the universe pulsates and vibrates - nothing stands still! "Om" is said to be the primordial sound of the universe, the primordial sound of creation. It is interesting to note that astrophysicists have detected echoes of the "big bang" that occurred at the beginning of time. And the sound they discovered was a hum, very similar to "Om." The sound "Ohm" when chanted vibrates at a frequency of 136.1 Hz. This is the same vibrational frequency found in nature [5-7]. Interestingly, this is also his 32-octave frequency of the Earth year.

The Gayatri Mantra

According to ancient Hindu scriptures, it is the most important and effective mantra (hymn). Its meaning is simply stated. May this divine light illuminate our intellect. American scientist Howard Steingal [9] found that the chanting of his Gayatri mantra produces his 110,000 Hz (>20 kHz?) frequency. Mantra chanting patterns are designed to potentially contain the essence of music, the life sustaining energy emanating from the cosmic energy center of the corresponding mantra. (The divine cosmic energy center associated with the Gayatri Mantra is the Sun). Chanting the Gayatri Mantra creates vibrations that calm the human mind and all plants and animals.

2. Review of Literature

Jean Paul Banquet conducted several experiments on subjects practicing mantra-based Transcendental Meditation (TM) and observed the following results [16]: (i) frequency changes: mantra meditation, leading to a shift from alpha to slower frequencies, mainly theta and mixed frequencies. frequency, sometimes delta frequencies for low and medium voltages. High-voltage beta appears at

about 20 Hz and is usually mixed with alpha and theta, with the higher beta frequencies disappearing at the same time.

Meditation therapy is used by some doctors at Bombay Hospital [18] to prevent various ailments, especially cardiovascular diseases. Meditation has been shown to be effective for coronary artery disease and a variety of associated risk factors, particularly high blood pressure, hypercholesterolemia, and diabetes. Many studies have shown that regular practice of mantra meditation can lower blood pressure. have been shown to help lower cholesterol and blood sugar levels.

Importance Of Pronunciation Of Mantras And Faith For Social Environment

Sound (nad) is the basic building block of creation and is based on the science of music and mantras. Pronounce "Om" as usual and record your spiritual experience. Then extend the length of Om, meaning "O...m...", three or four times and record your experience. With expanded ohms, you experience more energy than normal ohms, or go into a sort of trance state. The reason for this is that with normal pronunciation only one direction is stimulated, whereas with long variation he is stimulated in all eight directions. Exactly for this reason, you usually get a positive effect when notes are lengthened.

3. Conclusion

Almost all religions, sects and beliefs on this planet encourage their followers and others to achieve a peaceful mind through techniques and practices of meditation with coherent thoughts leading to a healthy body, mind and spirit. I hope. Therefore, there are so many meditations in the world that lead to the same goal. Mantra-based meditation is one such technique. This technique can be practiced by anyone in the world without conflicting religious beliefs. The mantra sound of the right frequency for a particular person, along with the addition of faith, can have miraculous effects on the practitioner of this meditation technique. This article explores, through scientific analysis, how practitioners of mantra meditation can guide themselves on their journey to a disease-free body, a calm mind,

clear and coherent thoughts, increased IQ, and enlightenment.
attainment of bliss, self-realization, and

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ECOLOGICAL CONSCIOUSNESS IN ANCIENT INDIA PREACHING**Dr. Pritee D. Thakare¹, Mr. Milind Dhale²**¹ Associate Professor, Jijamata Arts College Darwha, India² Assistant Professor, S.P. M.Science & Gilani Arts Commerce College Ghatanji, IndiaEmail: ¹drpriteethakare@gmail.com**ABSTRACT**

The word "meditation" comes from the Latin root "meditatum" which means "to think". Meditation is a technique that calms the mind and leads to peace, happiness, bliss and self-realization. There are many meditation techniques in the world. Mantra-based meditation is a technique in which sounds, words, or phrases (called "mantras") are recited aloud or silently during meditation. Both experience and experiment show that the correct frequency and correct intention of the mantra sound has helped practitioners to oxygenate the brain, lower heart rate and blood pressure, cure many ailments, have calm brain wave activity and generate immunity. shows that it helps to achieve External mental disorders. In this work, the theoretical and experimental aspects of mantra-based meditation are scientifically analyzed. The main purpose of this article is to make more people, including the intelligentsia, aware of this wonderful gift from the Almighty, so that they themselves may practice meditation for their own benefit and, as a result, bring about peaceful vibrations in society. is to be able to bring A time of turmoil on the transmitting planet.

Keywords: Mantras, Social Environment

India is one of the oldest civilizations in the world. India has a rich cultural heritage. It is beautiful dwelling of various religious sects like Hinduism living in complete socio-cultural harmony. Environment awareness, is not a recent phenomenon. The vital element of the Indian culture is its unity in enormous diversity. The relationship between culture and ecology was the integral part of ancient Indian societies .

Reverence for nature and its creations is the unifying ethical principle in almost all religions of India. They have all kept nature above man. Ancient Hindu mythology believes that the universe is made up of Panchamahabhutas - physical creation five Great Elements composed of Akash (Ether), Vayu (Air), Agni (Fire), Jala (water) Prithvi (Earth)[2]. Atharva Veda in its Eighth Chapter, tenth Sukta, First Shlokas mentions about origin of Universe (Shruthi):

**fojkm~okbnexz~vklkhÛrL;ktkr;k%
loZefoHksfn;esosnaHkfo";rhfrAA**

(Acharya Vedanta Tirth written Book- 'Atharva Veda' in 2018,)

It means, there was gigantic power before the Shruthi. It is known as Eternal Power. It is believed that Shruthi originated out of this Eternal Power, this Eternal Power lies in every life on Shrushti. Further in its Ninth Chapter, First Sukta, First Shlokas it narrates that Cow (Gau Mata) is originated from Heaven, Earth, Ether (Solar System) and Sea. According to

one indigenous theory established, our ancient people learn to live with these five elements and actually worshipped them in reality and symbolically. It is the nature who keeps balance between and among these constituents or elements and living creatures. We get lots of information about the relationships between man and nature and the human behaviors and indebtedness towards nature from the writing in the ancient Indian treaties and literatures.

Hinduism has a religious tradition whose roots lie in the ancient Sanskrit Vedas. The Vedas, along with the Upanishads and Puranas, hold teachings of nurturing, caring, and protecting all aspects of the natural world. Environmental ethics had always been upheld as an inherent part of Indian philosophy. Indian ancestors believed Man, Nature relationship is at the centre of Vedic vision and they proclaim man's duty to preserve environment. Most ancient Indian cultures have grown in the lap of Nature with reverence for nature in which all its elements, mountains, rivers, forests, animals, etc., considered sacred. The Hindu scriptures have also expressed the sacredness of various aspects of the environment and its conservation. The Upanishads provide a vision of cosmic piety and harmony with the natural environment. The Vedic lifestyle was environmentally ethical.

The Vedas are the first texts in the library of mankind. They are universally acknowledged

to be the most precious Indian Heritage. The Vedic literatures like the *Vedas*, *Brahmanas*, *Aranyakas*, *Upanishads*, *Samhitas*, *Upavedas* are replete with references to different aspects of environment. Ecological wisdom, is discernible in the Vedic texts. **In this chapter an attempt has been made to discuss on the Ecological preaching in Vedas.**

The term 'ecology' was first defined in 1866 by Ernst Haeckel. Among the sciences, it has become sought after from the latter half of the 20th century, largely due to widespread environmental degradation and pollution which is a dangerous threat to the whole globe. The Western discourse forget to assess and inform that the roots of ecology lie in Hinduism and no other religion in the world pays as much attention to environment and environmental ethics, and to the understanding of the role and value of nature. **Hinduism is basically an ecological religion.** Here every aspect of this cosmos is pious and have a reverence. It believes in the connectedness of soul with this entire cosmos.

The Upanishads say, "Sarvam Khalvidam Brahma" (everything is Brahman) that means that the animals and plants found in the land of India are sacred; that like humans, our fellow creatures, including plants have consciousness; and therefore all aspects of nature are to be revered. Human beings are not above all but equal to all. No one species encroach into the rights and privileges of other species this is the teaching of Upanishads thousands year ago. This is relevant in today as the modern human civilization armed by the technological weapon, made arrogant of his scientific knowledge and compelled by the ever increasing greed for material achievement is systematically encroaching into the living rights of all other life forms on earth by using, misusing, exploiting and over-exploiting the finite and scarce natural resources of earth. The modern environmentalists are harping upon the 'sustainable development'-to use of natural resources judiciously for the stable development without interfering the living rights of other species of nature so the future generation can get it. This is already mentioned years ago by our scriptures. The Vedic hymns

are filled with many simple, but universal messages, such as:

Plants are mothers and Goddesses. (Rig Veda Samhita x-97-4)

Trees are homes and mansions. (Rig Veda Samhita x-97-5)

Sacred grass has to be protected from man's exploitation (Rig Veda Samhita vii-75-8)

Plants and waters are treasures for generations. (Rig Veda Samhita vii-70-4)

We invoke all supporting Earth on which trees, lords of forests, stand ever firm (Atharva Veda 12:1:27)

"Do not cut trees because they remove pollution." (Rig Veda 6:48:17)

"One should not destroy the trees." (Rig Veda Samhita vi-48-17).

From many centuries our ancient, majestic trees, are part of our rich ecological inheritance. Today, the *sthala vriksham* is considered the single genetic resource for the conservation of species diversity. In comparison with the western philosophy, where trees are merely natural objects, India is filled with magnificent sacred trees: peepal, neem, bel, banyan, asoka, amla, arjuna to name, but a few –and most deities have their favorites. For Shiva his favorites are Rudraksh and Bel, for Vishnu it is Peepal and tulsi, for Hanuman it is Mango. In fact, first came the tree and then the *mandir*. No ritual is complete without the leaf of a bilva, or neem or tulsi. The use of these leaves reminds us of our connection with the earth and the unity of man and nature. There are numerous examples from puranas and Upanishads that shows us how trees are an integral part and parcel of our lives.

A pond is equal to ten wells;
Ten ponds are equal to one lake;
Ten lakes are equal to one son;
And ten sons are equal to one tree
- verse from Matsya Purana

Truly man is just like a tree. His hairs are the leaves and his skin resembles the natural bark. His blood streams forth out of his skin like the sap of a tree ... The flesh is comparable to wood, the sinews are like the inner bark, the bones are the inner core of the wood and the marrow resembles the pith of the tree (*Brhad-*

aranyaka Upanishad 3.9.28, cited in Dwidevi and Tiwari 1987:23).

My dear son, from this finest essence that you can't even see has come this huge banyan tree...and this finest essence constitutes the Self of this whole world (*Chandogya Upanishad 6.12, cited in Dwidevi and Tiwari 1987:23*)

Of this great tree, if someone should strike at its root it would bleed but still live. If someone should strike at its middle, it would bleed but still live. If someone should strike at its top it would bleed but still live. Being pervaded by *atman* it continues to stand eagerly drinking in moisture and rejoicing...If the life leaves the whole, the whole dries up (*Chandogya Upanishad 6.11.1-2, cited in Dwidevi and Tiwari 1987:24*)

Throughout the Upanishads, passages like the ones above show the homology between human beings, trees and gods. Along with the interconnectedness of humans and deities, the Upanishads also establish a religious social order that make forest dwelling auspicious and a way to find peace. Hindu scripture gave rise to an ideology of trees as sacred for a number of economic, ecologic, and theological reasons. The most important thing to understand in examining the doctrinal origins of the sacredness of trees is that, there is never a separation or a dichotomy between humans and the natural world. As **Haberman (2013:23) states: "whereas the human-nonhuman divide has characterized much modern Western thought, which insists that personhood applies only to human beings, here we encounter an application of the concept of personhood that includes more than human beings, extending even to trees."** (Cited in Haberman 2013:51)

It was the Hindus who first understood the sacredness of trees. With the increasing importance of sacrifice within the Vedic tradition, it was necessary for wood to be used to create the ritual fires. In order to do this, wood was needed and would be taken from the forest surrounding the village. The collection of wood for fires did not take place without concern from the villagers. In the Vedic time period (which spanned from 1500 BCE- 500 BCE), forests were a source of natural wealth

such a wood, roots and herbs. Trees represented patience and tolerance in the Vedic world. Certain areas of the forest around the villages were designated for different purposes. This was to ensure that the forest would be protected from over consumption. These protected areas eventually developed into sacred groves (**Prime 1992:11**). Wood was used to create sacrificial fires but was also important in creating the "axis mundi" (**Nugteren 1955:11**). For Hindus during this time period, the village represented the order of the cosmic universe and the surrounding forest represented chaos. In the direct center of the village was a wooden post or pillar to which the sacrificial animal was tied. According to **Nugteren (1955:11)** this post represented the priest as a "director of forces," who could bring sacred forces from God to man and vice versa.

This entire environment is a dwelling of our gods and goddess including all the species so this is pure. Nobody has a right to disturb or pollute it. Atharvaveda has warned not to dirty and add toxic substances into water bodies as it may lead to spread of diseases "**he who dirties or spoils ponds, lakes, rivers, etc., or cause smell near residential areas is liable to chastisement (Joshi and Namita, 2009)**. This is relevant in the context of pollution of rivers and lakes and the resulting ecological diseases which the modern civilization is experiencing. The National Botanical Survey of India (NBRI) Lucknow, has identified about 150 trees and herbs including peepal which are pollution fighters. They are able to intercept several toxic gases and dusts and also infuse the atmosphere with plenty of oxygen (Rabindra, 1985)

The Yajurveda too mentions about plants and animals, the ill effects of cutting of trees; and the poisoning of the atmosphere; but it also discusses about energy relations of the global ecosystem. "No persons should kill animals helpful to all" (Y.V. 13.37). "O King you should never kill animals like bullocks useful in agriculture or like cows which gives us milk and all other helpful animals and must punish those who kill or do harm to such animals" (Y.V. 13.49). The oceans are treasure of wealth protect them" (Y.V. 38.22); "Do not poison (pollute) water and do not harm or cut the trees

(Y.V. 6.33); “Do not disturb the sky and do not poison the atmosphere” (Y.V. 5.43). About the flow of energy in the global ecosystem the Yajur Veda says “the whole universe is full of energy in which the sun is at the centre and the ultimate source of energy for all living organisms on earth.

All social and cultural activities in Hinduism have some environmental overtones. Hindus have extended their relationship from social and natural environment treating rivers as their mother goddess, forest as gods, totemic animals as brethren and prey species as mortalities. Hindus strongly believe in the tenet *vasudev kutumbakam* (the world is one family) and hence, the divine is also seen in animals and are protected. The deification of animals, therefore, has led to the protection of many species of animal. Hinduism in its belief that all living creatures are subject to the cycle of birth, death and rebirth, never distinguishes between the soul of man and a soul of an animal. Apart from this, the recognition that every animal played a role in creating an ecological balance, allowed us to live in harmony with animals.

No religion in the world has such an abundance examples of teaching to protect the environment and the belief of connectedness of all species as the Hindus’ Vedas and other scriptures. The westerns faiths in their scriptures perceive man as the Supreme Being, the supreme species, who “rules all over other creatures”. In fact nature worship is so abhorred and derided by the Church, it is

almost iniquitous to worship rivers, to revere mountains and trees as these are considered soulless objects to be conquered by man. The elements of nature are devoid of any form of divinity. This is in complete contrast to the Hindu’s love, understanding and respect for nature, which shows that Hinduism understood the invaluable role of trees and forests in ecosystem services like purifying the air, hydrological services, as a provider of food and material, climate, rain, and soil. The cultural dynamics of India have drastically changed over the past two centuries, causing a diminishing importance of doctrines for environmental protection embedded within Hindu scripture. So we do not have to forget our rich teaching of Vedas.

Today’s environmental crisis demands a response. The world is grappling to find solutions to multiple crises of the environment. Technology is considered the panacea. Global conventions on biodiversity and climate change are signed by 190-odd countries, earth summits keeps taking place, activism by international environmental NGOs is at its peak. But, it is very unlikely that the ecology would be saved by this Western approach, which is characterized by activism and relies solely on science and the scientific community. For ecology to be truly saved and revived, we have to return to the meanings and practices that infuse sacredness and reverence towards nature as in Hindu traditions, re-awaken our relationship with nature and not view religion and ecology as separate.

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HISTORY OF ENVIRONMENT AND DEVELOPING ECOLOGICAL SUSTAINABILITY**Dr. Aseem. P. Khapre**

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ABSTRACT

Environmental rights are common freedoms, as individuals' jobs, their wellbeing, and some of the time their very presence rely on the nature of and their admittance to the general climate just as the acknowledgment of their privileges to data, investment, security and change. Ecological issues, prominently contamination and environmental change, embroil financial, social, and social rights, including the rights to wellbeing and water. Procedural rights, for example, the rights to get together, articulation, and data, are basic to natural security. Numerous constitutions and various territorial basic freedoms systems fuse an autonomous right to a satisfactory and solid climate, demanding the inseparable connection between basic liberties and the climate.

Keywords: Environment, Ecological, Sustainability

4. Introduction

Ecological rights imply access to unpolluted and normal commodities that enable endurance, such as land, cover, food, water and air. They also include simpler biological rights, such as the ideal of certain eerie crawling animals and the right of humans to appreciate pristine landscapes. Our vision of ecological rights includes political rights such as the rights of indigenous and diverse populations, the privilege of data, the interest in dynamism, the opportunity to speak and clarify, and the option to oppose the transformation of undesirable events. It is included. We also seek remedies for abusive rights, including the rights of expatriates and those displaced by natural depletion, options to guarantee biological obligations, and the privilege of ecological justice. I have. Various of these rights, especially political rights, are regulated and maintained in various shows and arrangements. The establishment of some of these rights, and the recognition of others that have not yet been legally exercised, can be attributed to the ongoing struggles of networks and indigenous peoples around the world. Other 'new' rights, including rights, have emerged in recent years due to the accelerating pace of financial globalization and ongoing ecological and social disruption. As well as one side guaranteeing biological commitments, yet another has resulted from a long struggle by Friends of the Earth and others to recognize the effects of resource depletion in the North and the normal crushing of Southern nations. rice field.

The relationship between fundamental freedoms and natural problems has been a hot topic lately. The connection between the two emphasizes that a fair current climate is a prerequisite for leading a noble and worthy existence. A good actual climate is even more related to safety against worsening riots, air pollution, surface water pollution, pollutant dumping, and so on. Nature's corruption and fundamental freedoms were first put on the world map at the 1972 United Nations Conference on the Human Environment. Criterion 1 of the Stockholm Declaration on the Human Environment establishes a mechanism for combining common liberty and the security of nature, and that humans should have "opportunity, equity and adequate living conditions in a climate of supportive quality." has a fundamental right to "Allowed to exist among nobility and prosperity, he owes a heavy duty."

In 1992, twenty years after the primary worldwide climate gathering, the United Nations Conference on Environment and Development (UNCED), otherwise called the Earth Summit, occurred from 3-14 June in Rio de Janeiro. The Conference meant to enable governments 'to reevaluate financial turn of events and discover approaches to stop the devastation of indispensable characteristic assets and contamination of the planet' as, in spite of worldwide endeavors, natural corruption had quickened at a disturbing rate. Appointments from 178 nations, heads of condition of 108 nations and delegates of in excess of 1,000 NGOs went to the gatherings. In Rio, three significant arrangements were

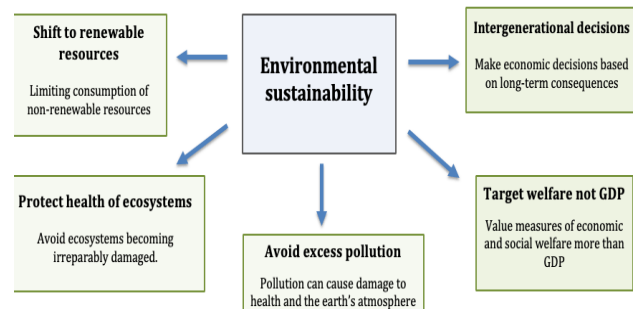
closed of which the Rio Declaration on Environment and Development is the most appropriate with regards to common freedoms and the climate. Rule 1 sets out that 'Individuals are at the focal point of worries for supportable turn of events. They are qualified for a solid and profitable life in concordance with nature' and Principle 4 builds up 'to accomplish practical turn of events, ecological insurance will comprise an essential piece of the advancement cycle and can't be considered in disconnection from it'.

Standard 10 of the 1992 Rio Declaration was critical for the advancements that prompted the 1998 Convention on Access to Information, Public Participation in Decision-production and Access to Justice in Environmental Matters (Aarhus Convention) which went into power in 2001. The Aarhus Convention covers the three subjects demonstrated by its title. Instead of utilizing rights-situated language the Convention requires states gatherings to 'guarantee' that individuals from people in general approach data, are permitted to partake and approach legal audit. In spite of the fact that the term 'right' is commonly maintained a strategic distance from, the targets, structure and setting of the Aarhus Convention are rights-arranged, drawing on ideas of global basic freedoms law. The Convention is planned to accommodate participatory, educational and procedural rights in natural issues.

5. Human rights protects the environment

Recently, there has been a tremendous expansion of awareness of the link between fundamental freedoms and the climate. The number and scope of global and national laws, legal decisions, and scholarly research on the relationship between shared freedoms and climate is rapidly evolving. Created in March 2012 and passed in 2018, the Common Liberties and the Climate Order reviews the obligations of fundamental freedoms to equate with a protected, unblemished, sane and sane climate. Furthermore, it highlights the best work that equates to the use of shared freedom in environmental governance. Many states now integrate privilege and a healthy climate in their constitutions. However, many questions about the relationship between fundamental

freedoms and climate remain unanswered and require further investigation. Environmental Quality - Building a strong network requires clean air, shared assets and a harmless climate. Development – UNTHSC recruitment is evolving and requires more assets such as energy, water and space.



6. Pollution and Environment

Contamination is the presentation of hurtful materials into the climate. These unsafe materials are called contaminations. Toxins can be characteristic, for example, volcanic debris. They can likewise be made by human movement, for example, refuse or spillover created by industrial facilities. Toxins harm the nature of air, water, and land. Numerous things that are helpful to individuals produce contamination. Vehicles regurgitate poisons from their fumes pipes. Consuming coal to make power dirties the air. Businesses and homes create trash and sewage that can dirty the land and water. Pesticides—substance harms used to execute weeds and bugs—saturate streams and damage natural life. Every living thing—from one-celled organisms to blue whales—rely upon Earth's gracefulness of air and water. At the point when these assets are contaminated, all types of life are compromised.

Human rights

These rights are similarly significant, and they are on the whole reliant. Natural rights are common freedoms, as individuals' occupations, their wellbeing, and here and there their very presence rely on the nature of and their admittance to the general climate just as the acknowledgment of their privileges to data, interest, security and change.

Rights can be affirmed in an assortment of ways: for instance, by engaging straightforwardly to the abusing government,

global monetary foundation or enterprise; through worldwide, provincial and public courts; by applying public and media pressure; and by building alliances with others looking for comparable rights. Over the most recent couple of many years, basic freedoms advocates are progressively testing movement bringing about ecological damages as common liberties infringement under the watchful eye of public and worldwide courts and commissions. The International Human Rights Clinic has interceded in the space of basic liberties and the climate through prosecution, documentation, exploration, and promotion in zones, for example, environmental change, strategic approaches, and the lingering impacts of equipped clash.

7. Environment and The Indian Constitution

The Indian Constitution is among the couple of on the planet that contains explicit arrangements on ecological protection. Laws made by public, commonplace and neighborhood government add to the rights and duties that are essential for the constitution and the precedent-based law. These laws additionally called enactments must conform to the constitution yet they can alter change the basic hand.

Security of Life and Personal Liberty is exemplified in Article 21. It expresses, No individual will be denied of his life or individual freedom besides as indicated by strategy set up by law. The Indian Constitution ensures the privilege to equity to all people with no separation. This demonstrates that any activity of the State identifying with climate must not encroach upon the privilege to fairness as referenced in the Article 14 of the Constitution. The Stockholm Declaration, 1972, likewise perceived this standard of uniformity in ecological administration and it called up all the universes countries to submit to this rule. In the Constitution of India it is plainly expressed that it is the obligation of the state to ensure and improve the climate and to defend the woodlands and untamed life of the nation. It forces an obligation on each resident to ensure and improve the regular habitat including woodlands, lakes, streams, and natural life.

8. Conclusion

Environmental rights are common freedoms, as individuals' jobs, their wellbeing, and some of the time their very presence rely on the nature of and their admittance to the general climate just as the acknowledgment of their privileges to data, investment, security and change.

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THE ANALYSIS OF AN ENVIRONMENTALLY SUSTAINABLE PRODUCT DIVERSIFICATION AND ELIMINATION PROCESS

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ABSTRACT

There are some products which cannot be improved or modified to suit market. Here the profitable alternative would be to withdraw the product. The process of withdrawal is technically known as 'Product Elimination'. Products are removed from the product line at times. Though management introduces a new product and reviews existing products from time to time and at times cancels the production. Continuation of sick product will lead company to lack of profitability.

Keywords: Environment, Ecological, Sustainability, Sustainable Product

1. Introduction

Factors Motivating Product Diversification:

Following are given various factors which affect the decision of product diversification :

1. Utilisation of Unused Capacity

If sources (capital labour, managerial skill, research and marketing facilities etc remains unutilised or underutilized, the company can take the decision to diversify its products to make the best use of such unutilised or underutilised capacity. Change in product mix will reduce the cost of production because now the company is not to bear the cost of unutilised resources unnecessarily.

2. Scientific and Technical Development

The decision of diversification may be the result of scientific and technical developments in production methods. Such developments make the existing products obsolete and the demand of the new product increases. So, the company can replace the old product with the new one using the modern technological methods. It may take advantage of its goodwill if it pioneers in the field.

3. Efficient Management

If the management of the organisation is efficient and takes interest in the development of the concern, it may come out with the decision to produce new and new items whether related or unrelated to the existing product line.

4. Industrial and Economic Policies of the Government

Government industrial and economic policies also affect the decision of diversification. If these policies motivate the producers to produce new items and does not restrict the monopolistic tendencies on sound basis or amalgamation and absorption, diversification may take place.

5. Social Changes

Social changes such as changes in nature and behaviour of the consumers, demand, fashion, and style, motivate the producer to diversify his product accordingly to meet the demand of the new product.

6. Desire of the Producer

Sometimes, desire of the producer is very strong to produce different products either to take the advantage of his goodwill or to control the market or to dominate the will of the buyers. So he goes on to diversify.

7. Consumer Satisfaction

In some cases, the faith of consumer is favourable to one company and he likes that the company should produce other products also. In such cases, if the company is confident enough to consumer's faith, it takes decision to diversify in such areas also. In India, the consumer has faith in the products of Tata or Hindustan Unilever and any new product from them will be easily reliable in the market only because it is produced by Tata or Hindustan Unilever. In addition to above, there may be several other reasons for diversification such as the sense of national integration etc.

2. Product Elimination:

R. S. Alexander categorically states, "Putting products to death or letting them to die is a drab business and often engenders much of the sadness of a final parting with old and trusted friend'. In spite of this hesitation most managements are always on the lookout for finding weak products and adopting a gradual elimination of such products. There are some products which cannot be improved or modified to suit market. Here the profitable alternative would be to withdraw the product. The process of withdrawal is technically known as 'Product Elimination'. Products are removed from the product line at times. Though management introduces a new product and reviews existing products from time to time and at times cancels the production. Continuation of sick product will lead company to lack of profitability.

Again, these products require a disproportionate amount of management's time and may even spoil the company's reputation if they are unsuitable to the customer. Elimination is discarded as the product remained for years in the concern's history. Still deletion of one substitutes the new one. The sick product loses market appeal and capital is tied up. According to Lawrence suggestion accurate costing and experimentation as aids to making right decisions regarding whether a product should be dropped or retained.

3. Process of Elimination:

A systematic approach is therefore, required for considering the question of elimination of marginal or unprofitable products. The process may be like the following:

- (i) The first step in the process would be to select the products which are to be considered for elimination.
- (ii) Thereafter, necessary information would be collected and analysed. Factors which require analysis are deficiency product, substitutes, product life cycle, price, profitability, inability of the product to satisfy the needs of the consumers etc. If, after due analysis, it is found that the product can modified to suit the needs of the consumers and it can be do profitably, the product should be improved or modified.

On other hand, if the analysis finds that the product cannot be modified to the aspiration of the customers, a decision to eliminate it should be taken.

4. Reasons Or Indicators Suggesting Product Elimination:

There are certain reasons or indicators which suggest a careful analysis to determine whether or not to eliminate a particular product. These include the following:

1. Continuous decrease in the Sale of the Product. It may be due to the last stage of the product life cycle or incoming of better quality products of the competitors in the market.

2. Reduction in Product Effectiveness. Over a period of time, certain products lose their effectiveness for providing the benefits for which they were produced originally. This particularly happens in case of pharmaceutical products and certain drugs may have to be eliminated or substituted by other drugs.

3. Emergence of a Superior Improved Products. If an improved substitute of the existing product emerges in the market, the management must consider this seriously even at the time when substitute is in its introductory stage otherwise company will lose the battle.

4. More Administrative Time. If management devotes disproportionately excessive time on one product in comparison to the other products of the product mix only due to the product being sick, it is better to decide elimination of the product. However, this must be distinguished from the growing pains of a new product.

5. Downward Trend in Prices. If prices of the product are continuously decreasing inspite of the best efforts of the executives, and the management thinks that obsolescence stage cannot be warded off further, the firm must take a decision to eliminate the product.

6. Product Life Cycle. If the product is in its last stage, i.e. in obsolescence stage, it would be wise step to eliminate the product timely to restrict the fall in profits otherwise the product will die itself within short time. These are the indicators of the sickness of the product. The management should analyse the reasons very

carefully and should take various measures to improve the situation by various tactics but still the management justifies the elimination on various grounds, the it should be allowed to be scrapped. The elimination should made at an appropriate time so that the manpower and capital released through the deletion of the product may be employed in me other and more profitable activities.

5. Problems Involved In Product Elimination Decision:

A decision for elimination of the product is not so easy. There are certain problems or barring factors before the management which force the management to avoid the elimination. Some of such factors or problems are as under :

- (i) Management always avoid the problem of product elimination and is interested in continuing the present product mix. Executives are sensitive to the elimination.
- (ii) It is thought that market will turn favourable to the product and its sales will go up very soon.
- (iii) Sometimes, it is realised that the defect does not lie in product, it is in somewhere in marketing function and it can be improved

(iv) Very often a poor sick product is allowed to continue because it facilitates the sale of other products of the concern.

(v) Where management is of the view that the sale of the product shall have been increased after its proper modification by developing its quality, style, brand, and packaging.

(vi) In order to meet the liability of its fixed overhead charges, and to utilise its fixed resources, the management has a hitch in eliminating the product. Until and unless those resources are utilised profitably, the management cannot take a decision of losing its capital.

6. Conclusion:

Vested interests, sentiments of management and consumers and the sense of irresponsiveness of the firm are some other factors which help continuing the sick product. The above factors favour the continuance of the sick product in the market for a fairly long time, but the management should be cautious enough in taking the decision to eliminate the product. Taking in view the present circumstances, if management thinks it desirable to eliminate the product, it should take the decision. immediately to avoid the firm from loss.

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WATER MANAGEMENT ASPECT OF KAYADHU RIVER IN AKHADA BALAPUR, DIST.HINGOLI MAHARASHTRA WITH REFERENCE TO TOTAL DISSOLVED SOLIDS AND TOTAL HARDNESS

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ABSTRACT

There are some products which cannot be improved or modified to suit market. Here the profitable alternative would be to withdraw the product. The process of withdrawal is technically known as 'Product Elimination'. Products are removed from the product line at times. Though management introduces a new product and reviews existing products from time to time and at times cancels the production. Continuation of sick product will lead company to lack of profitability.

Keywords: Environment, Ecological, Sustainability, Sustainable Product

1. Introduction

Minerals and some organic substances are present in water referred as total dissolved solids, A large number of salts are found dissolved in natural waters, the common are carbonates, bicarbonates, chlorides, sulphates, phosphates and nitrates of calcium, magnesium, sodium, potassium, iron, manganese. If their conc. increases beyond the natural limits 500 mg/l, the water becomes polluted.

High conc. of dissolved solids in irrigation water increases the salinity of the soil and produces distress in cattle and causes scaling in boilers and corrosion in water pipes.

A high content of dissolved solids elevates the density of water, influences osmo regulation of fresh water for drinking, irrigational and industrial purposes. It is especially an important parameter in the analysis of saline lakes, coastal, estuarine and marine water. Total dissolved solids is having high values in such waters. The maximum conc. of total dissolved solids was during rainy season while the minimum value was found in winter because of stagnation (Ansari 1993)

The excess amount of dissolved solids results into high osmotic pressure which in turn causes imbalance of osmotic regulation

2. Material and Methods

Most of the salts and a variety of organic substances (except lipids) are soluble in water. Thus a water sample, either from surface,

ground or marine source contains appreciable quantity of dissolved solids.

3. Procedure

Total dissolved solid of river water samples collected from different sampling sites is determined by following Procedure. -100 ml of filtered sample was taken in a previously dried and weighed beaker and evaporated to dryness and weighed again. The amount of total dissolved solids calculated using formula.

$$\text{T.D.S. mg/l} = \frac{(A - B) \times 106}{V}$$

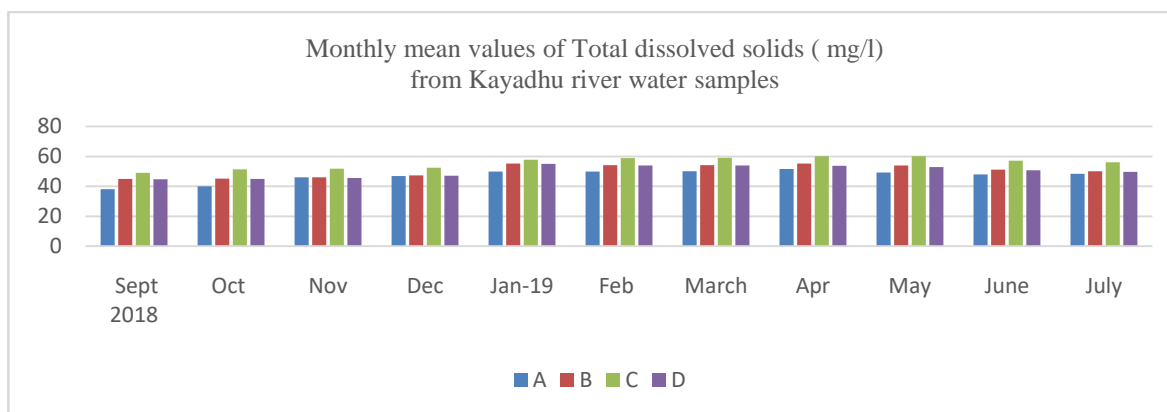
A = Final wt. of the dish in gm.

B = Initial wt. of the dish in gm.

V = Volume of sample taken in gm.

Monthly mean values of Total dissolved solids (mg/l) From Kayadhu river water samples Year 2020-2021

Months	Stations			
	A	B	C	D
Sept 2020	38.0	44.9	49.0	44.8
Oct	40.0	45.21	51.3	44.9
Nov	46.0	45.9	51.8	45.5
Dec	46.8	47.2	52.3	47.1
Jan 2021	49.8	55.1	57.7	54.9
Feb	49.9	54.2	58.8	53.8
March	50.1	54.2	59.0	54.0
Apr	51.6	55.1	60.2	53.6
May	49.3	53.8	60.1	52.9
June	47.9	51.2	57.1	50.8
July	48.3	50.1	56.1	49.6



4. Conclusion

In the present investigation the range of total dissolved solids was 145 to 500 mg/l at station A, 205 to 545 mg/l at station B, 235 to 550 mg/l at station C and 207 to 545 mg/l at station D from river Kayadhu at Akhada Balapur . The values of TDS from Kayadhu river water are illustrated in table...

As the permissible level of T.D.S. for drinking water is 500 mg/l . In the Kayadhu river waer it was noted that maximum conc. of T.D.S. was during summer which increased in rainy season while the minimum values were found in winter probably because of the sedimentation proces and decrease in velocity of water In monsoon TDS values were noted above the permissible level.

Total dissolved solids were recorded in the range of 81 to 195 mg/l in Saigon river at Hochiminh city, Vietnam (viet, 1989) the total dissolved solids from river Godavari at Paithan , Maharashtra were recorded in the range of 300 to 470 mg/l The maximum valyue were noted in the month of may and minimum in the month of Nov. (Zafar Javeed 1991) In physico - chemical investigations of water from river Betwa , in M.P. the T.D.S. was recorded in the range of 84-403 mg/l (Datar and vashistha, 1992). Baruah et al. (1993) recorded total dissolved solids in the range of 100 to 450 mg/l in Gelabil river , Assam..In the ground water quality assesment from chidambaram town Tamilnadu, the T.D.S. noted was in the range of 750 to 1074 mg/l (Nagrajan et. al .199

5. Total Hardness

Introductions:- Hardness may be due to carbonate, non carbonates depending on nature of anion to which it is linked. The ions which

are present in natural waters are calcium and magnesium. The total hardness may be due to the combination of calcium and magnesium ions. Hardness of water is not pollution parameter but indicates water quality. Temporary hardness is due to carbonates and bicarbonates while permanent hardness is due to sulphates and chlorides. Carbonate hardness refers to the amount of carbonate and bicarbonate in solution that can be removed or precipitated by boiling. This type of hardness is responsible for the deposition of scale in hot water pipes and kettles. Non carbonated hardness is caused by the association of the hardness causing cation with sulphate, chloride or nitrate and is referred to as permanent hardness because it can not be removed by boiling.

The hardness of water is inversely co-related with death rates from cardiovascular diseases but their insufficient proof that either calcium or magnesium in water is directly involved. The hardness has no known adverse effects on human health. However some evidance has been given to indicate its role in heart diseases (Peter, 1974) The water containing excess hardness is not desirable for drinking purpose it forms stone in kidney. Such water is also not desirable for potable as well as cooking purposes. The water having hardness above 200 mg/l may cause scale deposition in the water distribution system and more soap consumption.

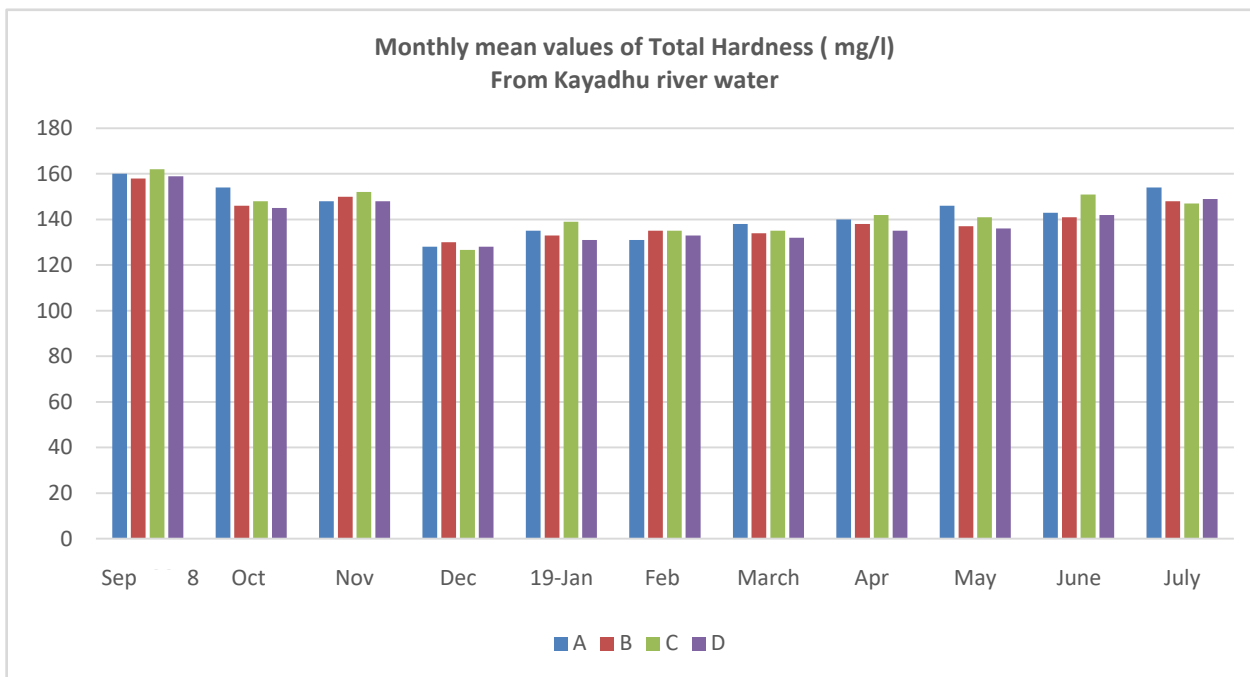
6. Materials and methods

Water sample for the study of total hardness was collected from the different stations and total hardness is calculated as

**Monthly mean values of Total Hardness (mg/l)
From Kayadhu river water samples
Year 2018-2019**

Months	Stations			
	A	B	C	D
Sept 2020	160	158	162	159
Oct	154	146	148	145
Nov	148	150	152	148

Dec	128	130	126.6	128
Jan 2021	135	133	139	131
Feb	131	135	135	133
March	138	134	135	132
Apr	140	138	142	135
May	146	137	141	136
June	143	141	151	142
July	154	148	147	149



PROCEDURE:

- 1) In 50 ml sample 1 ml ammonia buffer (PH 10+1) and a pinch of EBT indicator is added.
- 2) This was titrated against 0.01 N EDTA solution.
- 3) The end point was the conversion of wine red to blue.

Calculation

$$\text{Total hardness (mg/l)} = \frac{T \times 1000}{V}$$

(Caco3)

Where,

T = Titrant in ml

V = Sample in m

7. Conclusion

The variations in total hardness values were found to be in the range between 128 to 160

mg/l at station A, 130 to 158 mg/l at station B, 126.6 to 162 mg/l at station C and 128 to 159 mg/l at station D. The total hardness was found to be maximum in the month of september and minimum in the month of December at all the four stations.

Saxena et.al. (1966) found the total hardness ranged between 112 to 250 mg/l in river Ganga at Kanpur. Ghose and Sharma (1988) recorded the hardness varied from 80 to 180 mg/l in river Ganga at Patna. Tripathi and Pandey (1995) recorded the maximum hardness during summer and minimum hardness during winter from (Chandari Pond), Kalyanpur fish pond at Kanpur.

Minimum values of hardness were observed in rainy while maximum values during summer. High values of hardness are probably due to the regular addition of large quantities of sewage, detergents and large scale human use.

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STUDIES IN THE ECOFRIENDLY REACTIONS IN THE SYNTHESIS OF N-SUBSTITUTED THIOAMIDODICYANDIAMIDE DERIVATIVES

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ABSTRACT

Chemists are responsible for soil, water and air pollution during synthesis of various drugs. Hence it becomes a prior duty of chemists to study such reaction conditions so that pollution will be minimized and the yield as well as purity will increase. To avoid environmental pollution an interaction of dicyandiamide with various thioureas and alkyl/arylthiocyanates had been investigated in sufficient details in various reaction conditions. Some of these compounds show noticeable pharmaceutical and biological values. Hence it was thought interesting to synthesize 1-[S-TAG-N-substitutedthioamido]dicyandiamide. With the above aim and objectives the interaction of tetra-O-acetyl-β-D-glucopyranosylbromide with cyanoamidinosubstitutedthiocarbamides in isopropanol medium had been investigated. The reaction was carried out under various reaction conditions to avoid pollution during synthesis. The justification of the structure of these newly synthesized compounds has been established on the basis of chemical characteristics, elemental analysis and IR, NMR and mass spectral analysis. These materials found several applications in pharmaceutical industry and also in medicinal chemistry.

Keywords: Dicyandiamide, Thiocarbamide, Isopropanol, Glucosides.

1. Introduction

Thioglycosides¹⁻³ and thiocarbamido⁴⁻⁶ compounds have their own identity due to their pharmaceutical, medicinal, biological & industrial importance. These compounds are invaluable intermediates in the synthesis of valuable heterocyclic compounds like thiazole, triazole, thiadiazine, triazine⁷. Recently synthesis of certain acetylated thioglycosides were briefly studied. S-glycosides and N-glycosides had been found several applications in industry and also in medicinal chemistry⁸⁻⁹.

An exhaustive literature survey about tetra-O-acetyl-β-D-glucopyranosylbromide and tetra-O-benzoyl-β-D-glucopyranosylbromide showed that these two analogs play the great role in the synthesis of S and N-glycosylated heterocycles and heterocycles. Very few thioglycosides of thiocarbamide were reported earlier¹⁵. Hence, it was thought interesting to synthesize 1-[S-TAG-N substituted thioamido] dicyandiamide. With this aim and objectives the interactions of tetra-O-acetyl-β-D-glucopyranosylbromide with cyanoamidinosubstitutedthiocarbamides and 1-formamidino-3-substituted formamidinothiocarbamide in isopropanol

medium were investigated to isolate 1-[S-TAG-N substituted thioamido] dicyandiamide.

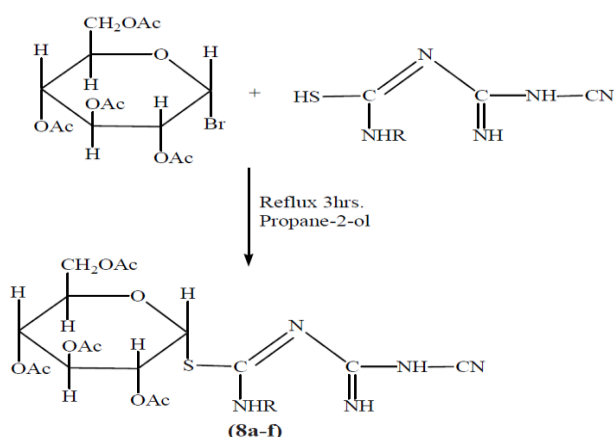
2. Materials & Methods

The melting points of all the synthesized compounds were recorded using hot paraffin bath and are uncorrected. The carbon and hydrogen analysis was carried out on Carlo-Ebra-1106 analyzer, nitrogen estimation was carried out on Colman- N-analyser-29. IR spectra were recorded on Perkin-Elmer spectrometer in the range 4000-400 cm⁻¹ in KBr pellets. PMR spectra were recorded on Bruker AC-300F spectrometer with TMS as internal standard using CDCl₃ and DMSO-d₆ as solvent. The FAB mass spectra were recorded on a Joel SX 102/Da-600 mass spectrometer. Data System using Argon. The accelerating voltage was 10kV and spectra were recorded at room temperature by using m-nitro benzyl alcohol as a matrix. The purity of the compounds was checked on Silica Gel-G plates by TLC with layer thickness of 0.3 mm. All chemicals used were of AR grade except allylthiourea Lancaster (Germany make). Alkyl/arylthiocyanates and phenylthiourea have been prepared by known literature methods.¹⁵

Experimental-

1-[S-TAG-N-phenylthioamido] dicyandiamide was synthesized by refluxing a mixture of tetra-O-acetyl- β -D-glucopyranosylbromide and cyanoamidino phenylthiocarbamide in isopropanol medium, on water bath for 3 hrs. During refluxing the suspended tetra-O-acetyl- β -D-glucopyranosylbromide and cyanoamidino phenylthiocarbamide went into the solution and clear solution was obtained. It was kept for 8 Hrs. at room condition. It was then mixed with distilled water, small quantity of semisolid was obtained, it was filtered. The aqueous solution on basification with dilute ammonium hydroxide, afforded dark brown colored sticky solid which on titration several times with petroleum ether gave brown crystals. It was re-crystallized with aqueous ethanol, yield-78%, m. p. 71°C. The probable reaction mechanism of the formation of is as depicted below.

Scheme-I



Where R= -phenyl, -p-Cl-pheny, -p-tolyl, -methyl,-ethyl,-t-butyl

Literature survey revealed that the reaction amino compounds with thiocarbamides were performed in acetone, ethanol, isopropanol only and time required for completion of reaction was in between 8 to 12 hrs. Hence, taking all these things into consideration it was thought interesting to perform these reaction in various solvent. The main objective to synthesize novel series of and to investigate proper solvent which reduce the time span as well as increase the yield by maintaining the purity of compound.

Similarly, 1-[S-TAG-N-p-chlorophenylthioamido]dicyandiamide (8b), 1-[S-TAG-N-p-tolylthioamido]dicyandiamide (8c), 1-[S-TAG-N-methylthioamido]dicyandiamide (8d), 1-[S-TAG-N-ethylthioamido]dicyandiamide (8e), 1-[S-TAG-N-t-butylthioamido]dicyandiamide (8f) were synthesized by the interaction of tetra-O-acetyl- β -D-glucopyranosylbromide with cyanoamidino-p-chlorophenylthiocarbamides [3b], cyanoamidino-ptolylthiocarbamides [3c], cyanoamidinoethylthiocarbamides [3e], cyanoamidino-t-butylthiocarbamides [3f] in isopropanol medium respectively were synthesized by above mentioned method in experiment no 2 to 6 and listed in Table No-2

3. Results and Discussions

The IR spectrum of compound 1-[S-TAG-N-phenylthioamido] dicyandiamide was carried out in KBr pellets and is reproduced on plate No. IR-2.1. The IR spectrum clearly indicated the bands due to ν -NH, ν -C-H(Ar), ν -C=O, ν -C=N, ν -RC-N, ν -RC-S and an important absorption can be correlated in table

Table-1: FT-IR spectrum of 1-[S-TAG-N-phenylthioamido] dicyandiamide

Absorption Observed (cm ⁻¹)	Assignment	Absorption Expected (Cm ⁻¹)
3184.8	NH stretching	3100-3500 ¹¹⁻¹³
2931.3	C-H (Ar) Stretching	3150-2900 ¹⁴
1533.8	C=NH Stretching	1789-1478 ¹⁵
1496.3	C=N stretching	1789-1471 ¹⁵
1324.5	C-N stretching	1324-1250 ¹⁶
839.0	Glucopyranosyl ring	844+8 ¹⁷
746.2	C-S Stretching	800-600 ¹⁸

The PMR spectrum of compound 1,3-diformamidinothiocarbamide (5a) was carried out in DMSO-d₆ and Ar. This spectrum distinctly displayed the signals due to NH protons at 2.5-2.6 ppm, ArNH protons at δ 7.1 (Silversteiry) ppm. Protons at δ 7.77 - 7.01

ppm, the signals at δ 6.99 – 6.27 ppm are due to protons of pyranosyl ring.

The FAB mass spectrum of 1,3-diformamidinothiocarbamide was recorded at room temperature by using meta nitrobenzyl alcohol as the matrix and show signals at 549,524,509,508,364,188 and 110

Table No-2 Solvent and reaction condition to prepare compound(8a-f)

Sr. No	Expt No	1-[S-TAG-N-substitutedthioamido]dicyandiamide	Medium											
			Isopropanol			Methanol			Ethanol			Methanol/Ethanol		
			Yield %	mp (°C)	Time req. (Hrs)	Yield %	mp (°C)	Time req. (Hrs)	Yield %	mp (°C)	Time req. (Hrs)	Yield %	mp (°C)	Time req. (Hrs)
1	1	---phenyl---	78	71	3	67	81	4	65	82	7	61	84	5
2	2	--p-Clphenyl-	71	74	3	68	89	4	54	86	7	59	85	5
3	3	--p-tolyl--	69	72	3	65	91	4	52	88	7	60	87	5
4	4	--methyl--	70	75	3	62	99	4	51	81	7	55	89	5
5	5	--ethyl--	69	73	3	61	97	4	50	84	7	67	86	5
6	6	--t-butyl--	72	70	3	63	95	4	61	87	7	58	82	5

From this table, it was observed that during the study when the interaction of tetra-O-acetyl- β -D-glucopyranosylbromide and cyanoaminosubstitutedthiocarbamide was carried out in isopropanol medium. Then the yield obtained is more and the time span of the reaction for the synthesis is minimum compared to other organic solvents. As the time span reduces hence ecofriendly reaction parameter were maintained

4. Conclusions

The compound 1-[S-TAG-N-phenylthioamido]dicyandiamide was successfully prepared which grown brown crystalline solid with m. p. 71°C. The synthesized sample was characterized by FT-IR, PMR and mass spectrograph indicating formation of the

desired product. In this work we were interested to perform these reaction with different solvent and also to investigate best solvent which curtails the time span and maintains the green chemistry parameter. All these compounds were tested for their purity by TLC and melting point. The justification of the structures were confirmed by IR, NMR and mass analysis..

5. Acknowledgement

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A STUDY OF SOIL POLLUTION SOURCES, EFFECTS AND CONTROL**Dr. N. M. Gutte**Assistant Professor, Commerce, Smt. L.R.T. College of Commerce, Akola, India
E-mail: nagnathgutte007@gmail.com**ABSTRACT**

Soil is a vital part of the natural environment. It is just as important as plants, animals, rocks, landforms, loch and rivers. It influences the distribution of plant species and provides a habitat for a wide range of organisms. It controls the flow of water and chemical substances between the atmosphere and the earth, and acts as both a source and store for gases (like oxygen and carbon dioxide) in the atmosphere. Soils not only reflect natural processes but also record human activities both at present and in the past. They are therefore part of our cultural heritage. The modification of soils for agriculture and the burial of archaeological remains are good examples of this. Soil, together with the plant and animal life it supports, the rock on which it develops its position in the landscape and the climate it experiences, form an amazingly intricate natural system powerful and complex than any machine that man has created.

Keywords: pollution effects and control

1. Introduction

World Soil Day was established in 2002 by the International Union of Soil Sciences (IUSS) to celebrate the importance of soil and its vital contributions to human health and safety. On December 20, 2013, the 68th UN General Assembly recognized December 5th, 2014 as World Soil Day and 2015 as the International Year of Soils. This official recognition of these events will emphasize the importance of soils beyond the soil science community. It took two years for the leadership of Thailand and the FAO Global Soil Partnership (GSP) to get these dates approved by the UN, but their hard work prevailed and soil has garnered the attention it has so long deserved. World Soil Day is annually held on December 5 to highlight soil's importance on Earth. We need soil for basic survival - energy. It is linked with the United Nations' (UN) Year of Soil. World Soil Day serves as a reminder to all of us that we owe our existence to the soil. As we face mounting global production, climate and sustainability challenges Soil is fundamental to human life on Earth.

2. Objectives of the study

1. To study of the recent Components of soil pollution.
2. To study of the recent implementation and controls of soil pollution.

3. Research Methodology

1. Research paper is based on secondary data.
2. Research paper studied on various recent reports

4. Sources of Soil Pollution:**1. Agricultural sources**

Agricultural practices such as the use of non-organic products in crop and livestock include artificial chemical pesticides, herbicides, fungicides, and fertilizers, as discussed below:

i) Pesticides, herbicides, and insecticides

The introduction of modern pesticides, herbicides, and insecticides has resulted in an increase in the use of agricultural chemicals.

ii) Improper use of fertilizer

Fertilizers are mostly used to correct the deficiency of soil nutrients. A soil that is deficient of potassium, calcium, nitrogen, and sulfur, among other important macro-nutrients, should be treated with the right fertilizer and at the right amount.

2. Industrial sources

These by products combine with the rainwater causing the production of acidic rain, which changes the soil pH and, after that, affects the overall crop production. Industries also dump their solid and liquid effluents into the soil.

3. Urban waste

The garbage is dumped anyhow and contains wastes such as food waste, plastics, industrial wastes, e-waste, and general household wastes.

4. Sewer sludge

The sewage sludge is usually treated before being disposed of into land or water bodies.

5. Mining and Smelting sources

There are also other hazardous materials that including harmful dust particles that are deposited on the surrounding soils.

6. Nuclear sources

All the radionuclides deposited on the soil emit gamma radiations. Thorium, Uranium, isotopes of Potassium (K-40) and Carbon (C-14) are commonly found in soil, rock, water and air.

5. Effects of Soil Pollution

The short term effects of human exposure to polluted soil include

- Headaches, nausea, and vomiting.
- Coughing, pain in the chest, and wheezing.
- Irritation of the skin and the eyes.
- Fatigue and weakness.
- Exposure to high levels of lead can result in permanent damage to the nervous system. Children are particularly vulnerable to lead.
- Depression of the CNS (Central Nervous System).
- Damage to vital organs such as the kidney and the liver.
- Higher risk of developing cancer.
- Since the volatile contaminants in the soil can be carried away into the atmosphere by winds or can seep into underground water reserves, soil pollution can be a direct contributor to air.
- It can also contribute to acid rain (by releasing huge quantities of ammonia into the atmosphere).

6. Control of Soil Pollution:-

- Excavation and subsequent transportation of polluted soils to remote, uninhabited locations.
- Extraction of pollutants via thermal remediation – the temperature is raised in order to force the contaminants into the vapour phase, after which they can be collected through vapour extraction.
- Bioremediation or phytoremediation involves the use of microorganisms and plants for the decontamination of soil.
- My core mediation involves the use of fungi for the accumulation of heavy metal contaminants.

7. Summary

Human and animal excreta used as organic manure to promote crop yield, pollute the soil by contaminating the soil and vegetable crops with the pathogens that may be present in the excreta. Nitrification, which is the process of forming soluble nitrates from the elemental atmospheric nitrogen or from originally harmless organic materials actually contribute towards water pollution when the nitrates leach out of the soil and accumulate to toxic levels in the water supply. Therefore, intensification of agricultural production by practices of irrigation (causes salination), excessive fertilizers, pesticides, insecticides etc. have created the problems of soil pollution. Soil pollution can be checked by restricting the use of above mentioned soil pollutants, resorting to organic farming, adopting better agriculture practices etc. Soil pollution comprises the pollution of soils with materials, mostly chemicals that are out of place or are present at concentrations higher than normal which may have adverse effects on humans or other organisms.

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SYNTHESIS, CHARACTERIZATION AND IN-VITRO ANALYSIS OF OCIMUM TENUIFLORUM AND CURCUMA LONGA SILVER NANOPARTICLES AGAINST WOUND INFECTING BACTERIAL PATHOGENS

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ABSTRACT

The need of environmental non-toxic synthetic protocol for nanoparticles synthesis leads to developing interest in biological approaches with free from the use of toxic chemicals as by product thus there is an increasing demand for green nanotechnology the present study was carried out synthesis characterization and in-vitro analysis of *Ocimum tenuiflorum* and *Curcuma longa* silver nanoparticles against wound infecting bacterial pathogens. Characterization of silver nanoparticles was done by using UV is spectroscopy, FTIR analysis the results showed the *Ocimum tenuiflorum* and *Curcuma longa* silver nanoparticles have 8 mm to 15 mm zone observed as compared with the standard streptomycin 24 mm. The result obtained maybe useful in strengthening the standardization of *Ocimum tenuiflorum* and *Curcuma longa* for their medicinal use.

Keywords: *Ocimum Tenuiflorum*, *Curcuma Longa*, Silver Nanoparticles, Bacterial Pathogens

1. Introduction

Nanoparticles can be synthesized using various approaches including chemical physical & biological. Although chemical method of synthesis require short Period of time for synthesis of large quantity of nanoparticles this method requires capping agents. for size stabilization of nanoparticles. chemicals used for nanoparticles synthesis and stabilization are toxic lead to non- ecofriendly by product. The need for environmental nontoxic synthetic Protocols for nanoparticle synthesis leads to developing interest in biological approach which free from the use of toxic chemicals as by Product Thus there is an increasing demand for "green nanotechnology" [1]

Metal incorporated nanoparticles have received wide interest in the area of industrial and medicinal applications. Among them, Nobel metals gold, silver, platinum and palladium-based nanoparticles have received much attention due to their unique electrical, optical and electronic as well as catalytic properties. Nanoparticles reveal atom like behaviours due to high surface to volume area and wide gap between valance band and conduction band [2,3]. Silver Nanoparticles have initiated useful interest not only fundamental development in

research but also the industrial level owing to their versatile properties [[4], [5], [6], [7], [8]]. This feature has attracted many researchers to find new methods for their synthesis [9]. A number of physical and chemical methods like reduction in solutions, thermal decomposition of silver compound, microwave assisted and photochemical reactions have been reported by several workers. The most common method for the synthesis of silver nanoparticles is a chemical reduction using inorganic and organic reducing agents such as hydrazine [10], N-dimethylformamide [11], Sodium borohydride [12], poly (ethylene glycol) [13] and surfactant template approach [11,14]. The synthesis of nanoparticles through green routes using microorganisms enzymes and plant extracts were suggested as possible environmentally friendly alternatives to chemical methods. Additionally, these methods were reported to be of cost effective and synthesized particles were found more stable. Several medicinal plants such as *Acorus calamus*, *Alternanthera dentata*, *Ocimum canum*, *Azadirachta indica*, *Brassica rapa*, *Coccinia indica*, have already been used to synthesize and stabilize metallic NPs, very particularly biogenic AgNPs. In present study aim at first synthesis and

characterization of silver nanoparticles against wound infecting bacterial pathogens

2. Importance Of Tulsi

The tulsi plant or Indian basil involves a vital place in the Hindu religion. The name “tulsi” denotes “the exceptional one” which is a sweet-smelling plant. It is local to Indian Subcontinent and it is widely spread throughout the Southeast Asian tropics. Tulsi or *Ocimum tenuiflorum* is an aromatic plant belonging to the family Lamiaceae. It is widely used for religious and medicinal purposes, and for its important oil. A large number of the component are present in tulsi leaves, the main constituents of Tulsi are Oleanolic acid, Ursolic acid, Eugenol, Rosmarinic acid, Linalool, Carvacrol, and β caryophyllene, have been used widely for many years in food products, perfumery, dental and other oral products. Phytochemical analysis of the tulsi leaves reveals the presence of saponins, alkaloids, flavonoids, cardiac glycosides, steroids, phenols and tannins in it. It is broadly referred to over the Indian Subcontinent as a therapeutic plant and regularly utilized as a part of Ayurveda, where it is considered as the destroyer of all the doshas. It has an essential part inside the “Vaishnavite tradition of Hinduism”, in which followers do devotion including Tulsi plants.

CLASSIFICATION: -



Fig 2. Leaves of *Ocimum tenuiflorum*

Kingdom Plantae
Phylum - Tracheophyta
Class - Magnoliopsida
Order - Lamiales
Family - Lamiaceae
Genus - *Ocimum*
Species - *tenuiflorum*

3. Importance Of Turmeric

Turmeric (*Curcuma longa*) is a medicinal plant broadly utilized as a part of Ayurveda, Unani and Siddha medicine as a primary treatment for different diseases. It belongs to the family named Zingiberaceae and is one of the essential medicinal plants around the world. Turmeric is used as a food improver (spice), preservative and coloring agent in Asian countries, including China and South East Asia. It is also measured as a promising part of all religious festivals. It is broadly utilized for the treatment of sprains and swelling brought about by injury. Now a day, regular Indian medication uses turmeric powder for the treatment of the biliary issue, anorexia, coryza, cough, diabetic injuries, hepatic issue, and sinusitis. In China, *C. longa* is utilized for diseases related to stomach pain. The coloring standard of turmeric is the main fundamental property of this plant. It contains many bio active components for example, curcumin, turmerone, curcuminoids, turmerone, arturmerone, and zingiberene, that have antioxidant activities. Although recent studies have revealed that turmeric displays an extensive variety of pharmacological impacts, for example, antioxic, antitumor, hepatoprotective, antimutagenic, antiangiogenic, immunomodulatory, antimicrobial, anticancer, and wound healing.

CLASSIFICATION:-



Fig 1. Rhizomes of *Curcuma longa*

Kingdom: Plantae
Phylum - Magnoliophyta
Class - Liliopsida
Order – Zingiberales
Family – Zingiberaceae
Genus - *Curcuma*
Species - *Loga*

4. Materials And Methods

Materials:**A) Test organisms:-**

1) Isolate 1=SKPS1

2) Isolate 2=SKPS2

3) Isolate 3=SKPS3

4) Isolate 4=SKPS4

B) Nutrient Agar:-

Composition: -

peptone	- 10 g
Sodium chloride	- 05 g
Beef extract	- 03 g
Agar	- 20 g
D/W	- 1000 ml
pH	- 6.8

C) Muller Hinton Agar:-

Composition:

Beef Extract	- 2g
Acid digest casein	- 17.5g
Starch	- 1.5g
Agar	- 17g
D/W	- 1000ml

Methods: -**PLANT COLLECTION-**

Ocimum cancum leaves and *Curcuma longa* powder collected from Latur & brought to laboratory in air tight polythene bags for further processing

Pus Sample Collection: -

The pus samples were collected by using a sterile cotton swab the inner Surface of the infected area was swabbed gently. Each swabbed gently each swab was plated onto media

1) Preparation of leaf extract

For the Preparation of leaf extract fresh leaves were collected in a beaker and washed several times with water to remove the dust & finally with double distilled water. 10 g washed leaves were cut into fine pieces & Crushed with the help of pestle in 100ml double distilled water After grinding the aqueous extract was taken in 250 ml beaker & boiled for 10 min 80°C temp. The plant extract allows to cool at RT. & then filtered with Whatman filter paper The filtrate was centrifuge for 20-25 min at 10000PM the supernatant was collected & stored at 4°C. "This filtrate was used as a stabilizing and reducing agents.

To prepare the aqueous extract of turmeric powder, 10 gm of curcumin Powder were weighed & mixed 100ml after that the mixture was boiled for 10 min 80°C temp. & cooled down at room Temperature & The exact was then filtered using what man filter paper

Preparation of 1mm silver nitrate solution: -

The conc of 1mM silver nitrate. was prepared by dissolving 0.169-gram AgNO₃ in 1 l deionised water and stored

Green synthesis of silver nanoparticle: -

The Preparation of silver nanoparticles is a single step synthesis 10ml o of tulsi leaf extract, prepared and add to 90 ml silver nitrate solution & the mixture was kept at room temp for 30 min. The colour of the solution turned from light yellow to brown indicating the formation of silver nanoparticles.

A) Analysis of silver nanoparticles by using UV-visible spectrophotometer: -

The bio reduction of silver nitrate [AgNo₃]. to Agno's was checked intermittently by UV vi spectroscopy after the dilution of the sample with distilled water an UV-Vis Spectrograph of the agno₃ and nanoparticles was recorded by using a quartz cuvette the UV-vi spectrometer readings were recorded at wavelength 200-800 nm

B) Analysis of silver nanoparticles FTIR

FTIR spectra of the samples were measured using PerkinElmer spectrum one instrument in this diffuse reflectance mode at a resolution of 4 cm in KBr Pellets Powder samples for the FTIR were prepared similar to Powder diffraction measurement The FTIR spectra of synthesized AgNPs taken were analyzed which discussed for the Possible functional groups for the formation of nanoparticles

C) Isolation of organism from pus sample: -

the pus sample was collected from Government hospital in Latur. For the isolation make nutrient agar on that nutrient agar streak the swab stick on it and incubate it after incubation the microbial colonies are observed. For their colony confirmation or organism confirmation staining and tests are carried out

D) Disk diffusion assay:

The antibacterial activity of AgNPs against the selected wound infected Pathogens was carried out disk diffusion Susceptibility test method The bacteria strains on the MHA agar Sterile cotton swab each sterilized AgNP's were Spread using sterilized Paper disk AgNP's 30 μ l *Ocimum tenuiflorum* & *Curcuma longa* plant extracts and of Streptomycin as standard Each disk was then placed on the Sterile solidified MHA agar which was Spread with inoculums The plates was kept for diffusion then transferred to the incubator at 37°C for 1days After incubation the zone around the discs were measured by the zone scale

5. Results And Discussion

A. Preparation of silver nanoparticles using plant samples.



Fig 3. Green synthesis of silver nanoparticles

B. Bacterial isolates isolated from patients pus sample.



Fig 4. Isolation of organisms from pus sample

C. UV-Visible spectral analysis of selected plant samples

I) UV visible spectra of *Ocimum tenuiflorum* + silver nanoparticles

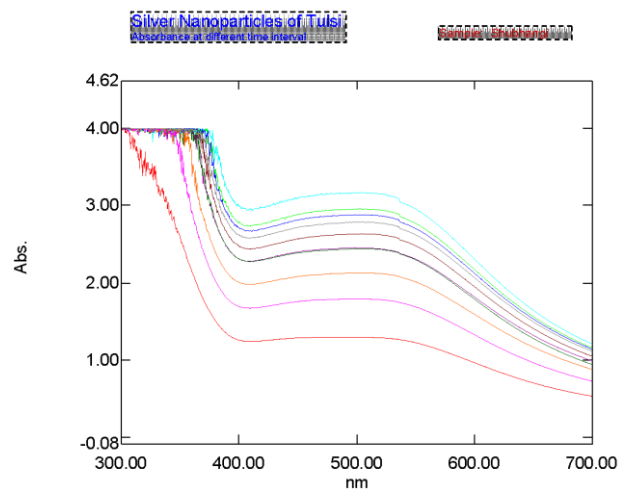


Fig 5. Spectral Graph showing reduction of silver using plant extract.

II) Uv visible spectra of curcuma longa +silver nanoparticles

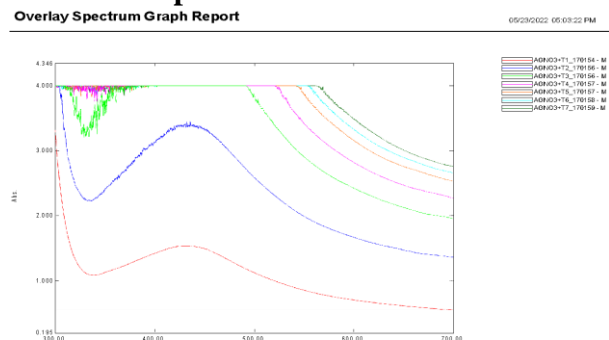


Fig 6. Spectral Graph showing reduction of silver using plant extract.

D. FTIR analysis of selected plant samples

i) FTIR spectra of *Ocimum tenuiflorum* + silver nanoparticles

Tulsi + AgNO₃ Results:

Administrator

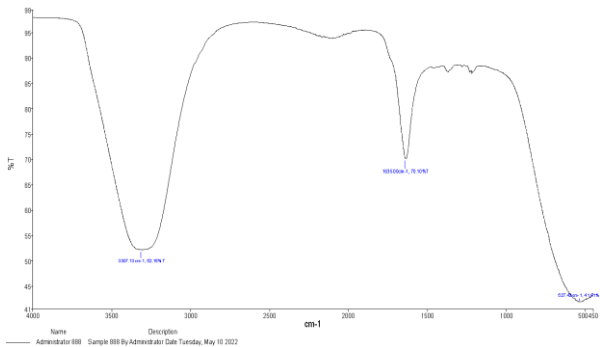
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Spectrum Name	Number Of Peaks
Administrator 888	3

Administrator 888 Details:

Peak Number	X (cm-1)	Y (%T)
1	3307.13	52.15
2	1635.00	70.10
3	527.42	41.91

Administrator 888 Spectra:



ii) FTIR spectra of *curcuma longa* +silver nanoparticles

Turmeric + AgNO₃ Results:

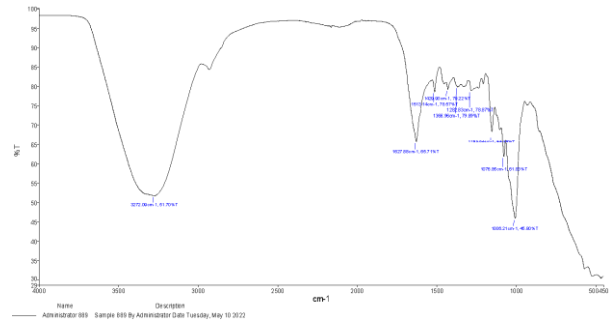
Administrator

Spectrum Name	Number Of Peaks
Administrator 889	9

Administrator 889 Details:

Peak Number	X (cm-1)	Y (%T)
1	3272.09	51.70
2	1627.88	65.71
3	1513.14	78.57
4	1429.90	79.22
5	1366.96	79.89
6	1282.83	78.87
7	1153.04	68.35
8	1076.85	61.83
9	1006.21	45.80

Administrator 889 Spectra



E. Morphological characteristics of isolated wound infecting pathogens

ISOLATES	I	II	III	IV
Size	0.4	0.3	0.2	0.6
Colour	Cream	White	Orange	Yellow
Shape	Circular	Round	Circular	Circular
Surface	Smooth	Smooth	Smooth	Rough
Consistency	Sticky	Sticky	Sticky	Sticky
Opacity	opaque	opaque	opaque	Translucent
Elevation	Flat	Flat	Flat	Convex
Margin	Entire	Entire	Entire	Entire
Gram nature	Gram positive	Gram positive	Gram positive	Gram positive

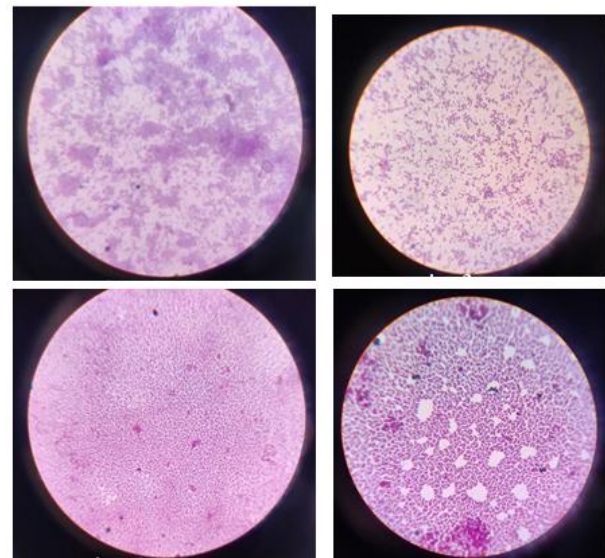


Fig 7. Gram staining photo of isolates

F. Photographic evidences showing inhibitory effect of silver nanoparticles towards bacterial isolates isolated from pus samples

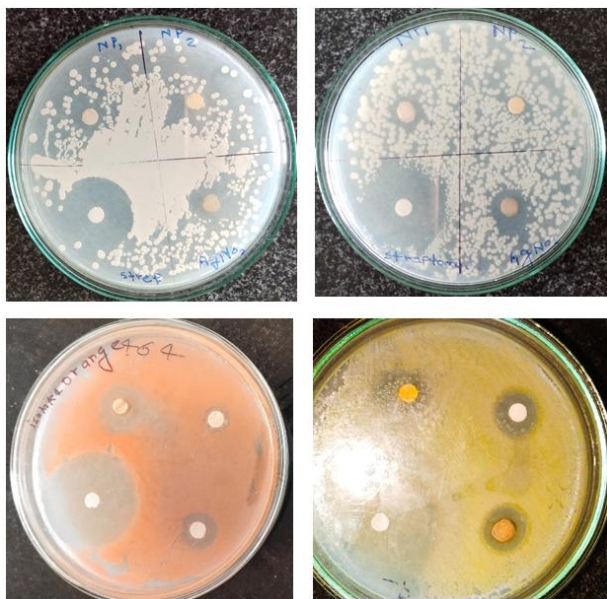


Fig 8. Antibacterial activity of synthesized nanoparticles against the selected wound infected pathogens

G. Antibacterial activity of Agno3 + Ocimum tenuiflorum and Agno3 + Curcuma longa

Isolates	I	II	III	IV
Streptomycin	11mm	24 mm	13mm	12mm
Agno3	8mm	10 mm	7mm	16mm
NP1	14mm	15mm	8mm	14mm
NP2	5mm	4mm	14mm	5mm

6. Discussion

The antibacterial assay performed by disc diffusion method & results are summarized in result showed the *Ocimum tenuiflorum* and *curcuma longa* AgNP's have 8 mm to 15 mm zone of inhibition and standard streptomycin have 24 mm of zone of inhibition was confirmed the zone of inhibition was observed in isolate I II III IV

7. Conclusion

From observation & result concluded that synthesis of nanoparticle effectively antibacterial activities against isolate I II III IV but the *ocimum tenuiflorum* and *curcuma longa* silver nanoparticles was moderate zone of inhibition than standard streptomycin.

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SYNTHESIS AND ANTI-MICROBIAL ACTIVITY OF SOME NOVEL CHALCONES

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ABSTRACT

Some new chalcones have been synthesized by the condensation of 2-acetyl furan with different aromatic aldehydes in 40% alkali. The synthesized compounds were identified by Physical data and Spectral data (IR, ¹H NMR). These Synthesized derivatives of Chalcones Screened for Antimicrobial Activities. Some of these compounds showed moderate to considerable anti-microbial activity.

Keywords: Chalcones, Synthesis, Physical data, Spectral data, Anti-microbial activity

1. Introduction

Chalcones are synthesized by Claisen – Schmidt condensation of aldehyde and ketone by base catalysed followed by dehydration to yield chalcones. The synthesis of chalcone compounds incorporating with heterocyclic become the great importance in medicinal chemistry. The hetero atom products variety of application in the biological engineering and in other field of their specific structure. To the best of our knowledge acetyl furan involving different substituted aldehyde under basic condition reaction is unprecedented. In continuation of our interest to developing novel synthetic methodologies and use of chalcones for organic synthesis. The compounds with the backbone of chalcones have been reported to possess various biological activities such as antimicrobial, anti-inflammatory, analgesic, antiulcerative, antimalarial, anticancer, antiviral and antioxidant activities. Antifungal activity of chalcones has been investigated by a number of researchers. Elemental sulfur has long been known to act as an antibacterial agent. Sulphur is present in antifungal agents of natural origin, e.g., *Allium sativum* (garlic), which is known to inhibit *Candida albicans*. The present work indicates that, when a thiophene ring was incorporated into a chalcone structure, the molecule exhibited antifungal activity.

The Chalcones display interesting biological activities, including antimalaria, anti-inflammatory, cytotoxic, anticancer and antimicrobial activities. In the present study, some new chalcones (**1i-1p**) have been synthesized by the reaction of 2-acetyl Furan

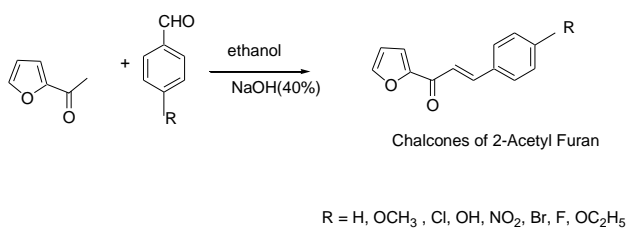
with different aromatic aldehydes. The structures of the various synthesized compounds are assigned on the basis of elemental analyses, IR and ¹H NMR spectral data. These compounds were also screened for their anti-microbial activity.

2. Materials and Methods

The melting point of the compounds were determined in open capillaries, using Eligo digital melting point apparatus and Melting points were determined on a capillary melting point apparatus and are uncorrected expressed in degree Celsius and the values were uncorrected. IR spectra of the compounds were recorded on Shimadzu 8201 spectrophotometer using KBr and the values are expressed in 4000-400 cm⁻¹. ¹H and ¹³C NMR spectra were recorded on Bruker AV 400 MHz Spectrophotometer using TMS as an internal standard and the values are expressed in δ ppm. All the solvents used were analytical grade. The purity of the compound was checked by TLC using silica gel plates.

2.1 General procedure for the preparation of chalcones (1i-1p)

Equimolar quantity of 2-Acetyl furan (0.01 mol) and substituted aromatic aldehyde (0.01 mol) were dissolved in 20 ml of ethanol was cooled heated about 60°C. In solution, 10 ml of 40% Sodium hydroxide solution was added drop wise. The reaction mixture was magnetically stirred for 1h. Allow the solution to cool and acidify with dil. HCl. A flocculant precipitate was formed. The precipitate was filtered and washed with cold water and recrystallize from ethanol.



3. Results and Discussion

Physical data of compounds (**1i-1p**) are obtained and given in following table.

Compound	Molecular Formula	Melting Point (°C)	Percentage Yield
1i	C ₁₃ H ₉ O ₂ Cl	78	83
1j	C ₁₃ H ₁₀ O ₃	118	77
1k	C ₁₃ H ₉ O ₂ Br	60	85
1l	C ₁₃ H ₉ O ₂ F	65	80
1m	C ₁₄ H ₁₂ O ₃	68	82
1n	C ₁₅ H ₁₄ O ₃	120	80
1o	C ₁₃ H ₉ O ₃ N	220	96
1p	C ₁₄ H ₁₂ O ₂	190	94

Spectral data of the compounds (**1i-1p**) are obtained using various a spectral methods. The results discussed are given below.

1i - (2E)-3-(4-chlorophenyl)-1-(furan-2-yl) prop-2-en-1-one:

IR (KBr) cm⁻¹: 3527 (ArC-Hstr), 2924 (C-Hstr thiophene), 2854(C-Hstr alkene), 1743 (C=Ostr), 1651(C=Cstr), 802 (C-Hdef) and 677 (C-Clstr).

¹H NMR (DMSO) ppm; 7.1-7.6 (Ar), 7.7 (H β =CH-Ar), 6.6 (H α -CO-C=s). ¹³C NMR (CDCl₃)ppm: 181 (-CO-), 128-134(Ar), 145 (C β), 112 (C α).

1j – (2E)-3-(4-hydroxyphenyl)-1-(furan-2-yl) prop-2-en-1-one

IR (KBr) cm⁻¹: 3516 (ArC-Hstr), 2924 (C-Hstr thiophene), 2856(C-Hstr alkene), 1805 (C=Ostr), 1651(C=Cstr), 1473 (C-Fstr) and 835 (C-Hdef).

¹H NMR (DMSO) ppm; 7.4-7.7 (Ar), 7.3 (H β =CH-Ar), 6.9 (H α -CO-C=). ¹³CNMR; (CDCl₃)ppm: 181 (-CO-),126-140 (Ar), 145 (C β) 124 (C α),

1k - (2E)-3-(4-bromophenyl)-1-(furan-2-yl) prop-2-en-1-one

IR (KBr) cm⁻¹: 3446 (ArC-Hstr), 2924 (C-Hstr thiophene), 2854(C-Hstr alkene), 1745

(C=Ostr), 1649 (C=Cstr), 671 (C-Brstr) and 889 (C-Hdef).

¹H NMR (DMSO) ppm; 7.0-7.6 (Ar), 7.7 (H β =CH-Ar), 6.8 (H α -CO-C=).¹³CNMR (CDCl₃) ppm: 127-142 (Ar), 181 (-CO-), 145(C β),122 (C α).

1l - (2E)-3-(4-fluorophenyl)-1-(furan-2-yl) prop-2-en-1-one

IR (KBr) cm⁻¹: 3446 (ArC-Hstr), 2924 (C-Hstr thiophene), 2854(C-Hstr alkene), 1745 (C=Ostr), 1649 (C=Cstr), 671 (C-Brstr) and 889 (C-Hdef).

¹H NMR (DMSO) ppm; 7.0-7.6 (Ar), 7.7 (H β =CH-Ar), 6.8 (H α -CO-C=).¹³CNMR (CDCl₃) ppm: 127-142 (Ar), 181 (-CO-), 145(C β),122 (C α).

1m - (2E)-3-(4-methoxyphenyl)-1-(furan-2-yl) prop-2-en-1-one

IR (KBr) cm⁻¹: 3454 (ArC-Hstr), 2922 (C-Hstr thiophene), 2854(C-Hstr alkene), 1743 (C=Ostr), 1649 (C=Cstr), 979 (C-Sstr), 734 (C-Hdef), and 675 (C-Clstr).

¹H NMR (DMSO) ppm; 8 (H β =CH-Ar), 7.3-7.7 (Ar), 7.2 (H α -CO-C=). ¹³C NMR; (CDCl₃)ppm: 129-138 (Ar), 192 (-CO-),143 (C β),128 (C α).

1n - (2E)-3-(4-ethoxyphenyl)-1-(furan-2-yl) prop-2-en-1-one

IR (KBr) cm⁻¹: 3454 (ArC-Hstr), 2922 (C-Hstr thiophene), 2854(C-Hstr alkene), 1743 (C=Ostr), 1649 (C=Cstr), 979 (C-Sstr), 734 (C-Hdef), and 675 (C-Clstr).

¹H NMR (DMSO) ppm; 8 (H β =CH-Ar), 7.3-7.7 (Ar), 7.2 (H α -CO-C=). ¹³C NMR; (CDCl₃)ppm: 129-138 (Ar), 192 (-CO-), 143 (C β),128 (C α).

1o – (2E)-3-(4-Nitrophenyl)-1-(furan-2-yl) prop-2-en-1-one

IR (KBr) cm⁻¹: 2924 (C-Hstr thiophene), 2854(CHstr alkene), 1743 (C=Ostr), 1635 (C=Cstr), 974 (C-Sstr), 889 (C-Hdef) and 731(C-Hdef).

¹H NMR (DMSO) ppm; 7.8 (H β =CH-Ar), 7.0-7.7 (Ar), 6.9 (H α -CO-C=). ¹³C NMR; (CDCl₃) ppm: 181 (-CO-), 145 (C β), 128-134 (Ar),

1p - (2E)-3-(4-methoxyphenyl)-1-(furan-2-yl) prop-2-en-1-one

IR (KBr) cm⁻¹: 3454 (ArC-Hstr), 2922 (C-Hstr thiophene), 2854(C-Hstr alkene), 1743

(C=Ostr), 1649 (C=Cstr), 979 (C-Sstr), 734 (C-Hdef), and 675 (C-Clstr).

¹H NMR (DMSO) ppm; 8 (H β =CH-Ar), 7.3-7.7 (Ar), 7.2 (H α -CO-C=). ¹³C NMR; (CDCl₃)ppm: 129-138 (Ar), 192 (-CO-), 143 (C β), 128 (C α).

4. Antimicrobial Screening

Antibacterial Activity - The purified products were screened for their antibacterial activity by using disc diffusion method. The nutrient agar broth prepared by the usual method, was inoculated aseptically with 0.5 ml of 24 hr old subculture of *Staphylococcus aureus* and *Escherichia coli* in separate conical flask at 40^o-50^oC and mixed well by gentle shaking. About 25 ml of the contents of the flask were poured and evenly spread in Petridis (90 mm in diameter) and allowed to set for two hrs. The cups (8mm in diameter) were formed by the help of borer in agar medium and filled with 0.1 ml (1mg/ml) solution of sample in acetone. In antibacterial activity of chalcone derivatives (1i – 1p) were carried out using culture of *Klebsiella aerogenes* and *Proteus Vulgaris* by the disc diffusion method and the minimum inhibitory concentration (MIC) of these compounds were determined. Ciprofloxacin was used as the standard drug, whereas dimethyl sulphoxide (DMSO) as solvent. The minimum inhibitory concentration (MIC) was evaluated by the micro dilution method of test compounds. more active against *Klebsiella aerogenes*. Compound 1i was better antibacterial activity against *klebsiella aerogenes*.

Antifungal Activity - *Aspergillus niger* was employed for testing antifungal activity by disc diffusion method. The culture was maintained on Sabouraud dextrose agar slants. Sterilized Sabouraud dextrose agar medium was inoculated with 72 hr old 0.5 ml suspension of

fungal spores in a separate flask. About 25 ml of the inoculated medium was evenly spreader in a sterilized Petridis and allowed to set for 2 hr. The cups(8 mm in diameter) were punched in Petridis and loaded with 0.1 ml (2 mg/ml) of solution of sample in acetone. The plates were incubated at 200 – 250^oC for 72 hr. After the completion of incubation period, the zones of inhibition growth is in the form of diameter in mm was measured. Along the test solution in each Petridis one cup was filled up with solvent which acts as control.

In antifungal activity of chalcone derivatives (1i – 1p) were carried out using the culture of *Mucor racemosus*, *A. flavous* and *A. Fumigatous* by the disc diffusion method and the MIC of these compounds were determined. *Nystatin* used as the standard drug. The compound 1l shows high(35mm) antifungal activity against aspergillus fumigatous than other compounds.

5. Conclusion

The present study of an efficient protocol for the Chalcones can be synthesized in good yields from aromatic aldehyde and ketone using the catalytic system of NaOH/ EtOH. The synthesized compounds were characterized by TLC, melting point, IR, NMR spectroscopy and elemental analysis. The results obtained from this study confirmed that the product has formed. The synthesized compounds 1a and 1b show significant antibacterial activity against *Klebsiella aerogenes* and *Proteus vulgaris*. Compounds 1c and 1d shows significant antifungal activity against *Mucor rcemosus*, *A. flavous* and *A. fumigatous*. Hence, it is concluded that thereis ample scope for further study in developing these as goodlead compounds.

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EFFECT OF AGRICULTURAL PRACTICES ON THE ENVIRONMENT**Dr. Vilas Balajirao Ganipurkar¹**

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ABSTRACT

India is an agricultural country but it is necessary to think whether we are really doing agriculture properly, have you ever wondered if the methods we use while farming are the right ones? Through this research article I want to say that we need to know the methods of farming. It is necessary to use various medicines and fertilizers while we are farming, but we also need to think about whether it has any effect on the environment while using it. Now is the time to know the impact of farming practices on the environment. While we are farming, we think about how our income will increase but we don't think about the environmental impact of the way we are farming. I want to say through this research article that it is necessary to protect the environment as much as it is necessary for the farmers and to protect the environment we should stop the wrong way of farming or adopt the wrong method and protect the environment. In these research articles I have presented various such practices that adversely affect the environment.

Keywords: Agriculture, Pesticides, Fertilizer.

1. Introduction

My country is an agrarian country and I am an informed citizen of this agrarian country. As a conscious citizen of this agricultural country, we need to know the effect of the farming method on the environment and not only think that we are farming and that it is of great benefit to our economy, but not limited to us, but the environmental impact of the use of that method while farming. It is also very important to know the consequences and how we are responsible for them.

Be it our country, be it Maharashtra or our Nanded district, most of the people here are engaged in agriculture and are dependent on agriculture. While farming, we only think about the fact that our farm income should increase and we should get financial benefit from it, but we never think about whether the method we use to farm has any effect on the environment and that effect on the environment will affect us in the future. We never think about any adverse effect but now is the time when we have to think about it, if we don't think about it then it will be a serious problem for us in the coming life. Some of the farmers are not aware of the effect of the method we use for farming on the environment but the serious thing is that some of them know the effect of the method we use for farming but they don't think about it at all. There is a very big problem, we have to get out of this problem and think about the environment.

It's wrong farming practices, it affects the environment, not only the farmers are responsible, but the government is also responsible somewhere, the reason is that many of the drugs we use in agriculture are banned in other states or outside the country, but we use them widely. We need to think somewhere that does it mean that it affects only the foreign state or the people of the foreign country and not our own people at all? Therefore, it is not only the farmers who should think about the wrong methods of farming, but it is necessary for all of us to think about it, from the government to the farmers and the farm workers. If we think about it, it will definitely benefit us in the future. While we are farming we use different fertilizers we use different drugs but many farmers do not know how much fertilizers should be used and when they should be used. So now it is necessary to know.

2. Effect of Agricultural practices on Environment**(2.1). Pollution by Fertilizers:**

Fertilizers said that we associate it with income, yes it is correct but it is necessary to think how correct it is. Farmers who are aware also use fertilizers extensively and how they add to their income but the use of those fertilizers has a huge impact on the environment because when we use fertilizers. An infinite number of fertilizers are used in the soil and Fertilizers washed away by rainwater

from our fields into rivers and streams and pollutes the water. We have many types of fertilizers like 10. 26. 26., DAP , Potash etc we use it. Incorrect use of fertilizers affects not only the soil or water, but also kills beneficial bacteria in the soil.

(2.2). Pollution by Pesticides:

If there is no medicinal spraying, then there is no agriculture, as if such a concept exists in Indian agriculture. It is a serious problem that even drugs which are banned by the government are being used in some places. Actually we can also use biological drugs for medicinal spraying but many farmers don't know this and even though they know they don't follow that method but adopting that method is the current need when we use drugs it's not the effect on the crop it's the effect on the soil and beneficial microorganisms. Some of the pesticides we commonly spray are so dangerous that they can have adverse effects on the human body that sprays them, causing serious injuries and serious illnesses. Many of these pesticides as a residue leave long lasting effect in the affected field. This not only kills the harmful but the beneficial insects and organisms also. These when mixed with water, seeps down into the ground and makes the ground water toxic (Folnovic T.). When these as a effluent released in the local drainage system of farm, makes the nearby soil and water reservoirs polluted and toxic (Vatn et al., 1997).

(2.3). Pollution by Plant Hormone:

We use biological hormones widely in our farming practices. Biological hormones work to stimulate plant growth and increase yield. If you do, it will affect the crop and it will also affect the environment, and it's like if you have 2,4,D. herbicides or biological contact that we use in the field commonly, the effect you have on the crop and on the flora and fauna in the soil and We need to understand that the environment.

(2.4). Pollution by Plastic Film:

We use plastic extensively in new farming methods, we use it to save water and reduce water consumption for agriculture, but when we use these reactions. We do not think about the impact of the environment, but when we use this plastic film for agriculture and after it is used. This plastic film does not decompose in agriculture, it has a great impact on the environment, because this plastic film remains in our soil for years it has a great impact on the soil and the overall environment, so how do we use plastic film? We need to think about this matter as well. Large amounts of residual plastic film have detrimental effects on soil structure, water and nutrient transport and crop growth, thereby disrupting the agricultural environment and reducing crop production

3. Conclusion and Suggestions:

The above research article has discussed in detail about the effect of the wrong methods we use in agriculture on the environment, now is the time to know and convey to other farmers that there are wrong methods of farming and we should correct them and use them properly should be done.

WHO reports that the number of cancer patients is expected to increase in the coming years, and the biggest reason behind this is the adoption of wrong practices in Agriculture. I want to say through this research article that many farmers are not aware of the effect of the farming practices we follow on the environment, so my request to all environmentalists is that we need to inform those farmers about it so that they don't adopt wrong farming practices. In these research articles I have given information about the wrong practices that farmers follow in farming It is necessary to convey all the information about it to the farmers and we need to change the farming methods which are being done wrongly by them.

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PLASTIC POLLUTION AND ONCE USED PLASTIC BAN**R. R. Wankhade^{*1}, S. P. Mote²**

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ABSTRACT

To study the prevalence of gastrointestinal parasites of *Boselaphus tragocamelus*, 51 faecal samples were collected from Katepurna Sanctuary during the period from February 2022 to July 2022. Thirty five samples were found to be infected with gastrointestinal parasites and overall prevalence rate was 68.62%. *Paramphistomum sp.* (23.52%), *Ascaris sp.* (19.6%) *Fasciola sp.* (11.76%), stomach worm (11.76%), hook worm (9.80%), *Strongyloides sp.* (3.92%), *Balantidium coli* (3.92%) *Oesophagostomum sp.* (1.96%), *Eimeria sp.* (1.96%) & Mixed type of infections of *Ascaris sp.* Was found in 5 different scat samples or droppings.

Seasonal prevalence of gastrointestinal parasites in summer and winter were 80.01% and 17.3% respectively. This study provided a second overview on parasites in Nilgai of the Katepurna Sanctuary, but to evaluate parasite transmission dynamics much more studies were required on livestock and on wild herbivores.

Keywords: *Boselaphus tragocamelus*, Nilgai, Faecal sample, Parasite, Scat analysis.

1. Introduction

The word plastic is coined from the Greek word 'Plasticose' meaning flexible and getting any desired shape. It was in 1862 that Alexander Parkes introduced the world's first-ever man-made plastic. Britannica encyclopaedia defined plastic pollutant as that plastic, more use of it has adverse effect on environment, mankind, other living things, soil, air and water¹.

There was need of invention of plastic because the natural resources, especially various metals were not sufficient to fulfil the needs of mankind as population was increasing. The synthesised plastic is superior to the things used at that time. In 21st century this plastic has higher rate of conversion as plastic waste. Higher use of plastic is not only in India, but it is all over the world. Once used plastic is very problematic and hazardous. Use of plastic bags, plastic bottles have increased to very higher extent. They are made coloured to make it beautiful and attractive. These colours are of low quality and hence they are hazardous to mankind and living things. The cultures of use and throw is increasing in 21st century and habit of fulfilling the temporary need is growing day to day. This is responsible too increase the plastic waste all over the world. It is estimated that if the plastic waste is collected, it will form the hill, which will be 4 times in the height that of most high mountain,

'Everest'. If this rate of formation of plastic waste continues, then the existence of human being and all living things will be in danger.

2. Position of Plastic and Plastic-Waste in India and World

According to a U.N. report in the world from year 1950 to 2018. 9 billion tons of plastic was produced⁴. Out of this 44% was produced after the year 2000 just 18 years of duration. It was reported that out of total plastic produced 79% is harmful to the environment. Further report proposed that from total production, 94% of plastic can be recycled. But about 50% of total production is of single used plastic.

In the world in the year 2018, the rate of production of plastic-waste was 5kg/sec. Thus, in a year 15.55crore of kilograms of plastic-waste was formed. In this, contribution of India was 0.95 crore of kilograms. Out of this 60% i.e. 0.57 crore of kilograms was recycled and reused. Thus 0.38 crore of kilograms of plastic-waste was permanent waste. It was reported that in India, plastic(polythene) bags contribute mostly to plastic waste. In the year 2018, in India 11.16 tons of plastic bags were produced. In India, according to the record of 2018, there were more than 30,000 plastic industries and transaction of these industries was about 1,10,000 crore rupees. This gives 6900 crore rupee revenue to the government. There are more than 40 lacs of employee working in Plastic and plastic based industries.

3. Harmful Effects of Plastic Waste

Harmful effects of plastic waste are observed on human being, living organisms, environment etc. are mostly due to unplanned and excessive use of plastic.

1. Human beings: plastic particles are responsible for respiratory diseases. If plastic particles enter the human body, it may cause cancer, indofrain depression, dermatirise, thyroid diseases, fertility problems, etc.
2. Other Living Organisms: Animals, birds, insects, aquatic manure, land tenor, etc. are affected due to plastic wastes. We always hear the news of collection of plastic in kilograms in the stomach cows or similar animals. There is effect on children who drink the such affected cows' milk.
3. Environment: There is major role of plastic waste in environmental pollution. Plastic and plastic waste contributes to water, air and soil pollutions.

A. Water Pollution: River-dam water, ground water and sea water get polluted due to plastic and plastic waste particles. Plastic waste enters the river and dams from the runoff of cities. In India about 33.42 million tons of plastic waste enters the rivers and dams. It was reported that every Indian consume about 3000 to 4000 tiny plastic particles every day. An international survey in 2017 reported that the plastic contamination rate of tap water is about 94%. It was noted that at the bottom of sea plastic waste get collected, which mainly affects the aquatic life. Every

year about 4 lacs of sea creatures die because of plastic waste. A survey reported that plastic particles are found in 90.11% sea birds³.

- B. Soil Pollution: Now a days it's a common observation of every one that land at boundaries of villages and cities appear colourful due to spread coloured plastic bags in the dumping stations. As plastic can't be decomposed easily, there is formation of plastic layer on the surface. The poisonous materials used in plastic enter in the soil and pollute it. This harmful material get absorbed by vegetables through the roots from polluted soil.
- C. Air Pollution: Plastic particles gets suspended in air as particulate matter and pollutes the air. This particulate matter affects the air quality. When AQI (Air Quality Index) is 50-60, the air is safe. In last 3-4 years, during the winter in Delhi the AQI of 500 microgram per meter cube was noted. During the preparation of plastic and plastic powder, tiny particles of poisonous dioxane; responsible for cancer enters the air². When plastic is burnt, carbon dioxide, nitric oxide like harmful gases are produced, which pollute the air.

4. Conclusion

Plastic is very hazardous material. Once used plastic cannot recycled. Hence its use should be banned or very restricted.

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CASE STUDY OF MARINE FISHERIES COOPERATIVE SOCIETIES IN VILLAGE SATPATI, PALGHAR OF MAHARASHTRA STATE

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ABSTRACT

Satpati is a fishing village in the Palghar district of Maharashtra having two marine fisheries cooperatives with a total membership of more than 6000. These cooperatives have been promoting the active growth of the fishing community for the last six to seven decades. Both cooperatives have substantial assets and decent financial conditions. However, they have several problems in administration, infrastructural development, marketing, and fishing. To strengthen the present cooperatives and make them contribute to the development of their member; it is necessary to support and revitalize the activities carried out by fishing cooperatives.

1. Introduction

The fisheries sector plays a major role in socio-economic development through employment generation, food security, and nutritional requirement by providing a cheap source of food (Pagdhare and Bhakay, 2012). India has a marine fisheries potential of 66% and an inland fisheries potential of 51% (Handbook on Fisheries Statistics, 2020). The marine fisheries sector contributes significantly to the country's export figures. The total fish production of India for the year 2020 was 14.73 MMT, of which 11.49 MMT of the fish was exported (CMFRI, 2020). Hence, fisheries have great potential to improve the socio-economic condition of fishers.

A "cooperative society" is a group of people who seek to cooperate with some common economic goals. It is a group of people who have voluntarily come together to advance their social and economic interests (Salim *et al.*, 2011).

Cooperative activities started in the year 1904 in India. It was crucial to the growth of the agricultural industry, particularly in assisting the small, marginalized, and poorer segments of society. The government accepted the cooperative sector as a third economic sector following independence, to act as a bridge between the public and private sectors. In the Indian fisheries sector, it began in the year 1913 with the establishment of the first

fishermen's cooperative society named 'Karla Machhi Vyavasaik Sarv Seva Sahakari Sanstha Maryadit, Karla' in Ratnagiri district of Maharashtra. It has boosted the mechanization programme across the states. Further, the emphasis on fish marketing brought many benefits to the fishers resulted in the establishment of marine fisheries cooperatives in West Bengal, and Tamil Nadu states in the year 1918 (FISHCOPFED, 2021).

For educated youngsters of India, unemployment is a serious issue; however, fishing, particularly for employment, has good potential. Because of their poor economic standing and lack of education, the fishing community cannot use it. Cooperatives can be very helpful in these situations by giving them social, financial, and infrastructure support. We performed the current study to show the significance of cooperative societies in providing fishers with employment and income by investigating the management, operations, and limitations of the marine fishing societies in Maharashtra.

Sapovadia (2004) studied fisheries cooperatives as a tool for socio-economic development. The study represented the cooperative as a defense for the poor. The study's analysis of the cooperatives' advantages and disadvantages also suggested a solution. The study made the argument that wise resource management is crucial. Fishermen can

have a brighter future through fisheries, agriculture, and related industries.

Nair et al. (2007) studied the business achievement of fisheries cooperative societies in Vasai taluka of Thane district, Maharashtra to evaluate the functioning, role, monetary performance, and constraints in the management of cooperative societies. The profit ratio and operating ratio of various cooperatives were not satisfactory, but the net profit ratio and efficiency ratio were satisfactory. The main constraints to the cooperative society were lack of funds, untrained fishermen, the dominance of middlemen, and a lack of skills among the members.

In India's agricultural growth, Sahoo et al. 2020 examined cooperative organizations and reported that cooperatives offer finance for short- and medium-term financing. Studies give technical and vocational assistance to support the expansion of agriculture through the provision of training, cooperatives assist in the up-gradation of members, particularly young people, women, and poorer sectors. It aids in upgrading infrastructure facilities.

2. Methodology

Two societies were selected for the study in Satpati village of Palghar district of Maharashtra. It is a fishing village on west coast of India, located in north of Mumbai. It is located between 19°42'59.99" N latitude and 72°41'59.99" E longitude. Palghar and Thane have combined coastal length of 127 km. There are a total of 77 fishing villages with a total fishing population of 1,21,869, which involves 26,331 traditional fishermen families with 17,559 active fishermen. There are a total of 29 fish landing centers. The combined production of Palghar and Thane districts for the year 2019-20 was 86,225 MT (DOF GOM 2021). With the use of a semi-structured interview schedule and taking into account the study's aims, the main data of cooperatives were gathered from the cooperative's key informants, such as the chairman, vice-chairperson, or secretary of society. The Department of Fisheries, Government of Maharashtra, cooperative annual reports,

cooperative administrative records, and other sources served as the study's secondary data sources.

3. Results

Administration

The variable studied related to administrative functions are membership, by-laws, election, meeting, employees, audit

Membership

Satpati Madhyavarti Vividh Karyakari Sahakari Sanstha Maryadit as of now abbreviated (SMVKSSM) and *The Satpati Fishermen's Sarvoday Sahakari Society Limited* will be abbreviated as (TSFSSSL). Total members of SMVKSSM were 3108 and total members of TSFSSSL were 3823. Both of the societies had membership fee of Rs. 100.

By-laws

Both the societies follow the laws and by-laws. In order to maintain the efficient operation of society, changes have occasionally been made to the laws and bylaws of both societies.

Elections

Board members were selected by election process. Election is held in every five years in both the societies.

Employee

The SMVKSSM has 41 permanent employee and 12 temporary employees. Total salary paid to the permanent employee was Rs. 6,15,000 and Rs. 1,08,000 to the temporary employees per month while TSFSSSL has 48 permanent employee and 4 temporary employees with total credited salary Rs. 7,20,000 and Rs. 32,000 pr month respectively.

Audit:

As per the data of last five years both the societies SMVKSSM and TSFSSSL have received "A" audit grade by government approved agency.

Table No 01:
Present data of marine fisheries cooperative societies of Village Satpati

Particulars	<i>Satpati Madhyavarti Vividh Karyakari Sahakari Sanstha Maryadit (SMVKSSM)</i>	<i>The Satpati Fishermen's Sarvoday Sahakari Society Limited (TSFSSSL)</i>
Year of establishment	1944	1947
Total membership	3108	3823
Number of permanent employees	41	48
Number of temporary employees	12	4
Audit grade	A	A

Functions of the cooperative societies:

Cooperatives societies plays important role in fishermen life by fulfilling their needs. The main functions of cooperative societies in Satpati village are as follow:

- SMVKSSM and TSFSSSL societies provide the facilities like transportation, fish storage and marketing. Both have ice plant. TSFSSSL has salt pan on lease basis to made available the salt for ice production which gave the profit of Rs. 13,747 to the society. SMVKSSM has its own fish processing unit.
- Both societies are involved in fish marketing undertaking the wholesaling activities.
- Supply of high-speed diesel (HSD) for the fishermen and help to get concession on HSD under the scheme Fishermen Development Rebate on HSD Oil-CSS. TSFSSSL shows the increasing in profit on diesel tanker by 12%. Total profit was Rs. 9,88,718 while total sell of oil by SMVKSSM was Rs. 3,79,10,583.
- SMVKSSM provision of consumer goods through retail. Both the societies supply fisheries requisites like rope,

nylon twine, engine spare parts etc. TSFSSSL bought the fisheries requisites of Rs. 3,66,49,196 and got the profit of Rs. 18,33,259. Total sell of fisheries good by SMVKSSM was Rs. 1,41,21,252.

- Cooperatives have arranged training programmes on deep sea fishing and value-added products and also conducted awareness campaign on various topics like sustainable fisheries, safety at sea, introduction of government schemes etc.
- TSFSSSL avail the loans by NCDC for various work done for cooperative like ice factory, cold storage, supermarket etc. Also, both the cooperatives help to avail loan for members by NCDC.

Constraints:

- Major constraint affecting the cooperative societies in the Satpati area is pollution. Due to industrial development the problem of water pollution is increasing rapidly, which is leads to decrease in catch. Both the cooperative societies need proper infrastructural development.
- To avail the government schemes lengthy documentation is required. Hence many schemes were not attained by cooperative members.
- Another major problem affects the cooperatives production is limited landing centre and marketing yards for the fishers. Also increasing in the fishing vessel affects the fish landing.
- Societies need proper market place at district level for auctioning. There is lack of basic facilities at the landing centres like availability of water, light etc.

4. Conclusion

It was found that both the cooperatives were playing important role in developing the fisher's social and economical status by providing external support from many years. They are providing basic facilities like ice availability, fish storage, transportation etc. Now cooperatives are trying to get proper market area for women venders and auctioning

place for societies at district level. TSFSSSL got “Sahakar Bhushan” award for better performance in cooperatives of the year 2013-14 and in the 2016 SMVKSSM got the same award for their performance. Industrial

development, unrestricted fishing in the ban season and fishing by purse seine can affect the traditional fishermen. So, the government's policies need to be strengthened and properly adhered to.

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PRELIMINARY MORPHOTAXONOMIC STUDY OF SOME GRASSES IN DIGRAS TEHSIL DISTRICT YAVATMAL MAHARASHTRA

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ABSTRACT

The present preliminary documentation of some grass species were carried out in Digras tehsil of District Yavatmal Maharashtra, regarding the morphotaxonomic studies of grasses as an aid to their correct identification, their distribution and uses in the area. The study area has rich floral diversity . From the study area 26 species of grasses were studied with reference to their morphology and economic importance to local people. The grasses play an important role in rural economy of the area. Mainly grasses used as fodder in the area some grasses are used for thatching and for medicinal purpose . There is deterioration of the habitat of grasses due to overgrazing.

Keywords: Morphotaxonomic study , grasses

1. Introduction

Grasses are one of the largest and most valuable groups of flowering plant consisting of some 645 genera and about 10,000 species. It ranks third in number of genera after Compositeae and Orchidaceae and fifth in number of species after the Compositeae and Orchidaceae, Leguminoseae and Rubiaceae .

A high proportion of the most fertile and productive soils of the world were developed under a vegetation cover grasses. Roots, stolen, rhizomes and litter from the annual replacement of leafy culms are not only soil blinders but also are effective soil stabilizers. In both agriculture and range forest areas over utilization have resulted in the loss of vast quantities of top soil by the action of wind and water. Through experience man has learned that perennial grass cover provide the best means of checking surface soil loss and rebuilding depleted soils.

Grasses exceed all other in the importance of its products. It provides food in the form of cereals for man and forage is for most animals. There can be no doubt that cereals and pasture grasses are economically the most important plants in the world and it would be quite impossible to imagine how mankind could continue agriculture without them.

The present preliminary documentation of some grass species were carried out in Digras tehsil of District Yavatmal Maharashtra, regarding the morphotaxonomic studies of

grasses as an aid to their correct identification, their distribution and uses in the area. The study area has rich floral diversity. From the study area 26 species of grasses were studied with reference to their morphology and economic importance to local people. The grasses play an important role in rural economy of the area. Mainly grasses used as fodder in the area some grasses are used for thatching and for medicinal purpose . There is deterioration of the habitat of grasses due to overgrazing.

2. Study Area

The Digras is a municipal council in Yawatmal district in the state of Maharashtra India. It covers an area of 1135 km. The Digras is surrounded by dense forest areas forest play an important role in our life and economy . Dhawanda and Morna Rivers flow through the Digras. The study area has well demarcated 4 seasons as a hot summer , heavily raining monsoon, a brief autumn and a mild winter. Black cotton soil is abundant in Digras Tahsil. The present study deals exclusively with the information of various grasses species belonging to the poaceae family this work is helpful to explore biodiversity of grass is in the Digras Tahsil. Grasses is a dominant in herbaceous vegetation in terms of number of species in frequently percentage indicating favourable climatic and edaphic factor for agriculture. Grasses provides food and cover for various species of birds and small animals

people of that area use grasses for various purposes thatching making brooms making hearts for animals and shelter. Some grasses are used as a medicine and mainly as a fodder for their cattle hence there was a need to study grasses of the area and they are correct identification and distribution in the area.

3. Materials and Methods

The present study is the outcome of the one year of critical, minute and systematic study of grasses and their uses by the local people of the area. Field trips were carried out in every season and in all the representative locality of the area in the plants of some species were collected from different sites and from different

habitat to observe the morphological differences. Nomenclature of each taxon has been checked under the rules of ICBN.

A map of the area with the important places of collection is given. Detailed morphological study were carried down under the dissecting microscope and different morphological character were observed and their identification was confirmed by Floras like Flora of British India (Hooker 1872 – 1997), Flora of Bombay presidency (Cook 1958), Flora of Marathwada (Naik 1958), Flora of Yavatmal District (BSI) By Karthikeyan and Anand Kumar. Artificial key is generated for genera and species important for botanical research.

4. OBSERVATION

Table 1 The preliminary morphotaxonomic documentation of some grass species (Poaceae) in Digras tehsil

Sr No	Botanical Name	Occurance / Habitat	Diagnostic Characters	Economic Importance
1	<i>Alloteropsis cimicina</i>	Commonly grows on gravelly slope of hills in open grassland as well as in cultivated fields	Culms terete 20 -80cm long nodes glabrous .leaves 2 to 10 cm long covered with bulbous hairs. Blade flat elliptic. Flowers 4-6 digitate ovate ,membranous and elliptic	Fodder
2	<i>Apluda mutica</i>	Open grasslands	Routing from the lower nodes much branch in upper part. Leaf blades are flat. Inflorescence panicle simple, racemes.	Fodder
3	<i>Aristida adscensionis</i>	Rare in fields common on mountains slopes.	Culms 36 -70 cm tall, erect internodes length 6.5 to 8.6 cm . Leaf blades glabrous . Pointed tip Small white hairs. Panicle contracted . Spikelets long excluding awns ,hairy glumes . Linear and lanceolate.	Fodder
4	<i>Aristida setacea</i>	Frequent on hill slopes along roadsides dry rocky places.	Culms erect 30-450 cm tall . Leaf sheath terete . Ligules a rim of hairs , convolute . Panicle contracted . Spikelets linear to narrowly ovate awned glume membranous	Good soil blinder

5	<i>Arundo donax</i>	Rare in rocks river beds and streams	Height upto 5 metre having long and broad leaves. Internodes hollow having woody rhizomes. Leaves 32-60 cm long 5 cm wide Margins are sharp to touch. Panicle 30 – 60 cm long	Thatching
6	<i>Anthraxon lanceolatus</i>	Frequent growth along roadside and on hill slopes.	Culms terete , erect , 10-100 cm tall . Leaf sheath compressed covered with bulbous hairs . Inflorescence racemes . Racemes 1-7cm long hairy ,sessile spikelet .bawned .Margins cilliate and hairy .	Fodder
7	<i>Brachiaria deflexa</i>	Common in waste places in field in near fields	Weak ascending culms . Leaf blades flat rounded to the base . Inflorescence false panicle with triquetrous rachis .	Fodder
8	<i>Brachiaria ramosa</i>	Common in waste places in fields and near fields.	Mostly 10- 70 cm tall ,culms angular , ribbed More or less densely hairy . Leaves flat lanceolate . Inflorescence of 3- 25 racemes on an axis with triquetrous rachis.	Fodder
9	<i>Chloris barbata</i>	on mountains slopes.	Grass with flat basal culm. Inflorescence pink and green . Spikelets having 3 awns , spikelets disarticulating above the glumes	Used as a fodder when young.
10	<i>Chloris dolichostachya</i>	Occasionally occur along forest margins growth under shady places	Culms terete , nodes glabrous . Ligule of long hairs ,leaf blades linear , elliptic ,apex narrowed to fine point . Spikes 4-6 ,rachis filiform.	Fodder
11	<i>Cynodon dactylon</i>	Abundant throughout the area ,very common in moist places	Hizomatous, stoloniferous, culms slender, leaves narrow pointed . inflorescence digitate having 4-5 spikes.Spikelets on one side of rachus , having one floret lower glumes thin membranous narrowly oblong .Upper glume similar to lower one lemma is boat shaped	Used as fodder , religious importance
12	<i>Dactyloctenium aegyptium</i>	Common in cultivated fields ,shady places, wet lands	Plant upto 52 cm high ,rooting at lower nodes forming extensive spreading mats leaf blades hispid on both sides. Inflorescence digitate having 4-5 short spikes,Spikes sickle shaped .Rachis extended into pointed tip	Fodder

13	<i>Dichantium annulatum</i>	Common in grasslands , moist land throughout the near area of fields .	Culm upto 1m tall,nodes hairy . Leaf blades flat or rolled inflorescence having digitate or sub digitate spikes . Having a pair of spikelets pedicelled and sessile . Upper lemma of sessile spikelets with awn 9.5 – 1.6mm long, minute hairy	Fodder
14	<i>Dinebra retroflexa</i>	Very common near bushes and weed of cultivated fields	Up to 50 cm tall . Culms decumbent base ,much branched rooting at nodes ,infrequently erect . Leaves linear , glabrous Inflorescence 6-20 cm long,rachis flattened narrowly winged	Fodder
15	<i>Echinocloa colonum</i>	Common weed of fields and moist lands	Geniculately ascending , rooting at lower nodes. Inflorescence 4-6 cm long composed of racemes arranged on central axis Spikelets ovate elliptic , pubiscent and cuspidate , whole of the spikelets disarticulating . Spikelet in pairs , irregularly arranged on the rachis ligule absent .Tip of upper palea reflexed	Fodder
16	<i>Eleusine indica</i>	Common on shady places and near fields.	Inflorescence digitate , composed of 2-5 ascnding spikes, 6-11 cm long, spikes looks like a closed zipper . Glumes persitent and equal , leaf blades flat or folded.	Fodder
17	<i>Eragrotis minor</i>	Grows in open grasslands and as weed in cultivated fields	Panicle open and dispersed . Spikelets on long and slender pediceles . Spikelets oblong , leaf blades stiff and narrow fruit caryopsis .	Fodder
18	<i>Eragrotis tenella</i>	Rows in wastelands along roadsides.	Erect or ascending , 10-40 cm tall .Small spikelets at the base of inflorescence and large on the top . Having oval and oblong spikelets on pedicel.	Fodder
19	<i>Eragrotis tremula</i>	Grows along margins of wetlands .	Culms tufted , terete , 25- 60 cm long , nodes glabrous .Leaf blade flat ,linear ,rounded ,apex acuminate . Panicle effuse 10-30 cm long ,branches filiform . Fruits caryopsis	Fodder
20	<i>Eragrotis viscosa</i>	Frequent grows along roadsides, waste places and as weed in cultivated fields.	Culms tufted ,terete 10 -20cm tall erect ,nodes glabrous . Leaf blade flat , linear glandular hairs ,apex acuminate. Panicles 5-20 cm long . Spikelets ovate ,elliptic . Fruits caryopsis .	Fodder

21	<i>Eragrotis ciliaris</i>	Common Grows along the sandy soil along with water channels.	Culms tufted, terete , 10-40cm long ascending at base, nodes glabrous . Leaf blade flat ,linear apex acuminate . Panicles compact 2-6 cm long , pedicel very short, spikelets compressed ,fruits caryopsis	Fodder
22	<i>Heteropogon contortus</i>	Abundant on mountains throughout sandy dry soil , clay soil.	Recognized by bunch of twisted awns at tip of inflorescence that get entangled with clothes . Leaf blades auriculate, a few stiff hair at the leaf base . Adaxial surface rough ,some racemes may be spatheolate, the basal sheaths laterally compressed	Fodder
23	<i>Pennisetum pedicellatum</i>	Common along roadsides , in forest .	30-90 cm long. Leaves linear , acuminate, long hairy along margins near base . Inflorescence 8-13 cm , dense many bristles few to many . Spikelets solitary and geminate . fruits caryopsis	Fodder
24	<i>Sacciolepis myosoroides</i>	It is not confined to wet lands but often found in seasonally inundated places marches along water courses.	40-70cm long . Rooting at lower nodes .Leaves 10-20cm long , linear , base rounded . Ligule membrane . Panicle 10-20 cm long cylindrical .Fruits caryopsis .	Fodder
25	<i>Themeda quadrivalvis</i>	A weed roadsides, distributed site Waste areas open Woodlands.	Culms tufted, angular,ribbed .Leaves extremely variable . From hairy to non hairy green to bluish green in colour.Inflorescence is an open panicle with a group of spikelets situated on a long thin subsidiary branches. Fruits large and shiny black.	
26	<i>Vetiveria zizaniodes</i>	Commonly growth on wet low lying ground , along banks of streams and rivulet.	Tufted perennial, More than one metre high.Leaf blades keeled at the base Panicles with the whorls of numerous slender racemes Composed of several to many spikelets . A pair of two spikelets pedicelled and sessile . Glumes lanceolate , oblong and coriaceous .	A good fodder when young Roots are aromatic and are the source of vetiver oil.Ingredients in perfumes.

5. RESULT , DISCUSSION AND CONCLUSION

The present study documents a total 26 species of grasses have been studied taxonomic point

of view . All these grasses have been studied well for their distributions , morphology and uses. (Table 1)

The grass associations in study area can be grouped into two distinct categories

1. Grasses from forest region
2. Grasses from the plains .

1.Grasses from forest region : The dominant grasses of forest region of Digras are *Apluda mutica*, *Pennisetum pedicellatum*, *Themada qaudrivalvis*, *Heteropogon contortus*, *Brachia ramosa*.

2 Grasses from the plains: The plains of the Digras have a few reserve grasslands on which growth of *Heteropogon contortus* , *Dichanthium annulatum* .

The open areas around villages , waste lands and the roadsides shows the growth of *Aristida depressa*, *Aristida redacta* , *Dactyloctenium aegyptium* , *Eragrotis minor* , *Eragrotis ciliaris* , *Setaria viridis* etc. The grasses occurring in cultivated fields are mainly *Aristida deflexa*, *Brachiaria ramosa* , *Anthraxon lanceolatus* , *Chloris dolichostachya* , *Chloris barbata* , *Eragrotis* species *Chrysopogon fulvus* . *Alloteropsis cimicina* occur on rocky , moist substrata. Grasses like *Aristida depressa* , *Brachiaria sp.*, *Cynodon dactylon* are very troublesome weeds of the black cotton soils . Much energy and money of the farmers is spent on keeping these weeds in control .

The chief source of grass fodder for farm cattle is in the form the bunds of fields . Such bunds are left all around the fields for growth of grasses .*Dichanthium annulatum* ,*Dinebra retroflexa* , *Pennisetum pedicellatum* , *Sacciolepis myosuroids* ,*Themeda qaudrivalvis* , *Apluda mutica* ,*Chloris dolichostachya* , *Chloris barbata* ,*Cynodon dactylon* , *Dactyloctenium aegyptium* , *Eragrotis ciliaris* , *Eragrotis tenella* , *Heteropogon contortus* commonly grows on these bunds.Usually grasses are of little ornamental value . Some grasses of ornamental value for their foliage and panicles are *Arundo donax* , *Pennisetum pedicellatum* .some of the grasses are used on different occasions found have value in region . The grasses of religious significance include *Cynodon dactylon* , *Saccharum officinarum* ,*Sorghum bicolor* ,

Triticum aestivum and *zea mays* . Some of grasses possess aromatic oil which are or can be used in perfumes or medicines . Aromatic grasses include *Cymbopogon martinii* and *Vetiveria zizanioides*.

Artificial Key for Grass Species In Digras Tehsil

1. Lemma in articulated; lower glumes shorter than the upper ones
 . . . *Aristida adscensionis*
2. Lower glumes of sessile spikelets rounded on the back not keeled, spikelets laterally compressed, base of the plant not covered with cataphylls.
 Pedicelled spikelets, at least in the upper part of the raceme developed.
 . . . *Arthraxon lanceolatus*.
3. Spikelets or pairs or cluster of spikelets evenly distant by less than their own length .
 . . . *Brachiaria ramosa*.
4. Spikelets or pairs of spikelets very loosely scattered. . . .
 . . . *Brachiaria deflexa*.
5. Empty lemmas above the floret solitary spikes up to 20.cm long, spreading, spikelets appressed to the rachis, empty lemma reduced to an awn.
 . . . *Chloris dolichostachya*.
6. Empty lemmas above the floret 2 or 3.
 . . . *Chloris barbata*.
7. Upper glume of the sessile spikelet keeled, pectinate – ciliate in the lower two – third or three quarters with long golden or golden brown rigid hairs.
 . . . *Chrysopogon fulvus*.
8. Plant rhizomatous, hairs on lemma not clavellate, ligule a ring on hairs.
 . . . *Cynodon dactylon*.
9. Lower glumes of the sessile spikelets oblong, obtuse or truncate, median nerve present, ligule longish.
 . . . *Dichanthium annulatum*.
10. Wild, racemes distant or only the upper ones crowded. . .
 . . . *Echinochloa colonum*.
11. Spikes slender, nearly glabrous at the base, grains, oblong, obtusely trigonous
 . . . *Eleusine indica*.
12. Annuals, lemmas ciliate on the keels.

13. Panicles effuse. . . . *Eragrotis ciliaris*.
14. Stem slender, branches not more than 5 cm long. . . . *Eragrotis tenella*.
15. Perennial; shorter grass. *Eragrotis japonica*.
 . . . *Heteropogon contortus*.
16. Inner involucre bristles woolly, lemma dissimilar, the upper one 3 toothed at the apex.
 . . . *Pennisetum pedicellatum*
17. Bristles retroseely barbed . . . *Setaria verticiliata*.
18. Involucre spikelets less than 6 mm long, awn up to 3.5 cm long, hermaphrodite spikelet solitary or geminate.
 . . . *Themeda quadrivalvis*.

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La (III), Pr (III) and Nd (III) COMPLEXES WITH SUBSTITUTED PYRAZOLINES: KINETIC STUDIES IN 70% DIOXANE-WATER MEDIUM**Jayant R. Bansod¹, Sanjay P. Mote²**¹ Vidya Bharti Mahavidyalaya, C.K. Naidu Road, Camp Road, Amravati, Maharashtra, India.² B.B. Arts, N.B. Commerce & B.P. Science College, Digras Dist. Yavatmal, Maharashtra, India.
Corresponding author: jayant.bansod.cm@gmail.com**ABSTRACT**

The stability constant of La (III), Pr (III), Nd (III) with 3-(2-Hydroxy-5-methyl phenyl)-5-phenyl pyrazoline–L₃ & 3-(2-Hydroxy-5-methyl phenyl)-1,5-diphenyl pyrazoline–L₄ have been studied using pH-measurements in 70% (v/v) dioxane-water mixture at 0.1 ionic strength. The value of proton-ligand stability constants and metal-ligand stability constants are calculated.

Keywords: Pyrazolines, Stability constant, pK.

1. Introduction

Derivatives of many Pyrazolines have been shown to possess local and anesthetic properties. Pyrazolines are useful as intermediates in the synthesis of cyclopropanes. They are also of interest as effective chemical bleaching agent and as luminescent and fluorescent substances.¹ Pyrazoline rings are also capable of influencing photo-physical properties of lanthanides², considering these important properties of pyrazolines, we have chosen it as the main ligand of our complexes. Due to the high affinity of lanthanum (hard acid), towards the O-donor ligand (hard base)³. The lanthanide compounds have a remarkable importance in every day life⁴⁻⁵. The rare earth elements play a significant role in the development of our scientific and industrial life. More explicitly, in the previous decades their use in various organic technical processes led to a rapid growth especially in the field of complexes. In continuation of our previous work⁶, we have investigated the complexation behaviour of 3-(2-Hydroxy-5-methyl phenyl)-5-phenyl pyrazoline–L₃ & 3-(2-Hydroxy-5-methyl phenyl)-1,5-diphenyl pyrazoline–L₄ with La (III), Pr (III), Nd (III) followed by the pH-measurements of the resulting complexes.

2. Experimental

The ligands used in the present work are synthesized by standard known literature methods^{7,8}. 0.01 M stock solution of each ligand was prepared by dissolving the requisite amount in dioxane (100%) solvent.

All the pH measurement was carried out with EQUIP-TRONICS digital pH-meter (model EQ-610) equipped with combined glass electrode and magnetic stirrer (accuracy \pm 0.005 units).

Calvin-Bjerrum Titration :-

The experimental procedure involved pH-metric titrations of solutions of (i) free acid i.e. HNO₃ (A) (ii) free acid + ligand (A+L) (iii) free acid + ligand + metal ion (A+L+M) against standard alkali solution (i.e. NaOH). The ionic strength of each solution was adjusted a constant volume (0.1 M) by addition of appropriate amount of 1 M KNO₃ solution. The glass beaker placed in a water bath to maintain a constant temperature $27 \pm 0.1^\circ\text{C}$. The titrating solution was allowed to attain the bath temperature before commencement of the titration. The titration vessel and its contents were purged with nitrogen for five minutes and then titration was begun. The pH meter readings were taken only after the gas bubbling and magnetic stirring were stopped. At the point, when the meter readings raised suddenly i.e. at the neutralization point of HNO₃, the rate of bubbling was increased to allow the reading to become steady more quickly, normally, it took about two/three hours to complete one titration.

The optical densities of the ligand solutions and their metal complexes have been measured by UV-VIS spectrophotometer model 1700 (Shimadzu, Japan) and accuracy = \pm 0.005. The spectral range of the instrument was from 180 nm to 1100 nm.

Irving and Rossotti⁹ have proposed a relation between the stability of the complexes and basicity of the ligand by equation.

$$\log k = apK + b$$

3. Results and Discussion

The relation $\log K = a pK + b$ was, therefore, examined for 1:1 and 1:2 complexes of La (III), Pr(III) and Nd (III) metal ions with ligands by plotting $\log K_1$ or $\log K_2$ against $pK_1 + pK_2$ having straight line graph.

The result obtained during the work is tabulated in following tables.

pH-Metric Titration Data

SYSTEM : Ligand (L₃)

Medium : 70% Dioxane-Water.

$E^0 = 0.01 M$ $T_L^0 = 20.00 \times 10^{-4} M$

$V_0 = 50 ml$ $T_M^0 = 4.00 \times 10^{-4} M$

$N = 0.20 N$

$Temp. = 27^{\circ}C \pm 1^{\circ}C$ $\mu = 0.1M$

Table 1:

Titration of					
Free Acid		Free Acid + Ligand	Free Acid + Ligand + Metals		
			La(III)	Pr(III)	Nd(III)
Volume of Alkali added(ml)	pH	pH	pH	pH	pH
0.0	2.15	2.16	2.16	2.16	2.16
0.2	2.16	2.18	2.18	2.18	2.18
0.4	2.19	2.19	2.19	2.19	2.19
0.6	2.21	2.21	2.21	2.21	2.21
0.8	2.23	2.23	2.23	2.23	2.23
1.0	2.26	2.26	2.26	2.26	2.26
1.2	2.29	2.29	2.29	2.29	2.29
1.4	2.31	2.31	2.31	2.31	2.31
1.6	2.34	2.34	2.34	2.34	2.34
1.8	2.37	2.37	2.37	2.37	2.37
2.0	2.39	2.39	2.39	2.39	2.39
2.2	2.43	2.43	2.43	2.43	2.43
2.4	2.46	2.46	2.46	2.46	2.46
2.6	2.51	2.51	2.51	2.51	2.51
2.8	2.57	2.57	2.57	2.57	2.57
3.0	2.61	2.61	2.61	2.61	2.61
3.2	2.66	2.73	2.73	2.73	2.73
3.4	2.74	2.74	2.74	2.74	2.74
3.6	2.85	2.85	2.85	2.85	2.85
3.8	2.97	2.97	2.97	2.97	2.97
4.0	3.10	3.10	3.10	3.10	3.10
4.2	3.25	3.25	3.25	3.30	3.26
4.6	3.50	3.56	3.42	3.50	3.80
4.8	5.75	4.60	4.81	4.53	4.30
5.0	9.47	7.25	5.60	6.69	5.90
5.2	10.25	8.00	6.00	7.50	6.50
5.4	10.73	8.75	6.75	8.25	7.00
5.6	10.90	9.05	7.20	8.55	7.90
5.8	11.00	9.40	7.82	8.90	8.50
6.0	11.10	9.70	8.47	9.20	8.85
6.2	11.18	9.98	8.87	9.48	9.00

pH-Metric Titration Data**SYSTEM : Ligand (L₄)**

Medium : 70% Dioxane-Water.

E⁰=0.01 M10⁻⁴ MV₀=50 mlTemp. = 27⁰C ± 1⁰CT_L⁰ = 20.00 xT_M⁰ = 4.00 x 10⁻⁴ M

N = 0.20 N

μ = 0.1M

Table 2:

Titration of					
Free Acid		Free Acid + Ligand	Free Acid + Ligand + Metals		
			La(III)	Pr(III)	Nd(III)
Volume of Alkali added(ml)	pH	pH	pH	pH	pH
0.0	2.15	2.16	2.16	2.16	2.16
0.2	2.16	2.18	2.18	2.18	2.18
0.4	2.19	2.19	2.19	2.19	2.19
0.6	2.21	2.21	2.21	2.21	2.21
0.8	2.23	2.23	2.23	2.23	2.23
1.0	2.26	2.26	2.26	2.26	2.26
1.2	2.29	2.29	2.29	2.29	2.29
1.4	2.31	2.31	2.31	2.31	2.31
1.6	2.34	2.34	2.34	2.34	2.34
1.8	2.37	2.37	2.37	2.37	2.37
2.0	2.39	2.39	2.39	2.39	2.39
2.2	2.43	2.43	2.43	2.43	2.43
2.4	2.46	2.46	2.46	2.46	2.46
2.6	2.51	2.51	2.51	2.51	2.51
2.8	2.57	2.57	2.57	2.57	2.57
3.0	2.61	2.61	2.61	2.61	2.61
3.2	2.66	2.73	2.73	2.73	2.73
3.4	2.74	2.74	2.74	2.74	2.74
3.6	2.85	2.85	2.85	2.85	2.85
3.8	2.97	2.97	2.97	2.97	2.97
4.0	3.10	3.10	3.10	3.10	3.10
4.2	3.25	3.25	3.25	3.30	3.26
4.6	3.50	3.56	3.42	3.50	3.80
4.8	5.75	5.05	4.45	4.88	4.95
5.0	9.47	7.85	7.39	7.68	7.89
5.2	10.25	8.43	7.68	8.05	8.34
5.4	10.73	8.85	7.95	8.43	8.60
5.6	10.90	9.12	8.30	8.61	8.73
5.8	11.00	9.49	8.60	8.83	9.02
6.0	11.10	9.73	8.95	9.03	9.32
6.2	11.18	10.05	9.29	9.40	9.72

Table 3: Metal-Ligand stability constants (log K)

System	Ligand (L ₃)				Ligand (L ₄)			
	log K ₁	log K ₂	log K ₁ - log K ₂	log K ₁ / log K ₂	log K ₁	log K ₂	log K ₁ - log K ₂	log K ₁ / log K ₂
La(III)-	8.0247	3.7538	4.2709	2.1378	4.6247	2.3201	2.3046	1.9933
Pr (III)	6.7847	2.5538	4.2467	2.6567	5.4247	2.0538	3.3709	2.6412
Nd (III)	6.3448	2.6538	3.6910	2.3908	6.2247	2.4538	3.7709	2.5367

4. Conclusion

The above observations & results revealed that the changes in colour during pH metric titration also indicate the formation of complex between ligand and metal ions. The difference between $\log K_1$ and $\log K_2$ values is larger indicate the formation of stepwise complex formation. The departure between acid curve and ligand curve indicate the dissociation of phenolic -OH

groups. The formation of straight line between pK vs $\log K$ hold good the relationship between $\log K = a pK + b$.

5. Acknowledgement

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ETHNO-MEDICINAL PLANTS USED IN TREATMENT OF JAUNDICE BY INDIGENOUS FOLKLORE OF MAHUR TALUKA OF NANDED DISTRICT, MAHARASHTRA

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ABSTRACT

Since ages, herbs are being used for treating different ailments in different parts of world by different communities. The present ethno-botanical explorations conducted in forest areas of Mahur taluka resulted in the information on the plants used in treating many diseases. The most prevalent disease found in the area was jaundice. For which about 08 plants species belonging to 08 Angiospermic families are used.

Information gathered from Mahur Taluka of Nanded district indicates that the tribals, and other village people of this region possess good knowledge of plants in treating different ailments, but their continuous and progressive exposure to modernization may result in extinction of the such rich heritage of knowledge in the course of time. Majority of preparation are from leaves. Following communication includes the remedies against jaundice with the details like, method of preparation of medicine and its application. Among the plant parts used in different formulations, leaves are abundantly used which is followed by stem and roots.

Keywords: Ethno-medicinal plants, Jaundice, Mahur.

1. Introduction

Mahur taluka is located in northern part of Nanded district. It is bounded North by Yavatamal district, South by Kinwat taluka of Nanded district East part by Adilabad district of Telangana and West by Pusad taluka of Yavatmal district of Vidarbha region. Geographically the Mahur taluka is situated between 19°49' to 19°83' North latitude and 77° 91' to 77°55' East longitude. The total geographical area of taluka is 52,160 hectares of which 14397.39 hectares area covered with forest and 37762.61 hectares are non-forested area and its population is 86782 (Census-2001), out of this 15.5 percent is inhabited by tribal population of aborigines like Andh, Kolam, Gond, Naikede and Pradhan. Mahur taluka is a thick forested area of Nanded District. The main river is Penganga which flows from the South to North direction.

2. Materials and methods

For documentation of ethno-botanical information and collection of plant material, several tours were undertaken during the period from 2019 to 2021. Data presented here is based on personal observations and interviews

with traditional healers (Viz. Medicine men, Hakims and old aged people) and the methodology used is based on the methods available in the literature 7, 11. Ethnobotanical information about medicinal plants was documented in data sheets. For collection of plant material, local informer accompanied to authors. Plant identification was done by using regional floras and flora of adjoining districts 6, 15. Plants used were compared with major published literature 1-5, 8-10, 12-14 and 16. Uses which are not mentioned in the literature are considered as uses less known in India and are marked by asterisks(*) in the present paper.

3. Enumeration

The present ethno-botanical explorations conducted in forest areas of Mahur taluka of Nanded District. resulted in the traditional plant uses of 08 plants species belonging to 08 families. Following data includes botanical name of species, vernacular name, family, plant part used, method of preparation of medicine.

Sr. No.	Plant Name, Family & Local name	Part Used	Mode of Preparation
1	<i>Achyranthes aspera</i> L. (Amaranthaceae), 'Aghada'	Root	One table spoonful of juice mixed with half glass of curd Taken orally once early in the morning for 7days.
2	<i>Andrographis paniculata</i> (Burm.F.)Wall ex Nees (Acanthaceae), 'Bhui-Neem'	Leaf	Decoction prepared in water One tea cup taken, twice a day for 4 days.
3	<i>Azadirachta indica</i> A.Juss. (Meliaceae), 'Neem'	Bark	Extract prepared with water Taken half glass orally twice a day for 7 days.
4	<i>Boerhavia repens</i> L. ver. <i>diffusa</i> (L.) Hook. f. (Nyctaginaceae) 'Punarnava'	Leaves	Juice taken orally one glass daily twice for 41 days.
5	<i>Carica papaya</i> L. (Caricaceae) 'Papaya'	Leaves	Half cup leaf juice with cow milk taken orally daily once early in the morning.
6	<i>Curcuma decipiens</i> Dalz. (Zingibaraceae) 'Ran halad'	Rhizome	Rhizome with <i>Piper bettle</i> leaf taken orally daily once early in the morning for six days.
7	<i>Morinda pubescens</i> J. E. Sm. (Rubiaceae) 'Noni'	Stem bark	Powder One tea spoon daily once in morning for five days.
8	<i>Ricinus communis</i> L. (Euphorbiaceae) 'Earandi'	Root	One inch crush with milk and taken orally daily twice for three days.
		Leaf	Half cup juice with cow milk taken orally daily once early in the morning.

4. Results and discussions

Information gathered from Mahur Taluka, Nanded district indicates that the tribals, and other village people of this region possess good knowledge of herbal drugs.

Majority of preparation are from leaves (03), underground parts (03), bark (02), etc.

To test the scientific validity of the herbal preparations or drugs, clinical studies are required, which can establish therapeutic properties of these preparations for safe use.

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NOTE ON TRADITIONALLY USED BIOPESTICIDE PLANTS BY LOCAL VILLAGERS FROM BULDANA DISTRICT MAHARASHTRA, INDIA

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ABSTRACT

Today there is a global search for alternatives to chemical pesticides and as part of this process, there are various efforts to test the use and efficacy of natural products for pest control and crop protection. An extensive survey was conducted from 2019 to 2020 for the collection of various angiosperm species, but during this survey, the authors observed some of the collected plants were used as a biopesticide by local villages of the Buldana district. Collected plants, their mode of application on crops, botanical name, local name, and part used described in the present article. Results revealed that 20 plant species are recorded belonging to 12 families.

Keywords: Biopesticides, medicinal plants, Buldana district, Ecosafely.

1. Introduction

Despite the use of synthetic pesticides, millions of tonnes of crops are destroyed annually in our nation by bugs. Since synthetic pesticides are known to pollute the environment and have dangerous impacts on the health of plants, animals, and humans. Numerous plants and their components have been utilized extensively throughout history to safeguard crops against pests both on the farm and in storage. (Naggappan Raja 2015.)

Bio-pesticides are pesticides that are safe for the environment and are derived from elements that are found in plants, animals, and microbes. Several classes of plant-derived phytochemicals, including alkaloids, steroids, terpenoids, essential oils, and phenolics, have been successfully used to treat various plant diseases, claims a study. Plants and microorganisms are the main sources of biopesticides since they include some antibacterial agents and bioactive chemicals. (Nefzi 2016). The use of synthetic, organic insecticides in crop pest management operations has recently caused environmental harm, pest resurgence, insecticide-resistant pests, and deadly side effects on non-target organisms. (Krishna 2013). Traditional uses of botanical biopesticides date back thousands of years. Neem and tobacco products, for example, have been employed as pesticides. (Koul 2012). Botanical pesticides are used to

protect crops and storage items from insect pests. Compared to synthetic pesticides, they are less environmentally damaging and have a volatile nature. (Nawaz et al., 2016). Most nations support the use of biopesticides and reduce the usage of conventional pesticides. (Kumar and Singh 2014). The use of biological control in agriculture pest management systems dates back a very long time. The growing public preference for regional and organic foods acts as a larger-scale biological control.

2. Methodology

A survey was carried out during 2019- 2020 in different localities of the Buldana district, Maharashtra. Informative data was collected by using interview methods with villagers. Collected species were identified using local documents and floras available in a college library. Kamble and Pradhan (1988), Naik (1998), Deore (2009), Ugemuge (1986).

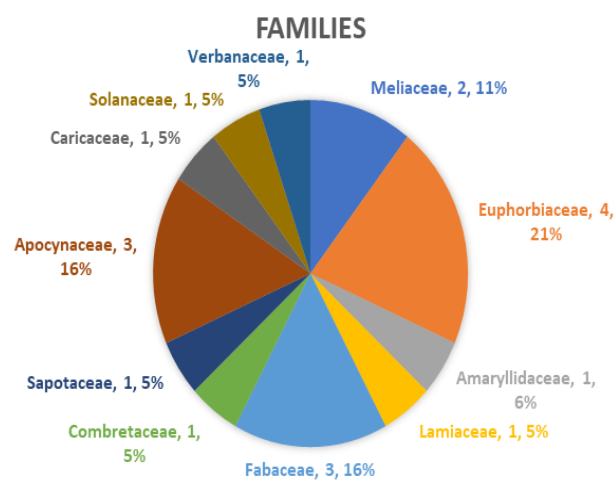
3. Result and Discussion

Table -1 List of plants used for biopesticides

Sr. No	Botanical name	Local name	Part used	Family
1	<i>Azadirachta indica</i>	Neem	Fruits	Meliaceae
2	<i>Euphorbia hirta</i>	Sagargoti	Leaves	Euphorbiaceae
3	<i>Allium sativum</i>	Lasan	Decoction of bulbs	Amaryllidaceae
4	<i>Jatropha curcas</i>	Ratanjot	Decoction leaves	Euphorbiaceae
5	<i>Vitex negundo</i>	Nirgudi	Leaves	Lamiaceae
6	<i>Abrus precatorius</i> L	Kachkuri	Leaf & shoot	Fabaceae
7	<i>Terminalia arjuna</i>	Arjuna	Bark	Combretaceae
8	<i>Madhuca latifolia</i>	Moha	Fruits	Sapotaceae
9	<i>Thevetia peruviana</i>	Pili Kaner	Decoction of the whole plant.	Apocynaceae
10	<i>Nerium indicum</i>	Lal Kaner	Decoction leaves	Apocynaceae
11	<i>Calotropis procera</i>	Rui	Crushed leave	Apocynaceae
12	<i>Caesalpinia bonducella</i>	Sagargota	Leaves extract	Fabaceae
13	<i>Carica papaya</i>	Papaya	Leaves extra	Caricaceae
14	<i>Ricinus communis</i>	Yerandi	Decoction leaves	Euphorbiaceae
15	<i>Ficus religiosa</i>	Pipal	Decoction of leaves.	Moraceae
16	<i>Cassia fistula</i>	Amaltas	Leaves	Fabaceae
17	<i>Lantana camara</i>		Decoction of leaves	Verbenaceae
18	<i>Withania somnifera</i>	Ashwagandha	Decoction leaves	Solanaceae
19	<i>Croton bonplandianum</i>	Ban tulsi	Decoction of plant	Euphorbiaceae
20	<i>Melia azedarach</i>	Bakan	Decoction leaves	Meliaceae

Survey results revealed that about 20 plant species belonging to 12 families are frequently used as a biopesticide by local people of Buldhana District. *Azadirachta indica* and *Vitex negundo* are two of the species listed that are frequently employed by the community as biopesticides and insecticides. The local population stores its grains and pulses in *Vitex negundo* dry leaves. Insects were deterred using lantana cameras. Leaf extract from *Ficus religiosa* and *Ricinus communis* is used to keep insects away from crops. The powder made from the leaves, bark, fruits, and seeds of Neem can be used as insecticides (Kale 2020). Vinodhini and Malaikazhandan (2011) revealed that Neem is employed in the cultivation of *Solanum tuberosum* as a

biopesticide against the pest. Detailed biopesticide plants are given in table-1.



4. Conclusion

The bioactive substances found in plants are known to behave as pesticides. The biopesticides made from plants are secure, good for the environment, and environmentally friendly. It has no negative effects on the environment's soil, water, or air quality. So it

makes sense to employ herbicides made from plants. The importance and historical applications of native plants as biopesticides are highlighted in the current study. It provides foundational information for the creation of herbal biopesticides that may be secure for the environment and human health.

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WOUND HEALING PLANTS OF MAHUR TALUKA, NANDED DISTRICT, MAHARASHTRA

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ABSTRACT

Medicinal herbs are being used for treating different ailments in different parts of world by different communities. The present study explorations conducted in forest areas of Mahur talukas resulted in the information on the plants used in treating many diseases. This paper deals with wound healing plants. At the time of sports computation minor injuries are occur in tribble areas the indigenous people are use herbal remedies. For which about 10 plants species belonging to 10 Angiospermic families are used.

Keywords: Wound healing plants, Indigenous people, Mahur.

1. Introduction

Mahur taluka is located in northern part of Nanded district. It is bounded North by Yavatmal district, South by Kinwat taluka of Nanded district East part by Adilabad district of Telangana and West by Pusad taluka of Yavatmal district of Vidarbha region. Geographically the Mahur taluka is situated between 19°49' to 19°83' North latitude and 77° 91' to 77°55' East longitude. The total geographical area of taluka is 52,160 hectares of which 14397.39 hectares area covered with forest and 37762.61 hectares are non-forested area and its population is 86782 (Census-2001), out of this 15.5 percent is inhabited by tribal population of aborigines like Andh, Kolam, Gond, Naikede and Pradhan. Mahur taluka is a thick forested area of Nanded District. The main river is Penganga which flows from the South to North direction.

2. Materials and Methods

For documentation of medicinal properties information and collection of plant material, several tours were undertaken during the period from 2021 to 2022. Data presented here is based on personal observations and interviews with traditional healers and the methodology used is based on the methods available in the literature. Information about medicinal plants was documented in data sheets. For collection of plant material, local informer accompanied to authors. Plant identification was done by using regional floras and flora of adjoining districts. Plants used were compared with major published literature.

3. Enumeration

The present botanical explorations conducted in forest areas of Mahur taluka of Nanded District. resulted in the traditional plant uses of 10 plants species belonging to 10 families. Following data includes botanical name of species, vernacular name, family, plant part used, method of preparation of medicine.

Sr. No.	Plant Name, Family & Local name	Part Used	Mode of Preparation
1.	<i>Azadirachta indica</i> A. Juss. (MELIACEAE) 'Kadu- Neem'	Root	Crush and apply externally till cure.
2.	<i>Butea monosperma</i> (Lamk.) Taub. (FABACEAE) 'Palas'	Gum	Apply externally on wounds.
3.	<i>Datura metal</i> L. (SOLANACEAE) 'Kala Dhotra'	Leaves	Crush and apply externally

4.	<i>Dioscorea bulbifera</i> L. (DIOSCOREACEAE) 'Jatashankar'	Root tuber	Crush and apply externally.
5.	<i>Heliotropium indicum</i> L. (BORAGINACEAE) 'Burandi'	Leaves	Past apply externally till cure.
6.	<i>Holoptelea integrifolia</i> (Roxb.) Planch. (ULMACEAE) 'Basmia'	Root	Past apply externally twice only.
7.	<i>Jatropha curcas</i> L. (EUPHORBIACEAE) 'Jungli erand'	Latex	Apply externally till cure.
8.	<i>Parkinsonia aculata</i> L. (CAESALPINIACEAE) 'Bangali babul'	Leaves	Past apply externally till cure.
9.	<i>Tridax procumbens</i> L. (ASTARACEAE) 'Taklani'	Leaves	Crush with 'Jagreen' and past apply externally till cure.
10.	<i>Verbascum chinense</i> (L.) Santapu (SCROPHULARIACEAE) 'Pivla kutke'	Leaves	Past apply externally till cure.

4. Results and Discussions

Information gathered from Mahur Taluka, Nanded district indicates that the village people of this region possess good knowledge of herbal drugs.

Majority of preparation are from leaves (05), underground parts (03) etc.

To test the scientific validity of the herbal preparations or drugs, clinical studies are required, which can establish therapeutic properties of these preparations for safe use.

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THERMAL STUDIES OF Co(II), Ni(II) and Cu(II) COMPLEXES DERIVED FROM THIAZOLE SCHIFF BASE WITH MICROWAVE IRRADIATION METHOD

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ABSTRACT

The new thiazole Schiff base have been synthesized by microwave irradiation method 2-hydroxy-5-chloro acetophenone and 4-(p-hydroxyphenyl)-2-aminothiazole. The metal complexes were obtained as a result of interaction of Schiff base ligand and metal ions Co(II), Ni(II) and Cu(II), The complexes have been characterized on the basis of elemental analysis, infrared, molar conductance, magnetic Susceptibilities, and thermogravimetric analysis. The kinetic analysis of the thermogravimetric data was performed by using Broido, Horowitz-Metzger and Freeman-Carroll method, which confirm first order kinetics and kinetic compensation effect.

Keywords: Thiazole Schiff Base, Molar conductance, Thermal.

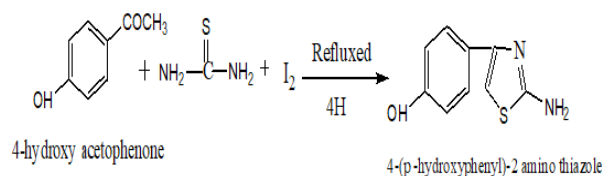
1. Introduction

Schiff bases are chemical compounds formed from the condensation reaction of aldehydes or ketones with amines. These compounds are majorly used in industries and also have significant biological activities, including antioxidant, antibacterial, antifungal, antiviral and antitumor. The majority of these compounds show excellent catalytic activities. Schiff bases are considered to be the most versatile ligands as they form complexes with the metal atoms. They are called privileged ligands because these compounds can be synthesized simply by condensation or microwaves. Performance of Schiff Bases Metal Complexes and their Ligand in Biological Activity¹ Antifungal Activity of Some Mixed Ligand Complexes Incorporating Schiff Bases² Spectral and thermal characterization of Mn(II), Ni(II) and Zn(II) complexes containing schiff Base ligands.³ Compounds containing an azomethine group (CH=N), known as Schiff bases, were formed by the condensation of a primary amine with a carbonyl compound. Schiff bases of aliphatic aldehydes were relatively unstable and were readily polymerizable. Schiff bases and their complexes are shows good progress in thermal analysis⁴. The mathematical calculating thermogravimetric data, thermal decomposition activation parameters can be obtained⁵ This paper discusses the kinetic of the thermal decomposition and the accompanying

compensation effect for Schiff base complexes of Co(II), Ni(II) and Cu(II)

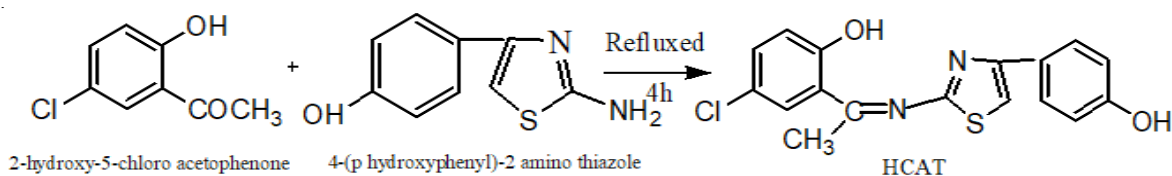
2. Experimental

All the chemicals were of A.R. grade and used as received. 2-hydroxy-5-chloro acetophenone (HCA) and 4-(p-hydroxyphenyl)-2 amino thiazole was prepared by known methods⁶⁻⁸. The solvents were purified by standard methods⁹ Synthesis of 4-(p hydroxyphenyl)-2 amino thiazole;



Synthesis of 2-hydroxy-5-chloro acetophenone 4-(p-hydroxyphenyl)-2 imino thiazole [HCAT]:

A solution of 4-(p-hydroxyphenyl)-2 imino thiazole (0.02M) in 25ml of ethanol was added to an ethanolic solution(25ml) of 2-hydroxy-5-chloro acetophenone (0.02M) and the reaction mixture was heat in microwave oven for 4h¹⁰. After cooling a pale yellow coloured crystalline solid was separated out. It was filtered and washed with ethanol, crystallized from DMF and dried under reduced pressure at ambient temperature. The purity of ligand was checked by elemental analysis shown in Table 1. and m.p. It was also characterized by IR and ¹H NMR spectral studies. Yield:70%; m.p. 310⁰C

**Table1. Analytical data of the Ligands.**

Ligand	Molecular Formula	Formula Weight	Color and nature	Elemental Analysis				
				C% found (Cal.)	H% Found (Cal.)	N% Found (Cal.)	Cl% Found (Cal.)	S% Found (Cal.)
HCAT	C ₁₇ H ₁₃ N ₂ O ₂ SCl	344.6	Yellow Crystalline	59.38 (59.19)	03.70 (03.77)	08.5 (08.12)	10.11 (10.30)	09.22 (09.31)

Preparation of Complexes:

All the metal complexes were prepared in a similar way by following method. To a hot solution of ligand HCAT (0.02M) in 25ml of ethanol a suspension of respective metal salts was added drop wise with constant stirring. The reaction mixture was in microwave oven for 4-6h. The precipitated complexes were filtered, washed with ethanol followed by ether

and dried over fused calcium chloride. Yield: 45-50%. The complexes are soluble in DMSO and DMF but insoluble in water and common organic solvents. The metal chloride content of complexes were analyzed by standard methods¹¹ The molecular weights of the complexes were determined by Rast method are shown in Table 2.

Table 2. Analytical data and molar conductance of the compounds.

Compounds	Colour	Mol.wt.	Analysis % Found (calc.)					μ_{eff} B.M.	χ_M ($\Omega^{-1} \text{cm}^2 \text{mol}^{-1}$)
			M	C	H	N	Cl		
[CoL ₂ (H ₂ O) ₂] H ₂ O	Brown	800.1	7.25 (7.36)	50.86 (50.99)	3.65 (3.74)	6.86 (6.99)	8.70 (8.87)	4.48	6.9
[NiL ₂ (H ₂ O) ₂] H ₂ O	Green	799.9	7.30 (7.33)	50.78 (51.00)	3.68 (3.75)	6.95 (7.00)	8.72 (8.87)	3.2	7.9
[CuL ₂ (H ₂ O) ₂] H ₂ O	Brown	804.7	7.70 (7.89)	50.60 (50.70)	3.65 (3.72)	6.82 (6.95)	8.72 (8.82)	1.70	8.3

3. Results and Discussion

The Schiff base ligand HCAT and its complexes have been characterized on the basis of ¹H NMR, IR spectral data, elemental analysis, molar conductance, magnetic susceptibility measurements and thermogravimetric analysis data. All these values and analytical data is consistent with proposed molecular formula of ligand. All the compounds are coloured solid and stable in air. They are insoluble in water but soluble in coordinating solvents like DMF and DMSO. The molar conductance values in DMF (10⁻³M)

solution at room temperature (Table 2) shows all the complexes are non electrolytes¹¹

The ¹H NMR spectra of ligand HCAT shows signals at δ 12.09, (1H, s phenolic OH), δ 9.51 (1H, s, phenolic OH), δ 7.55, 7.54, 7.53 and 7.52 (4H, m, phenyl) δ 6.81, 6.80, and 6.78(3H, s Phenyl), 6.68 (1H s thiophene), and 2.56(3H, s, methyl)¹²⁻¹⁵ IR spectra of ligand and metal complexes shows ν (C=N) peaks at 1620cm⁻¹ and absence of C=O peak at around 1700–1750 cm⁻¹ indicates the Schiff base formation.¹⁶⁻¹⁹ IR spectra of complexes are shown in Table 3.

Table 3. IR spectra of ligand and metal complexes.

Compound	□ (O□ H) hydrogen bonded	□ (C=N) imine	□ (C□ O) phenolic	□ (M□ O)	□ (M□ N)	□ (C□ S)
HCAT	3119	1620	1514	--	--	1122
[CoL ₂ (H ₂ O) ₂] H ₂ O	--	1608	1504	470	430	1098
[NiL ₂ (H ₂ O) ₂] H ₂ O	--	1585	1465	468	422	1090
[CuL ₂ (H ₂ O) ₂] H ₂ O	--	1610	1504	509	410	1110

Thermogravimetric studies:

An analysis of TG curves of HCAT and its metal complexes show that the Co(II), Ni(II), and Cu(II), complexes decomposed in three stages, the ligand. The Co(II), Ni(II) and Cu(II), complexes are stable upto 70°C. Elimination of one water molecule from Co(II), Ni(II), Cu(II) complexes upto 130°C have been observed (%wt loss obs./calcd. Co(II) : 2.44/2.24; Ni(II) : 2.56/2.25; Cu(II) : 2.46/2.23; complexes. In the Co(II), Ni(II) and Cu(II) complexes there is further loss in weight upto 220°C indicating the presence of two

coordinated water molecule in each complex Co(II) : 4.57/4.49; Ni(II) : 4.59/4.50; Cu(II) : 4.58/4.47; ²⁰ In the thermograms of ligand, Co(II), Ni(II) and Cu(II) complexes The half decomposition temperature and the basic parameter calculated for the compounds are tabulated in Table 4. The relative thermal stability on the basis of half decomposition temperature is found to be Cu(II)>Co(II)>Ni(II)>HCAT

The Thermal activation energy (Table 4) was calculated by Freeman-Carroll,²² Horowitz-metzger²³ and Broido²⁴ method

Table 4: Thermal decomposition data of the complexes of HCAT

Compound	Half Decomposition Temperature (°C)	Activation Energy (kJ mole ⁻¹)			Frequency Factor Z (sec ⁻¹)	Entropy Change -ΔS (J mol ⁻¹ K ⁻¹)	Free Energy Change ΔF (kJ mol ⁻¹)
		B*	H-M**	F-C***			
HCAT (LH)	260.51	3.27	5.45	4.36	87.25	212.55	117.75
[CoL ₂ (H ₂ O) ₂] H ₂ O	433.50	5.73	9.55	9.55	191.11	208.24	156.67
[NiL ₂ (H ₂ O) ₂] H ₂ O	384.17	4.13	8.26	3.30	66.03	216.60	145.64
[CuL ₂ (H ₂ O) ₂] H ₂ O	494.86	11.28	11.28	10.16	203.31	208.54	170.28

* Broido, **Horowitz-Metzger and ***Freemann-Carroll

4. Conclusion

The thermal decomposition in three stage decomposition. It is assumed that dehydration of the complexes containing water occurs

within an active reaction interface. The compensation effect of thermal decomposition of the complexes indicating the change of sample mass.

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A REVIEW ON MYCOLOGICAL MANAGEMENT OF STEM ROT DISEASE OF GROUNDNUT

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ABSTRACT

Groundnut is one of the most important oil seed crop in the world. *Sclerotium rolfsii* Sacc. is the causal agent of stem rot disease of groundnut, which is one of the major production constraints of groundnut (*Arachis hypogea* L.). The fungus infects lower stems of groundnut, which are in contact with the soil as well as pegs, pods and roots. The traditional agricultural practice to control the phytopathogen *S. rolfsii* is by using variety of fungicides like Bavistin, Captan etc. But severe disadvantage of the traditional practice is that it is not effective to check the *Sclerotium* during the cropping period (90- 100 days) and is not eco-friendly. Recently new technology is emerging i.e. biological control of plant disease which will be eco-friendly to human beings and environment. Various microorganisms like bacteria, fungi that can be used as biological control agents. The use of fungi as biocontrol agents is a safe and eco-friendly strategy towards sustainable agriculture. Fungi belonging to genera *Aspergillus*, *Fusarium*, *Gliocladium*, *Petriella* and *Trichoderma* are known to be important biocontrol agents.

Keywords: Groundnut, Stem rot, *Sclerotium rolfsii* Sacc, Biocontrol agents, *Trichoderma*, and *Gliocladium*.

1. Introduction

Groundnut is considered as one of the most important crops in the world. Groundnut is the 4th most important source of edible oil, and is ranked as 3rd most important source of vegetable protein in the world (Smith,2002). It is cultivated in more than 100 countries of the world. That's why it is referred as a "Universal Crop".

Groundnut is grown on a large scale in almost all tropical and subtropical countries of the world. It is estimated that around 65% of the crop produced in the world is crushed to extract groundnut oil and the rest is used in making other edible products. The most important groundnut growing countries are India, China, Nigeria, Sudan and USA (Handbook on Grading of Food Grains and Oilseeds). Groundnut (*Arachis hypogea*, L.) belongs to the family Fabaceae.

Groundnut is a valuable source of protein, Niacin, Fiber, vitamin E and antioxidants. The groundnut seed is a good source of edible oil and proteins in the form of oil cake, which can also be used as animal fodder and fertilizer. It also has some industrial uses like in paint,

varnish, lubricating oil, soap, furniture, polish etc.

Groundnut crop is prone to attack by different pathogens and to a much larger extent than many other crops. More than 100 pathogens have been reported to affect groundnut, but only a few are economically important in India such as leaf-spot (Tikka), early leaf-spot (*Cercospora arachidicola*), late leaf-spot (*C. personatum*), rust (*P. arachidis*), and aflatoxin contamination (*Aspergillus flavus* and *A. parasiticus*). The other diseases such as collar rot (*A. niger*), Stem-rot (*S. rolfsii*), root-rot (*M. phaseolina*), bud necrosis (tomato spotted wilt virus), clump and peanut (groundnut) mottle disease are localized (Subrahmanyam *et.al.*, 1980). In all these diseases of groundnut, one of the most emerging and rapidly spreading disease is the stem rot disease of groundnut caused by *S. rolfsii*. To control the plant diseases various traditional practices are being followed.

2. Stem Rot Pathogen of Groundnut

The pathogen *Sclerotium rolfsii* Sacc., is a soil borne pathogen. It commonly occurs in the tropics, sub-tropics and other warm temperate regions of the world causing root rot, stem rot,

wilt and foot rot on more than 500 plant species including almost all the agricultural and horticultural crops (Aycock, 1966; Domsch *et al.*, 1980; Farr *et al.*, 1989).

Sclerotium rolfsii was first reported by Rolfs (1892) later the pathogen was named as *Sclerotium rolfsii* by Saccardo (1911). Higgins (1927) worked in detail on physiology and parasitism of *S. rolfsii*. This was the first detailed and comprehensive study in USA. Sclerotia initially white in color, later it becomes light brown to dark brown at maturity and they are sub spherical, the surface finely wrinkled, sometimes flattened as shown in

Figure 1.0 (Subramanian, 1964 and Mehan, 1995). This pathogen *Sclerotium rolfsii* forms brown sclerotia which are very well organized compact structures, built of three layers, the rind, composed of empty melanized cells; the cortex cells, filled with vesicles and the medulla (Chet, 1975). Sclerotia may be spherical or irregular in shape and at maturity resemble the mustard seed (Taubenhaus, 1919; Barnett and Hunter, 1972). Sclerotial size was reported to be varied from 0.1 mm to 3.0 mm (Om Prakash and Singh, 1976; Ansari and Agnihotri, 2000 and Anahosur, 2001).



Figure 1. Stem Rot Disease of Groundnut caused by *Sclerotium rolfsii*

To control the plant diseases various traditional practices are being followed.

3. Traditional Plant Disease Management Practices

Methods of plant disease management vary considerably from one disease to another, depending on the kind of pathogen, the host, the interaction of the two, and many other variables. In controlling diseases, plants are generally treated as populations rather than as individuals, although certain hosts (especially trees, ornamentals, and, sometimes, other virus-infected plants) may be treated individually. Control measures are generally aimed at saving the populations rather than a few individual plants (Agrios, 2005).

Traditionally the plant disease management can be classified as regulatory, cultural, biological, physical, and chemical, depending on the

nature of the agents employed. Regulatory control procedures aim at excluding a pathogen from a host or from a certain geographic area. Most cultural control methods aim at helping plants to avoid contact with a pathogen, creating environmental conditions unfavourable to the pathogen or avoiding favourable ones, and eradicating or reducing the amount of a pathogen in a plant, a field, or an area. Finally, physical, and chemical methods aim at protecting the plants from the pathogen inoculum that has arrived, or is likely to arrive, or curing an infection that is already in progress (Agrios, 2005).

In general, excluding or reducing the initial inoculum is most effective for the management of monocyclic pathogens. Controls such as crop rotation, removal of alternate hosts, and soil fumigation reduce the initial inoculum. With polycyclic pathogens, the initial inoculum

can be multiplied many times during the growing season. Therefore, a reduction in the initial inoculum must usually be accompanied by another type of control measure (such as chemical protection or horizontal resistance) that also reduces the infection rate. Many controls, e.g., excluding a pathogen from an area, are useful for both monocyclic and polycyclic pathogens (Agrios, 2005).

The physical agents used most in controlling plant diseases are temperature (high or low), dry air, unfavourable light wavelengths, and various types of radiation.

Chemical agents are generally used to protect plant surfaces from infection or to eradicate a pathogen that has already infected a plant. A few chemical treatments, however, are aimed at eradicating or greatly reducing the inoculum before it encounters the plant. They include soil treatments (such as fumigation), disinfestation of warehouses, sanitation of handling equipment, and control of insect vectors of pathogens (Agrios, 2005, Mahmood *et al.*, 2016).

The traditional agricultural practice employed to control the plant disease have severe disadvantage that it is not effective to check the pathogen and is not eco-friendly. However, excessive use of chemical fungicides in agriculture has led to deteriorating human health, environmental pollution, and development of resistance in pathogen to fungicide (Dalvi and Rakh 2017, Bolognesi and Merlo, 2019).

One of the most promising alternatives to synthetic fungicides is biological control of pathogens, which includes the use of biofungicides based on antagonistic microorganisms. In contrast to commonly used chemical fungicides, biofungicides have several advantages, i) high specificity against target pathogens, ii) rapid degradation in the environment and iii) low mass-production cost. Antagonistic microorganisms operate through various modes of activity such as competition with pathogens for space and nutrients, production of antibiotics, cell-wall degrading enzymes and reduction of pathogen population by hyperparasitism (Dimkić *et al.*, 2013, Stanojević *et al.*, 2016, Rakh *et al.*, 2019).

4. Economic Importance and Distribution of Stem Rot Pathogen

The *Sclerotium rolfsii* attacks more than 500 species, the most common hosts are legumes, crucifers, and cucurbits (Punja, 1985). The disease is distributed throughout the world and prevalent particularly in warm dry climates. It was first reported by Mc Clintock (1917) in Virginia. Garren (1959) has estimated the losses in southern USA as 10 to 20 million dollars annually. Weber (1931) and Garret (1956) reported that the fungus survived in the soil for years together by producing sclerotial bodies and causing the disease on various hosts. The loss of yield caused by the pathogen is 25%, but sometimes it reaches 80- 90% (Grichar and Bosweel, 1987). Similarly, yield losses over 25% have been reported by Mayee and Datar (1988). Stem rot causes pod yield losses of 10-25%, but under severe diseased conditions yield losses may range to up 80% (Rodriguez Kabana *et al.*, 1975). Patil and Rane (1982) reported yield loss up to 10 to 50% due to this disease. Adiver (2003) reported the yield loss of 15-70% in groundnut is due to leaf spot, rust and stem rot singly or in combination.

5. Fungi as Biological Control Agents

The control of fungal diseases of plants by the use of naturally occurring antagonistic microorganisms has been the focus of intense research throughout the world. This approach is popularly known as biological control of plant pathogens. Biological control is a bio-based, ecofriendly strategy that offers a practical and economical alternative for the management of plant pathogens with a potential to emerge as an alternative to chemical control (Mark *et al.*, 2006).

Pathogens affecting plant health are a major and chronic threat to food production and ecosystem stability worldwide (Compant *et al.*, 2005). It has been estimated that about 10-16% of global food production is reduced due to field and post-harvest plant diseases (Lo Presti *et al.*, 2015; Strange and Scott 2005). Since agriculture is the largest economic sector in the world so to ensure high yield pesticides including bactericides, fungicides, herbicides and insecticides are used. It has been estimated

that more than two billion tons of pesticides are used every year all over the world to eliminate undesirable crop pests. But pesticides leave undesirable effects in the environment including the contamination of soil, groundwater and water bodies which then affect human and animal health due to their carcinogenic potential, recalcitrance, and toxicity (Baron *et al.*, 2019).

The use of fungi as biocontrol agents is greatly beneficial due to their metabolic diversity and efficiency that enhances the chances of finding the apt isolates for biocontrol and their relative environmental safety, as they are primarily decomposers (Thomas and Read 2007). Fungi belonging to genera *Aspergillus*, *Fusarium*, *Gliocladium*, *Petriella* and *Trichoderma* are known to be important biocontrol agents (De Silva *et al.*, 2019). The biocontrol activity of *Verticillium leptobactrum* against wilt disease induced by *Fusarium oxysporum*, *F.lycopersici* has been demonstrated by Hajji-Hedfi *et al.*, (2018).

Further many fungal biocontrol agents are also available as commercial products such as *Verticillium lecanii*, *Trichoderma polysporum*, *Trichoderma gamsii*, *Trichoderma asperellum*, *Purpureocillium lilacinum*, *Phlebiopsis gigantea*, *Paecilomyces lilacinus*, *Metarhizium anisopliae*, *Gliocladium catenulatum*, *Coniothyrium minitans*, *Candida oleophila*, *Beauveria bassiana*, *Aureobasidium pullulans* and *Ampelomyces quisqualis* (Larran *et al.*, 2016; Tranier *et al.*, 2014). The use of fungi as biocontrol agents is a safe and eco-friendly strategy towards sustainable agriculture. Furthermore, hidden possibilities or uses of fungi could be explored to enhance agricultural productivity, nano-agriculture, and metabolite production (Singh *et al.*, 2019).

6. Mycological Management of Stem Rot Pathogen

Several authors have reported the use of fungi as a biological control agent for the management of plant diseases. Some of them are mentioned here:

Doley *et al.*, (2017) investigated that the inoculation of arbuscular mycorrhizal fungi (AMF) and Fungal species found to be worth applying as they stimulated growth and decreased harmful effects of *S. rolfsii*. The low-input AM fungi along with Fungal species may be needed for the advancement of modern agricultural systems.

Wonglom *et al.*, (2019) evaluated five Fungal spp. against *Sclerotium spp.* SZ01 and LS01 which caused Fruit rot of snake fruit and stem rot of lettuce respectively. *Fungal sp.* T76-12/2 showed significant inhibitory effects on mycelial growth of *Sclerotium sp.* LS01 and SZ01 with 81.48% and 78.33% inhibition. While *Fungal sp.* T76-12/2 caused discoloration of *Sclerotium sp.* mycelia at the contact point. Volatile antifungal bioassay revealed *Fungal sp.* T76-12/2 was superior in inhibiting the growth of *Sclerotium sp.* by up to 44.44% for LS01 and by 59.52% for SZ01.

7. Conclusion

The survey of available literature suggests that every year, severe economic losses are caused due to soil – borne fungal pathogens. The excessive use of chemical fungicide was found to create food contamination, environmental risks, posing hazards to human health. To overcome such problems management of plant diseases by using fungi as a biological control agent has been suggested.

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AN ECOFEMINIST PRESPECTIVE OF ARUNDHATI ROY'S THE GOD OF SMALL THINGS

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ABSTRACT

Since the inception of the civilization humans had started to imitate or depict nature in their art and literary forms. Many of the cave paintings saved the proof in the form of paintings and carvings of nature and the elements of nature. All of the humanity agrees that nature, ecology or environment is quite essential for the existence of life in the planet earth. Ecofeminism is the term or as we called it a movement that propounds the idea that women have an innate connection with ecology. This theory equates the ecology and femininity in terms of exploitation and degradation of the natural world with the subordination and oppression of women. Arundhati Roy uses her debut novel as a medium to convey her ecological concern. Her female characters are the silent victims of patriarchy like the ever exploited Meenachal River, the pinned up butterflies and the horror striking moths in the fiction.

Keywords: Ecofeminism, Animals, Meenachal River, Nature, Ecological, Entomology, Population.

1. Introduction

The nature and the natural elements, in many cultures had been addressed and worshipped as women. They called the nature as Mother Nature or Nature Goddess, the Sea as Sea Mother, the earth as Mother Earth or Earth Woman etc. This tradition had resulted in attributing the characteristic of nature on woman. They were burdened up by the responsibilities of reproducing and nurturing along with being silenced and victimized by the patriarchy. Man's desire for comforts had always troubled the nature and women hood at large. The present woman identifies herself with nature in terms of being subjugated, covered up, tortured exploited and deformed.

This paper aims to focus on Arundhati Roy's ecofeminist concerns in the novel 'The God of small Thing'. All of the female characters in the fiction are identified with the nature in the terms of much exploited and subjugated beings. Hence ecofeminism has been the critical frame work of the novel.

2. Ecofeminism

Ecofeminism brings together the elements of the feminist and the green movement. While at the same time offering a challenge to the both, The term Ecofeminism was first coined by the French Feminist Francoise d'Eauboune in her book *Le feminisme ou la mort* in 1974. Its about green movement a concern about the impact of human activities on the non-human world and

from feminism the view of humanity as gendered in ways that subordinate the oppress women. Ecofeminist activities grew during the 1970's, 1980's and 1990's among women from the anti – nuclear environment an lesbian feminist movement (4). Greta Gaard and Patrick D.Murphy further characterize ecofeminism as “based not only on the recognition of nature and between the exploitation of nature and the oppression of women across patriarchal societies” but also “on the recognition that these two forms of domination are bound up with class exploitation, racism, colonialism, and neo colonialism” (3) There are variety of regional, ethnical and cultural ecofeminism which exist the primary concern remain the same that the subjugation of women and nature are linked historically, materially, culturally or conceptually.(9)

3. Ecofeminism and The God of Small Things

As ecofeminism fiction, *The God of Small Things* represents complex, exploitative relationships at variant levels of nature, class, sex, age and race and works to make the thin line between power and resistance visible in an imaginative way. This is a green manifesto as well as a structural representation of patriarchal cultural imagery. Roy places both the human victims and the non-human at the lower rung of the hierarchical ladder. The kind of

exploitation that occurs in Roy's text is one that follows the dualism enshrined by western patriarchy.

Roy's *The God Of Small Things* (1997) won her Booker Prize. Her work was immediately recognized as a 'passionate, sophisticated and lushly descriptive work'(1) and had launched her to international fame. Roy puts forth the idea that, like Indian women who remain silent against patriarchal oppression, environment has been enduring a wanton destruction for ages. With great skill, Roy integrates nature with her subject matter. She vividly presents how nature is being exploited by human beings in order to be modernized. She gives expression to her thought that nature is being made the silent victim of human greed and insensitivity and these in turn have reflexive effects on human life(2).

Roy chooses a small town called Ayemenem near Kottayam in Kerala to narrate the story of Ammu and her twins Esther and Rahel. She begins her narrative with a description of picturesque landscape of Kerala.

May in Ayemenem is hot brooding month. The days are long and humid. The river shrinks and black crows gorge on the bright, the mangoes in still, dust green trees. Red bananas ripen. Jackfruit burst, Dissolute blue bottles hum vacuously in the fruity air. Then they stun themselves against clear window panes and die, fatly baffled by the sun But by the early June the south-west monsoon breaks and there are three months of wind and water (1)

The Ayemenem house and its surroundings provide a macrocosm of all biological elements. We find humans co-habiting with the non-human beings. Roy introduces the house as located in typical country side that aids the author to give away her ecological concern. The bursted Jackfruits, the ripen red bananas, dust green mangoes, mossy walls, rat snake, bull frogs, moths, dragon flies, spiders, temple elephants, pond the river, the river side etc are specific to a country side and we find all these non living beings are enacting their roles like the human characters in this novel.

Roy had very dexterously tried to bond nature to women in her fiction. It is well evident in the past as Chacko gives lesson to the twins.

He told them about Earth Women. He made them imagine that the earth four thousand six hundred million years old was a forty six year old woman. It had taken the whole of earth woman's life for the earth to become what it was. Chacko said when the first single celled organisms appeared. The first animals, creatures like worms and jelly fish appeared only when she was forty(54).

The rivers in the novel has an important role in the cultivation of civilization. It has been as the life supports and always equated to women. The Meenachal River that passes through the Ayemenem has a very close association with the twin's mother Ammu. This river had been a mother figure, the fishermen in the Ayemenem village by providing the daily livelihood for them. But when she turns to a violent monster in rain and takes up everything by her side she becomes the terminator of lives. Like the river, Ammu has a deceptive face that expressed calmness but inside her she was a sleeping volcano, ready to detonate anytime. Ammu used to spend her hours much in the banks of the river with her transistor. She pretend to be in peace, enjoying the beauty of the Meenachal but inside her was like a suicide bomb (44). Meenachal too had this dual face. At times she pretends to be 'a little church going ammoma (grandmother), quite and clean. Minding her own business. Not looking right or left (210), but in reality she was a 'wild thing'

Both ammu and meenachal River are the two pathetic figures in the fiction who struggled to survive. Ammu had been a victim of patriarchy like the three generations of women depicted in the narrative. Ammu was treated very badly she was treated likes an unwanted bugs. On the other hand Chacko, her brother who has a similar status of a divorce is given many privileges by the family. When Velutha's is beaten to death. Hence Roy very nicely depicted the predicament of Ammu with a view of condemning the patriarchal dominance in society.

Meenachal River that flows through the locality of ayemenem had been an epitome of horror and beauty. Early the river was green with fish in it. The sky and trees in it and at night, the broken moon in it (203), but with the passage of time due to human selfishness to get

more yields from the farmland that led to the death of this river. The river 'smelled of shit' and pesticides bought with world Bank loans. Just like Ammu who lost her life and her love for the whims and fancies of caste and class conscious society and patriarchy, the river panted with the flith and merges t the sea. Like Ammu, Mammachi's conjugal life was invariably turbulent and restless. She had been a mere puppet in the hands of her educated husband. She also search for comfort and solace in the river, is discovering a new life with her pickle factory that preserved natural products which are linked with nature Roy very beautifully tries to connect all of the female characters to nature or creatures in nature, When they are disturbed, Right from her birth, Rahel has been the suffer and has been victim of 'pappachi's moth' (49). She very skillfully employs the image of moth to implement Rahel's insecurity. The moth symbolizes vulnerability aa they are obsessed with light that leaves them open to predators. Rahel feels herself exposed like a moth whenever she feels threatened or insecure.

4. Conclusion

In the novel we find all the female characters have direct association with nature world or the animal world as they are subordinated and supported by the patriarchy like the nature is tamed by the culture. The human history witnesses that all patriarchal societies follow the same pattern of subordinating the women. The God Of Small Things portrays the inter connectedness between human beings and nature and foregrounds the hierarchical dualisms and rationalized economic that has been used to exploit the natural environment and subordinate the Indian society. Roy successfully demonstrates her ecofeminism by exposing the structural and ideological interconnectedness of Indian society'.

Roy very nicely woven up the world that includes ants, spiders, fish, dragons, flies, trees, river etc that stands parallel to the oppressed lives of the female figures in the narrative. Roy has been a true Ecofeminist in this work voicing for the subjugate women and exploited nature like the social activist in her work.

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HAEMATOGRAPHIC STUDY OF WOMEN WITH REFERENCE TO HEAMOGLOBIN LEVEL

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ABSTRACT

Haemoglobin (Hb) is a complex protein that consists of haem group (iron) and globulin protein. Function of haemoglobin is to move oxygen to the body with the help of blood. . Low haemoglobin concentrations and anaemia are important risk factors for the health and development of women and children. We estimated trends in the distributions of haemoglobin concentration and in the prevalence of anemia and severe anemia in pregnant and non-pregnant women between January 2019 to December 2019. Estimation of hemoglobin level among different age groups of non-pregnant and pregnant women in Sub-district Hospital Karanja Lad was carried out. Data for this current analysis was obtained from a hospital-based retrospective study of 606 non-pregnant women and 2182 pregnant women . The demographic and medical information for each participant were collected by using a structured questionnaire . In our survey we determine the Hb (g/dl) in the women .We make a comparison depending on physiologic condition.

Keywords: Haemoglobin (Hb), Anaemia, Haemolyze, Hematin , Red Blood Corpuscles (RBCs).

1. Introduction

Hemoglobin is the protein molecule in red blood cells that carries oxygen from the lungs to the body tissues and returns carbon dioxide from the tissues back to the lungs.

Haemoglobin Protein Structure

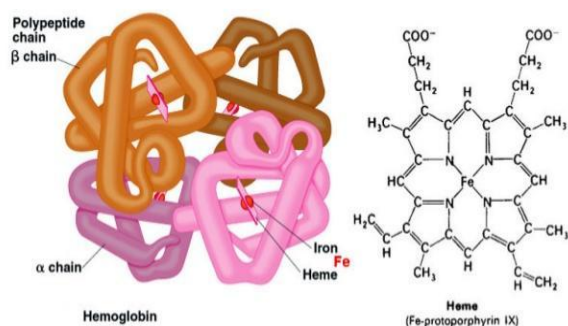


Fig.1 Haemoglobin protein structure :-

Haemoglobin is made up of four protein molecules (globulin chain) that are connected together. The normal adult haemoglobin (abbreviated Hgb or Hb) molecules contains two alpha globulin chain and two beta globulin chain. In fetuses and infants , beta chains are not common and the haemoglobin molecule is made up of two alpha chains and two gamma chains . As the infant grows, the gamma chains are gradually replaced by beta chains . Forming the adult haemoglobin structure. Each globulin chain contains an important iron containing porphyrin compound termed haem. Embedded within the haem compound is an iron atom that

is vital in transporting oxygen and carbon dioxide in our blood .

2. Shape and Colour

The iron contained in haemoglobin is also responsible for the red colour of blood .Haemoglobin also plays an important role in maintaining the shape of the red blood cells . In their natural shape , red blood cells are round with narrow center resembling a donut without a whole in the middle . Abnormal haemoglobin structure can , therefore disrupt the shape of red blood cells and impede their functions and flow through blood vessels .



Fig. 2 Red blood cells

3. Physiology of Oxygen Transport

Haemoglobin is the iron containing oxygen transport metalloprotein in the red blood cells. Haemoglobin has an oxygen binding capacity of between 1.36 and 1.37 ml oxygen per gram of haemoglobin, which increases the total

blood oxygen capacity seventy fold compare to dissolved oxygen in blood . The mammalian hemoglobin molecule can bind (carry) up 24 oxygen molecules.

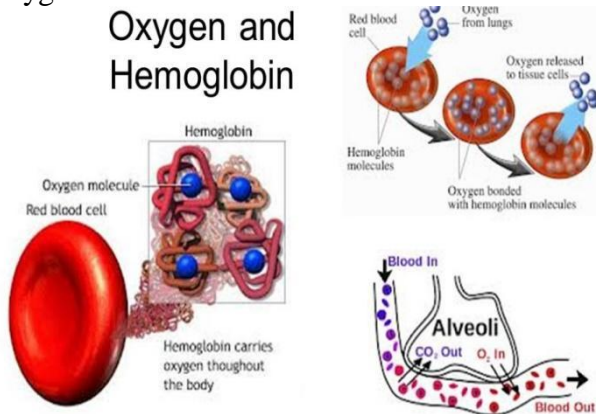


Fig. 3 Transport of oxygen

4. Correlation between Nutrition Intake and Haemoglobin Level

When the diet does not contain sufficient amount of iron, anemia develops. It is a gradual process and takes several months to show up . A normal person has about 14 to 15 gram of haemoglobin. Any person whose hemoglobin level is below 12 mili gram per 100ml blood is considered as anemic with expectation of pregnant women. About 80% of the total anemic cases are due to iron deficiency and the rest are due to deficiency of nutrition like folate and vitamin B12. Folic acid and vitamin B12 are important for the production of blood cells. Man rarely suffers from iron deficiency due to poor diet. However when new blood has to be made the requirement is greatly increased. An adult women requires 35 to 45 milligram of iron per kg body weight or total of 250 milligram of iron. It plays a major role in the formation of haemoglobin and myoglobin. Most of the iron in the body is located in the haemoglobin of circulating red blood cells. Whereas in many normal menstruating women, almost all of the iron is in red blood cells because of their limited iron stores (Nair 1990). The values of hematological parameters are affected by a number of factors even in apparently healthy population. These factors include age, sex, ethnic background ,body build and social ,nutritional and environmental factors. Higher than normal haemoglobin level can be seen in people living at high altitudes and in people

who smoke. Dehydration produces falsely high hemoglobin measurement that disappears when proper fluid balance is restored . Some other infrequent causes of high haemoglobin levels are ; advanced lung disease (example emphysema) ,certain tumors, disorder of the bone marrow known as polycythemia rubra vera ,abuse of the drug erythropoietin by athletes for blood doping purposes) increasing the amount of oxygen available to the body by chemically raising the production of red blood cells).

5. Study Area



Fig.4 Map of Karanja Lad.

Karanja Lad is a city of a municipal council in Washim district in the Indian state of Maharashtra . Karanja is located at 20°48'33"N 77°48'33"E. It has an average elevation of 422 meters (1387 feet). The Adan river flows near Karanja city. It is an important source of domestic water supply to the city. There are three lakes situated in the city, the Rishi Talaw, the Sarang Talaw, and the Chandra Talaw. Karanja is normally hot but the wells usually have water all year. Karanja receives an average of 33 inches of rainfall during the monsoon season .Karanja lad city is located in Washim district. It is located 64 km towards North from District head quarters Washim. 63 km to Amravati (division). Karanja City belongs to VIDARBHA region. 222 km to VIDARBHA capital of Nagpur. & 604 km to State capital of Mumbai. As of the 2001 Indian census, Karanja had a population of 100,947. Males made up 52% of the population and females 48%. Karanja has an average literacy rate of 72%, higher than the

national average of 59.5%. Male literacy rate is 78%, and female literacy is 67%.

6. Materials and Methods

Protocol for Data Collection and Participants

The secondary data were collected from local government hospital. The total of 606 non pregnant women and 2182 pregnant women cases were analyzed for this study. The cases were selected among non pregnant and pregnant women from rural area and also from urban area. Information was collected about physiologic condition (age ,sex ,pregnancy or lactation)health status. The demographic and medical information for each participant were collected by using a structured questionnaire. The demographic information such as maternal age pre pregnancy weight etc. were collected from the participants. Medical data such as medical history ,previous obstetric ,history laboratory parameters such as haemoglobin and glucose values etc were extracted from the medical records.

The data for this current analysis was obtained from hospital based retrospective study of patients . Participants in our study were stratified according to their hemoglobin level. For determination of the hemoglobin level in the blood usually Sahli-Hellige test method is used. In this method blood is mixed with dilute HCl. This process haemolyzes the red cells ,disrupting the integrity of the red cells

membrane and causing the release of haemoglobin which in turn is converted to a brownish colour solution of acid hematin . The acid haematin solution is then compared with a colour standard. This method is sufficiently accurate for routine examination. Results are reported both in grams per 100ml of whole blood and in percent of normal values .There are number of modifications of the Sahli-Hellige method 100% may be equal to from 13.8 to 17.30 gram. 100 percent is equal to 14.5 gram of haemoglobin 100 ml of whole blood. After reading the percentage on the scale turn the tube and read from the other side to get the equivalent reading in grams. If either scale is hard to read remember that 100% divided by 14.5 is equals to 6.9 gram so one gram of hemoglobin is equals to 6.9%. If only one scale can be read, the other reading can be computed.

7. Observations and Result

In our survey we determine the quantity of Hb (g/dl). We divide the cases into different groups, based on physiologic condition (age,sex and pregnancy). We make a comparison about percentage of haemoglobin between the different age groups and between non-pregnant and pregnant women. We divide the cases into two age groups (years), i.e.,(18 – 30 yr) and (30 -50 yr.) . The total number of cases in non- pregnant women are 606 and in pregnant women are 2182 .

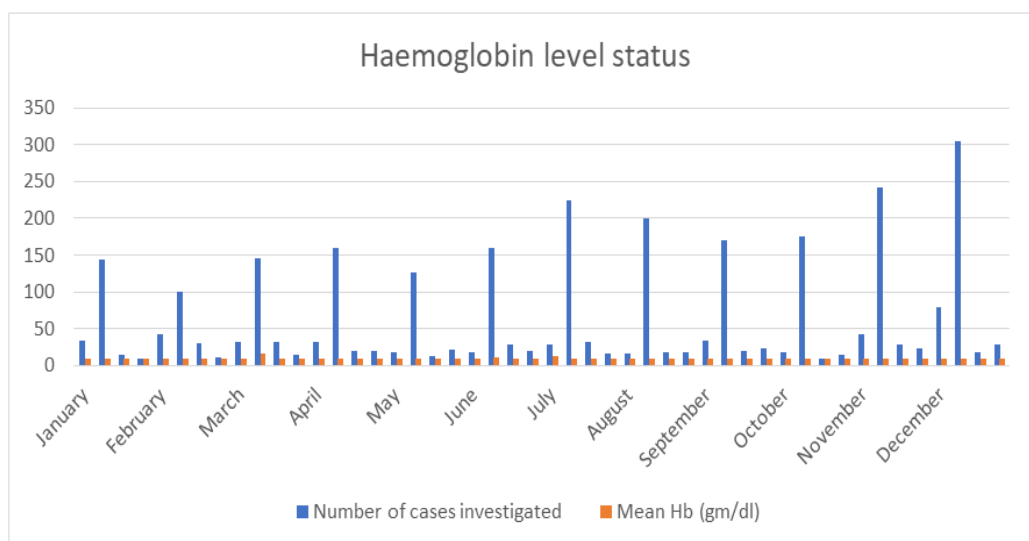


Fig. 5 Graph showing haemoglobin level in non-pregnant and pregnant women

8. Normal Range of Haemoglobin Level

Hemoglobin has a critical role in the body, as it is the protein in red blood cells (RBCs) that carries oxygen from the lungs to the tissues of the body. As such, abnormal levels of hemoglobin, or abnormal types of hemoglobin can result in serious disease. Let's look at the normal ranges of hemoglobin in adults in children, conditions that cause either a low hemoglobin or a high hemoglobin level . A hemoglobin level is usually checked as a part of a complete blood count (CBC). The normal range of hemoglobin varies depending upon on age and sex .

Table 2 :- Normal Hb (g/dl) level given by WHO

Group(years)/gender	Normal Hb level(g/dl)
0.6-4	11 g/d
5-12	11.5 g/d
12-15	Equal or Above 12 g/dl
Adult male	13.8 -17.2 g/dl
Adult female	12.1-15.1 g/dl
Pregnant women	Equal or Above 11 g/dl

Table 3: WHO's Haemoglobin thresholds used to define anemia

Age or gender group	Hb threshold(g/dl)
Children (0.55.0 yrs)	11 g/d
Children (5-12 yrs)	11.5 g/d
Teens (12-15 yrs)	12 g/dl
Women, non-pregnant (>15yrs)	12 g/dl
Women, pregnant	11 g/dl
Men (>15yrs)	13 g/dl

9. Discussion

This study has determined mean level of hemoglobin (Hb) among pregnant and non pregnant women of Karanja lad city. The mean Hb levels obtained did not show significant variation between pregnant and non- pregnant women. Likewise, they did not significantly vary by age and between women of varying tribes. To compare the percentage of Hb ,we

took the mean Hb (g/dl) of non-pregnant and pregnant women as well as of the two age groups and the data was collected from January 2019 to December 2019 . By these observation we said that the level of Hb (g/dl) varies depending on the physiologic condition and environment. Most of the cases are having the healthy level of Hb (g/dl) ,which is given by the WHO. But some of the peoples are having very less amount of Hb than the normal healthy Hb levels, so they were anemic patients. Haemoglobin levels below 10.5g/dl can have an impact on the health of the pregnant woman. Hence, it is important to take iron supplements during pregnancy as advised by the doctor.

10. Conclusion

The data shown in our study confirmed that Hb levels play a role in predicting the anemia. Deficiency of hemoglobin in red blood cells causes Anemia which is one of the most common health issues of the planet. It is important to give awareness about daily requirement of iron supplements to increase Hb level. When a woman is pregnant, she needs more oxygen than normal as the fetus also needs oxygen. Hence, as soon as a woman is pregnant, her haemoglobin level is estimated – the oxygen-carrying capacity of the blood directly depends on the concentration of the circulating haemoglobin.

In our survey we conclude that the maximum women are having healthy amount of Hb (g/dl) ,the limits which is given by the WHO. Some of the peoples are having very less amount of Hb they consider as a anemic patients. There is a significant difference between the amount of Hb present in the non-pregnant women and pregnant women cases and the different age groups by this we said that the amount of Hb on the blood varies depend on the physiologic condition, health status and the environment .

11. Recommendations

Seminars or health care program on awareness about Hemoglobin should be arranged at college and university levels to give knowledge about the foods that are required to make Hemoglobin in the body.

It is important to give awareness about daily requirement of iron supplements to increase Hb level. Iron ability is affected by some important factors known as iron blockers which are calcium, teas, colas and coffee, so

further study should also be carried on to find out those iron blocker which commonly more effected iron ability due to which Hb level gets low.

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MANAGEMENT OF NATURE RESOURCES

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ABSTRACT

Nature that are useful to humans are called natural resources. Natural resources include land, water, air, sunlight etc. and Locally available minerals, oil, plants etc. These resources are needed for the survival of life. Living things use this substance available in nature to survive, Exhaustible resources of nature renewable water soil, plants, animal world, and renewal. The part of these resources that is exhaustible that does not heal itself in a short time includes minerals oil, Natural gas. which metals and non metallic mineral share limited reserves inside the earth and are impossible to replenish because the formation of minerals in millions of years.

In the second group which has incomparable natural resources includes solar energy, wind energy, thermal energy and tidal energy. They are considered non-renewable. because their use does not deplete the stock.

1. Introduction

Natural Resources Management (MRM) is the management of natural resources such as water, soil, Plants and Animals with a particular focus on how management affects the quality of life for both present and future generations (stewardship). Natural resource management deals with managing the way in which people and natural landscapes interact. It brings together natural heritage management land use planning, water management bio-diversity conservation and the future sustainability of industries like agriculture, mining, tourism, fisheries and forestry. It recognizes that people and their livelihoods rely on the health and productivity of our landscapes and their actions as stewards of the land play a critical role in maintaining this health and productivity.

"Natural resource management specifically focuses on a scientific and technical understanding of resources and ecology and the life supporting capacity of those resources. Environmental management is similar to natural resources management. In academic contexts the sociology of natural resources is closely related to but distinct from natural resources management.

2. Objectives

Objectives of natural resources are as follows.

1. To sustain ecological diversity.
2. To offer resources for upcoming generations.

3. To maintain basic amenities supply for the people.
4. To improve the quality of living of all Organisations.
5. To maintain the ecological balance for Sustainable development.

3. Analysis of Information

It is definitely time to consider your strategies to meet your needs with minimal energy consumption and minimal environmental impact. There are many ways to help and improve the sustainable use of resources, some of them are very small like turning off the lights. when you go out and some are big, like not keeping track of how much natural energy you use at home as in your college. Can we compensate for the loss.

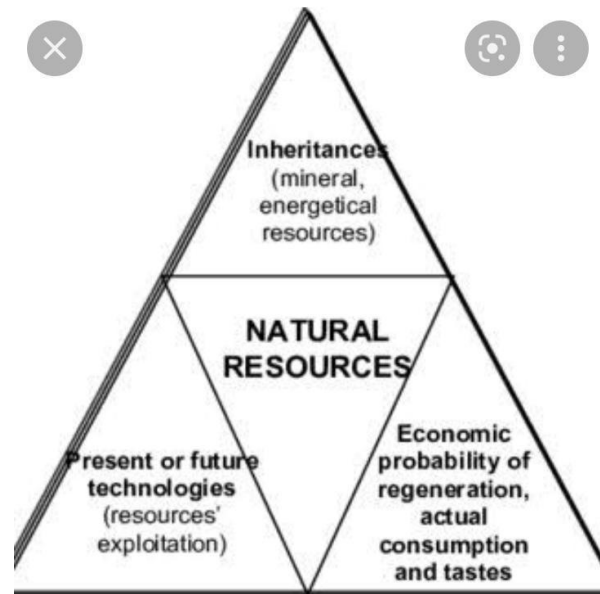
By naming unwanted household items, we can contribute to conservation. Only those items that can be reused, recycled or repaired should be used. Everyone can protect the environment if they are careful about walking, cycling using public transport or using environmentally hazardous materials as hazardous waste.

4. Important

1. To maintain balance in the ecosystem.
2. To avoid further destruction of the environment
3. To avoid over-consumption of natural resources

Needs to Manage Natural Resources

1. Everything that we use today. food, clothes, house, vehicles fuel, notebooks furniture, cooking gas, un toys, road etc. is obtained from resources on the earth
2. A significant portion of the Energy which we use today is obtained from non-renewable sources: This implies that once they are used up Cannot be replenished. The most important. source of non-renewable sources. This implice that once they are used up, they can not be replenished replenished. The most important source of non-renewable. energy used extensively is the fossil fuels which have taken millions of year. to be formed.
3. Managing the resources would not only ensure their rational use but also put a limit to the w degradation it is causing to the environment. for exemple, the usage of resources in different forms generates a lot of waste which is being disposed off into the water bodies. This in turn is polluting the sivers and lakes. Limiting usage will also reduce waste generation and pollution.



5. Conclusion

1. Learned the concept of natural resources
2. It was passiable to get more information about different types of natural resoustes
3. Learned the case courses of depletion of natural resources
4. Learned about what measures can be taken for the conservelen 10. Of natural resources

6. Remedial Plan

Individual level action plan for conservations of natural resources.

Forests water, soil road and minerals and energy are all natural resources these natural resources play the development of our country we can take some measures at individual level to Conserve natural resources we can do the following.

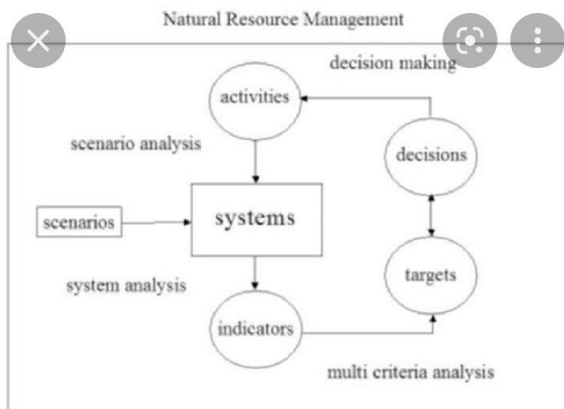
- 1) Save Water
- 2) Save Land
- 3) Save Forest
- 4) Save good
- 5) Save Minerals

1) Save water:-

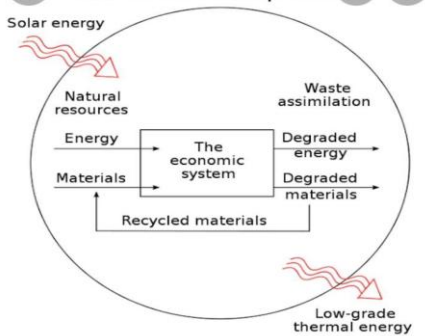
- A. Brushing teeth, Shaving, Washing Dishes, Taking a Bath
- B. Fill the washing machine with the required amount of water to wash the clothes. Reuse the soapy water from laundry for the garden or else where.
- C. Install a rain water retention system.

ii.

Natural Resource Management



The Earth's biosphere



Save Energy

- A. Turn of lights, fans and Other appliances when not in use.
- B. Use natural light i.e. sunlight as much as possible.
- C. Dry the washed clothes in the dryer in the sun.
- D. While building the house, design it so that sunlight will come into the house, this will Keep "the house warm

Save Land

- A. Plant a variety of ornamental plants, herbs 6 and trees in your garden.
- B. Plant grasses in open spaces their roots will hold the soil and will stop soil erosion.
- C. Compost Kitchen waste and use it in the garden
- D. Don't spray too hard when watering the plants as they wash away the soil.
- E. Use drip irrigation if possible and adopt good habits.

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GREEN COMPUTING APPROACH IN ICT COMPONENTS**Apurva Jha¹, Garima Gupta², Sanjay Rau³, Prashant Meshram⁴, Nitin Labhane⁵**^{1,5}Bhavan's College (Autonomous), Andheri (W), Mumbai, Maharashtra, India.²Sardar Patel College of Engineering, Andheri (W), Mumbai, Maharashtra, India.³Dy. General Manager (Env), Urban Engineering Division, RITES Ltd., Gurgaon, Haryana, India.⁴Maharashtra Remote Sensing Application Center (MRSAC), Nagpur, Maharashtra, India.Corresponding author: ³siraut@gmail.com, ⁴prashantmeshram20@gmail.com, ⁵nitin.labhane@bhavans.ac.in**ABSTRACT**

The Paris Climate Accords has led to the increasing awareness, research and development in sustainable and green technology. One of the facets of green computing is energy conservation or carbon footprint reduction, though its research focuses on more than just that. Low-power/energy computing is now commonly referred to as "Green Computing." However, all stages of the system life cycle must be taken into account for computing to be genuinely sustainable. Recent studies shows that the fabrication, both in terms of design and manufacturing too is responsible for a sizable portion of the energy being used by these systems throughout the course of their lifetimes. These systems include all the technology we make use of in our daily lives which are collectively referred to as Information and Communication Technology (ICT). This paper presents the applications and scope of green computing in different ICT system components in terms of design, manufacturing and disposal.

Keywords: Green Computing, Information and Communication Technology, Sustainable IT.

1. Introduction

The Intergovernmental Panel on Climate Change (IPCC, 2022) is the United Nations body for assessing the science related to climate change, which is playing a pivotal role. As we come closer to the year 2030, number 13 on the UN's Sustainable Development Goals list - Climate Change - becomes more talked about but less acted upon. While, COP26 focused on protecting and restoring ecosystems, COP27 is all set to discuss progress on mitigation, adaptation and means of implementation and support. However, not much can be seen in terms of improvement when it comes to carbon emissions and footprints. But, a shift in this trend has been viewed recently when green computing came into effect within industries. Today, sustainability is considered a corporate obligation, and companies are monitoring their operations via green computing and ICT applications. A KPMG (2020) study highlighted that sustainability reporting in G250 companies has grown from 64% in 2005 to 96% in 2020, which shows that a curtain of green is being pulled over big names in various leagues which in turn makes their ethically-rooted consumer's content. The usage of products largely depends on the users, but the design, manufacture, standardisation and

disposal are the components which could be worked with to take larger leaps in order to achieve sustainability.

2. Literature Review

In general sense, climate change, reliability of power and efficient power consumption are the reasons why companies, in the past few years have taken up a goal of providing green services through their products, and have been promoting green computing due to its additional benefits related to cost savings which invariably becomes appealing to their consumers. Additionally, green computing aims at reducing the carbon footprints generated by the IT sector, business and related industries. Energy efficiency and e-waste management being the two major strategies involved in green computing are often targeted by various designs, methods of manufacture, proper usage and disposal of devices (Jones et al, 2013). While energy efficiency targets the incorporation of energy-efficient units, servers and peripherals as well as reduced resource consumption, e-waste management is more focused towards the safe disposal of older models due the utilization of hazardous substances and toxic metals in their making so that minimum harm befalls the environment, as well as recycling components like lead and mercury to reduce land pollution.

Reduced energy consumption equals to reduced greenhouse gas emissions, which in turn equals to reduced operational costs for the data centres, therefore, adopting fewer and more energy efficient systems while refactoring application environments to make optimal use of physical resources is the best architectural model towards maintaining the gap between technology and ecology. Moreover, it is also obvious that the product durability and/or longevity is one of the best approaches towards achieving Green Computing objectives as it will allow more utilization of products and put a control on unnecessary manufacturing (Vinay & Rudresh, 2018). For instance, manufacturing a new PC makes a far bigger ecological footprint than manufacturing a new RAM module to upgrade an existing one.

At large, Green computing falls under the massive umbrella of environmental sustainability and can be considered to be a holistic approach that reaches power savings, to waste management, purchasing, usage, education, awareness and is a life-cycle management approach to the deployment of IT across an organization (Razal et al, 2012). It considers the total cost of ownership, the total impact, and the advantages of new technological systems on the environment. Bringing a recent development in this trend in picture, Intel's 2030 strategy which is fixated on bringing about net positive water use, zero waste to landfills and 100% green power policies. Another approach is to introduce a set of standardized policies so that companies design products to receive the eco-labels. It is also worthwhile mentioning here the Energy Star labelling program launched in 1992 by the US Environmental Protection Agency and US Department of Energy as it encourages power efficiency of various electronic devices and promotes energy savings.

The foundation of today's knowledge-based society is information and communications technology (ICT) systems. The adoption of innovations in this field happens incredibly quickly, and ICT use has increased significantly in recent years globally. The cost of this remarkable expansion is that ICT systems now produce the same amount of CO₂

emissions as international air travel. Clearly, the main R&D task for the ensuing decades will be to increase the energy efficiency of ICT systems. Although there isn't a single, agreed-upon definition of ICT, it is generally understood to refer to all hardware, software, applications, and networking elements that work together to enable communication between individuals and groups (Vinay & Rudresh, 2018). The comprehensive range of ICT components is always expanding. Some parts, like computers and phones, have been around for a long time. Robots, digital TVs, and cell phones are more recent additions. While there are many ICT systems and components the major building blocks remain the same. They are: Software, Hardware, Data and Communication. Now that we have understood what's green computing, sustainable technology and ICT, we now move onto our research work section where we understand the applications of green computing in ICT (Gao et al, 2022).

The future of green computing is going to be based on efficiency, rather than reduction in consumption. The primary goal so far has been in favour of the organization's self interest in energy cost reduction, at data centres and as a result, a considerable shift can be projected in carbon generation (Razal et al, 2012). The secondary focus has to go beyond energy usage at the data centre and should be more about innovation and improving alignment with overall corporate and/or social efforts. This will invariably demand the development of strategy sets which incorporate the idea of sustainability and addresses the subject of value creation while also ensuring that long-term environmental resources are not impacted. And there will of course be challenges. Due to obvious lack of concern and huge market competition, companies resist this change. Even though companies like Intel and Dell have become pioneers in the last few years towards a greener IT sector, many are still confused between the applications of green computing, and consumer needs, and are hence, stuck in the purgatorial race of thought (Vinay & Rudresh, 2018).

3. Research Work

ICT has five components – software, hardware, telecommunications, data and standard procedures - which if modified according to green computing measures, can become the future of greener IT sector (Jones et al, 2013, Reddy et al, 2017). Following is a set of available and suggestive data in accordance with the modifications in software systems and accessible hardware systems which are environmentally sustainable-

Optimization of software:

Creating efficient algorithms: While algorithmic efficiency might not have as much impact as other approaches of green computing, it is still an important consideration. Efficient algorithms might also be a major factor influencing the number of resources needed for a computing function. Algorithmic changes might make a search algorithm faster and can help reduce resource utilization substantially.

Virtualization: It is the abstraction of computer resources, such as the running two or more logical computer systems on one set of physical hardware. One of the best ways to go green and save enough space and resources is by streamlining efficiency with virtualization. It shows optimal usage of resources by reducing numbers of hardware, as well as space, thereby reducing cost and bringing in the low-power sleep mode so that the servers are either busy or in a state of low-power consumption.

Terminal Servers: These are servers or hardware devices providing terminals like PCs, smartphones, tablets, printers, etc., that share a common connection to the terminal server. They eliminate the need for terminals to have their own network interface, modem, or card. When using the system, terminal users connect to a central server where the actual computing is done, but the end user experiences the operating system on their side. Implementation of terminal servers can save both energy consumption and cost.

Strategic Resource Allocation: Researchers from MIT, Carnegie Mellon University, and Akamai have tested an energy allocation algorithm that successfully routes traffic to the

location with the cheapest energy costs. The research projected up to a 40 % savings on energy costs if their proposed algorithm were to be deployed. But this doesn't reduce the energy input. It only reduces company costs. However, a similar strategy can come in handy to direct traffic to rely on energy that is produced in a more environmentally friendly or efficient way. A similar approach has also been used to cut energy usage by routing traffic away from data centres experiencing warm weather as it allows computers to be shut down to avoid using air conditioning.

Optimization of hardware:

Mitra Solar PC: Developed for rural Indian areas where online teaching, medical treatment and online help for farmers is unavailable, this concept is a cylinder, dual power clamshell featuring a keyboard and an LCD monitor, which also holds a Wi-Fi, a USB port and a projector. When not in use, it can get charged using solar energy as its outer body is lined with solar cells, or can be charged using a hand crank.

Igglu modular PC concept: Designed to reduce e-waste generation from reusable and recyclable products, the high performance of this model involves easy component removal and replacement with revised or new models using an online account while maximizing resource and energy efficiency. When the old components are removed, they are reused in budget services by the company.

Biodegradable Desktop computer from Dell Computing: Also known as Froot, it is a compact device made with high-end laser projection units and onboard CD drives. Its body is made with biodegradable starch-based polymer. However, a better option at this technique could be completely decomposable bacteria-derived polymers like 'bioplastic'-polyhydroxyalkanoates.

Data Storage:

Ever-growing data volumes necessitate the use of electricity to power storage systems, transit data across systems, backup and replicate data, and provide a secure management environment. Organizations require additional resources to sustain their storage operations as

they acquire more data. In order to meet ongoing business commitments, IT teams are under increasing pressure to develop a more sustainable strategy for data storage (Reddy et al, 2017). In a time when data centres all around the world are consuming more energy than ever, efficient data storage is a laudable goal. In 2018, data centres consumed 250 terawatt-hours of energy globally, or almost 1% of all energy consumed globally, according to an article in Science magazine. Effective data storage architecture and management of computer resources and cooling systems can save up on energy usage.

Apart from these a few ways to make a step towards green and more sustainable storage of data are as follows:

1. Updating and cleaning: Delete unused data locally and from data centre on regular period of time
2. Green data storage hardwares: Over traditional HDDs and HVAC equipment one can prefer Tape Storage, Multiple virtualized servers should be stored on a single server, massive array of idle disks etc
3. Careful analysis of the location and optimum utilisation of resources at hand.
4. Create a physical environment that is ideal for storage systems. For instance, airflow patterns influence how effectively storage equipment can maintain cooling etc.

Communication:

The concept of choosing energy-efficient communications and networking solutions is known as "green communication," and it involves decreasing resource usage in all forms of communication whenever practical (Muniswamaiah et al, 2020). Heavy metals and rare minerals are commonly found in significant amounts in telecommunications equipment. The major problem is to mine for these materials, and the main environmental challenge is waste treatment. The amount of waste created with and without material can be calculated using this method. The extraction of materials, production, use, transportation, and end-of-life are the five steps that should be taken into account in order to have a thorough

understanding of a product's environmental impact. When discussing the topic, it is important to take into account greenhouse gas emissions, including those covered by the Kyoto Protocol. These gases include methane, nitrous oxide, carbon dioxide, PFCs, HFCs, and sulphur hexafluoride.

Modern high-speed wireless communication relies heavily on wireless sensor networks (WSNs), which are gaining popularity. A WSN is often made up of lots of static sensor nodes that have limited processing power and short-range radio communication capabilities. The management of wireless sensors' energy resources has grown in importance as a result of their widespread deployment (Muniswamaiah et al, 2020). The sensor nodes typically get their energy from regular batteries. The functioning of the sensor networks is hampered by the laborious and time-consuming procedure of replacing batteries on a regular basis for a large number of sensors. One of the carbon footprints models which can be adopted is Radio Access Networks. RAN site operations, including base station sites, control sites, and core sites' electricity efficiency (Vinay & Rudresh, 2018, Reddy et al, 2017).

Wirelessly energy harvesting has recently become a viable option for supplying power to low-powered wireless autonomous devices like wearables, Internet of Things (IoT), and sensor nodes in contemporary wireless systems. In order to power these low-power gadgets, energy harvesting is the act of capturing energy from ambient natural sources and converting it to electricity (Muniswamaiah et al, 2020). As opposed to conventional battery sources, the energy collecting method is environmentally friendly and sustainable and can run unattended for years (Gao et al, 2022; Reddy et al, 2017). A few more potential harvesting designs systems are as follows:

1. Radio frequency (RF) signal energy harvesting
2. Antenna modelling and characterization
3. semiconductors for applications such as power transfer and energy harvesting
4. High performance rectenna systems with new design topologies

5. Multi-layered approaches to energy harvesting system design
6. Beam-steering topologies and miniature array designs for effective and high gain antenna systems
7. Flexible and movable wireless sensor networks with wearable antenna systems
8. Compact metamaterial/meta surface concepts for improving rectenna system performance
9. Strategies for multichannel selection and energy collection in cognitive radio systems
10. Evolutionary methods to improve rectenna performance and design efficiencies
11. Wireless energy based in 3D

4. Conclusion

This paper presents an overview of energy consumption problems and green computing methods for a sustainable technology in various Information and Communication

Technology (ICT) components. With a thorough literature review done for various facets of green computing we have done our research in four major components of ICT namely Software, Hardware, Data and Communication. With comprehensive details of existing issues in environmental sustainability of the models currently at employment and steps being taken to make things greener we have suggested various modifications that can be implemented to make it environmentally conscious over a long period of time. Not only have we covered the design and manufacturing aspects but also taken into consideration the disposal of these components and its future. As technological networks experience exponential growth globally, it is of utmost importance that we make it a high priority to ensure the design, development and disposal of these components and technologies are environmentally sustainable.

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SOCIO-ECONOMIC STATUS OF FISHERMEN DEPENDENT ON THE LANJUD RESERVOIR, NEAR KHAMGAON BULDHANA (MH)

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ABSTRACT

Present research work was carried out to assess the socio-economic status of 39 fishermen depending on the Lanjud dam situated on the Lendi River near Khamgaon. From Nov 2020 to Dec 2021, a one-year survey of the Lanjud reservoir in the Buldana district of Maharashtra was conducted. During the study it was found that the fishery business is male dominant, the majority of fishermen were found illiterate, the majority of fishermen belonged to the age class 31-45 years, in addition to 27 fishermen employed in other part-time jobs. Along with this study, some other basic amenities status of fishermen was studied. This study revealed that the socioeconomic condition of fishermen in the study area is poor. Government agencies, NGOs, and relevant stakeholders should take the necessary actions to raise the literacy rate and the standard of living.

Keywords: Socio-economic status, Lanjud Dam, Fishery status, Fishermen, community.

1. Introduction

India has a prosperous variety of fauna and flora due to the presence of rich freshwater habitats and it ranks as one of the world's huge diverse nations. Fisheries play a very huge role in the socioeconomic development of the fishing community. Fish is a rich source of protein supply to the rural community where potentialities for production exist. (Shriparna Saxena, 2012)

Despite the fact that India has abundant fishing resources. However, it is not being properly and fully utilized. As a result, there is a fish supply shortage in relation to demand. This could be due to the fishermen being technologically, economically, and socially backward. As a result, the government, cooperatives, and the fishing industry should take appropriate steps to exploit available resources and improve the socioeconomic conditions of fishermen. Community information on various aspects such as income, living costs, fishing gear, boat transport, and marketing infrastructure are termed socioeconomic information. Socioeconomic status is the strongest indicator of people's life (Kitagawa and Hauser, 1973; Marmot *et al.*, 1987).

Fresh water from the Lanjud dam is especially used for drinking, domestic and agriculture purposes. But apart from these, the reservoir is used for catching fish. During the investigation from November 2020 to December 2021, 31 fish species belongings to 8 families and 13 orders were recorded from Lanjud dam (Kale & Bathe, 2022). The current work was undertaken with the objective to investigate the socioeconomic status of the fishing community. The socio-economical study provided a useful tool for better understanding the life condition of fishermen communities in the context of changing environmental and socioeconomic factors affecting their traditional livelihood from the given area.

2. Study Area

The Lanjud dam is a Medium Irrigation Project constructed on the Lendi River, 10 km on Khamgaon-Nandura Highway, North-West near Khamgaon Dist. Buldana (MS). It was sanctioned in 1984 and has a catchment area of about 66.96sq km. The gross storage capacity of the Dam is 1.9892 mcm. It coordinates 76°-36'-00" longitudinally and 20°-00'-45" latitudinal. The dam has a total length of 1215m with a height of about 12.55m. It was

mainly constructed to supply water to MIDC water to the surrounding villages. Khamgaon, nearby agriculture, and drinking

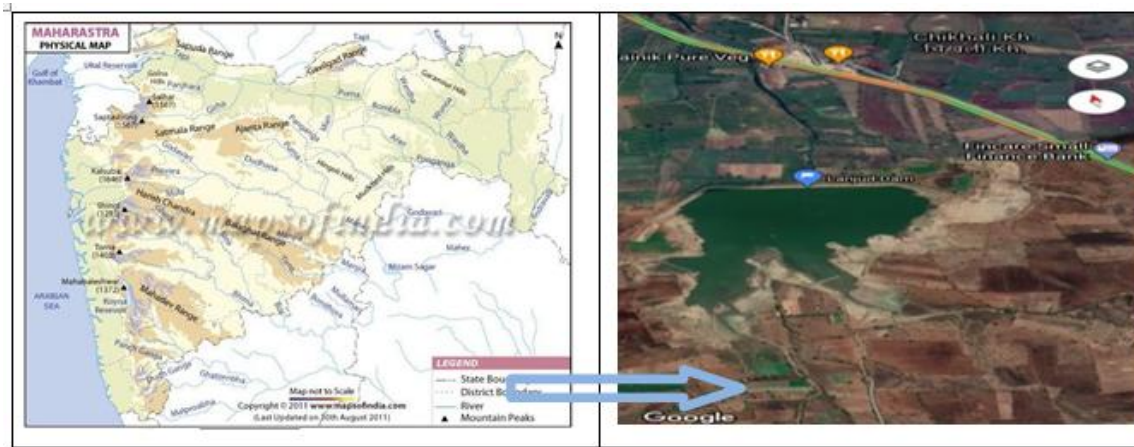


Fig. 1. Geographical location of the research site- The Lanjud dam. (Source-Google Maps)

3. Material and Methods

The present study was carried out from Nov 2020 to Dec 2021, among the fishermen engaged in fishing in Lanjud reservoir. 39 individuals from the fishermen’s community were interviewed. To acquire primary data, questionnaires, discussion, observation, and personal interview methods were used. whereas secondary data were obtained from

official documents. The obtained information was accumulated and analyzed by MS Excel. Collected data explain the socio-economic and livelihood condition of fishermen of Lanjud dam.

4. Result and Discussion

During the tenure of the socioeconomic study of fishermen, we have found the following data

Table 1: Age distribution of fishermen

Sr. No.	The age group of fishermen (yrs.)	No. of Fishermen	Percentage
1	0-15	-	-
2	16-30	6	15.38
3	31-45	23	58.97
4	46-60	6	15.38
5	61-75	4	10.25

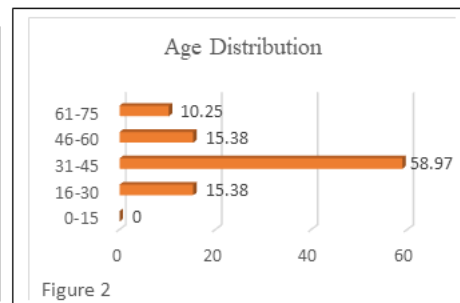


Table 2: Sex distribution of fishermen

Sr. No	Sex	No. of Fishermen	Percentage
1	Female	-	-
2	Male	39	100

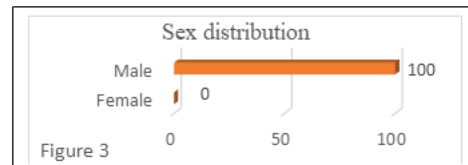


Table 3: Marital status of fishermen

Sr. No.	Marital status of fishermen	No. of Fishermen	Percentage
1	Unmarried	2	05.12
2	Married	37	94.87

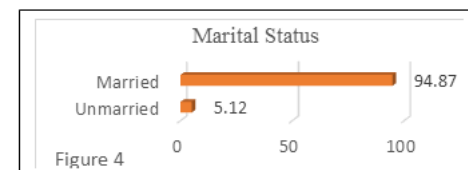


Table 4: Educational status of fishermen

Sr. No.	Educational Qualification	No. of Fishermen	Percentage
1	Illiterate	28	71.79
2	Up to SSC	9	23.07
3	Up to HSC	2	05.12
4	Graduate	-	-

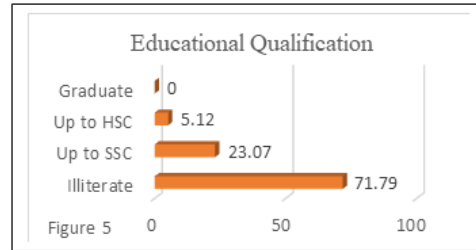


Table 5: Mode of transportation of fishermen

Sr. No	Transportation Facility	No. of Fishermen	Percentage
1	In thermacol boxes	11	28.20
2	In open trays/bags	28	71.79

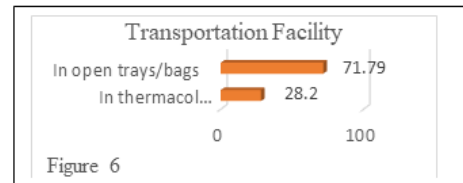


Table 6: Selling point of fishermen

Sr. No.	Selling Point	No. of Fishermen	Percentage
1	Local market	39	100
2	Export	-	-

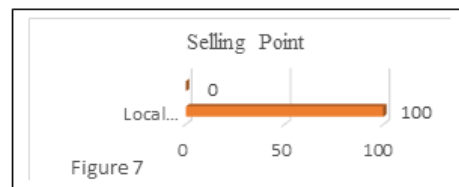


Table 7: Monthly income of fishermen (Rs.)

Sr. No.	Fishermen's monthly income	No. of Fishermen	Percentage
1	1000-3000	4	10.25
2	3001-6000	20	51.28
3	Above-6000	15	38.46

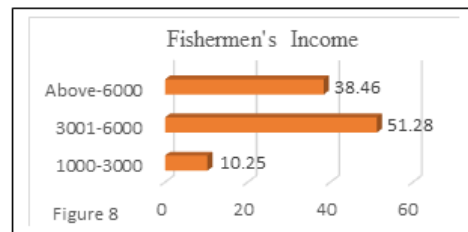


Table 8: Status of accommodation of fishermen

Sr. No.	Housing condition	No. of Fishermen	Percentage
1	Jute, Straw, plant leaves, and soil	9	23.07
2	Tin and wood	20	51.28
3	Brick, wood & tin	7	17.94
4	Brick and cement	3	07.69

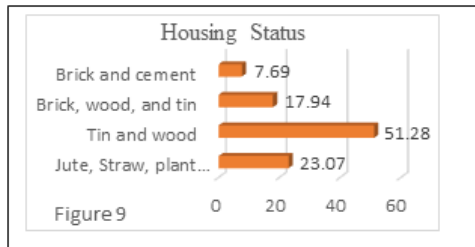


Table 9: Basic amenities status of fishermen

Sr. No.	Electricity and Water supply	No. of Fishermen	Percentage
1	Regular	09	23.07
2	Irregular	30	76.92

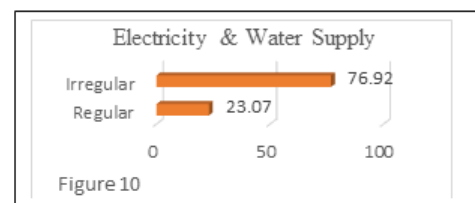


Table 10: Basic amenities status of fishermen

Sr. No.	Fuel facilities for cooking	No. of Fishermen	Percentage
1	Tap Water	8	20.51
2	Tube Well	24	61.53
3	Dam Water	7	17.94

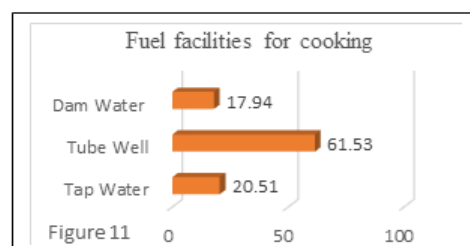


Table 11: Employed in other part-time jobs

Sr. No	Employed in other part-time jobs	No. of Fishermen	Percentage
1	Yes	27	69.23
2	No	12	30.76

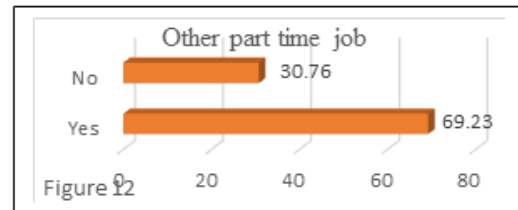
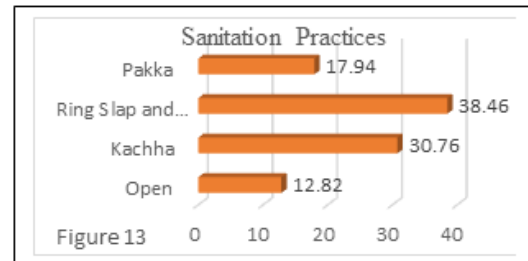


Table 12: Basic amenities status of fishermen

Sr. No.	Sanitation practices	No. of Fishermen	Percentage
1	Open	5	12.82
2	Kachha	12	30.76
3	Ring Slap and Wooden houses	15	38.46
4	Pakka	7	17.94



From the above (Table 1) it was concluded that 58.97 percent of fishermen’s age group present between 31-45 yrs., 15.38 percent were present under 30 yrs., whereas 25.63 percent of fishermen’s age group present between 45-75 yrs. So, the middle age group was dominated by fishing. From the present study, it was found that the (Table 2) rural area fishery business is male-dominated, and females do not show interest in the fishery. The above study (Table 3) reveals the majority of the respondent were married (94.87%) and the remaining few were unmarried (05.12%). Generally, in rural areas, they may have arranged marriages within close relations.

As far as their education is concerned (Table 4) most the of fishermen in the study area were illiterate (71.79%) only a few of them are able to do signatures. Of all the respondents only 23.07% of fishermen were educated up to SSC and only 05.12% up to HSC. In the survey (Table 5) it was found that 71.79% of fishermen don’t have thermacol boxes they transport fish in open trays and bags as soon as possible after catching and the rest 28.20% transport fish in thermacol boxes with the ice. The selling point (Table 6) for all the fishermen is a local market no fish will be exported out.

The average monthly income of the fishermen’s community is very low than the national per capita income (Table 7). 10.25% of respondents had the lowest income between Rs. 1000-3000. 51.28% of respondents had a monthly income between Rs. 3001-6000.

38.46% of respondents came under highest monthly income above Rs. 6000. The nature of the house reflects the fishermen’s social status. During the survey (Table 8), it was found that 51.28% of households of fishermen were wooden walls with a tin shed. 23.07% of households were from Jute, Straw, plant leaves, and soil. 17.94% of households were containing brick, wood & tin and very few fishermen (07.69%) were able to make their houses with brick and cement.

From the present survey, it was found that (Table 9) there was 76.92% of fishermen have irregular electricity and water supply facility, and only about 23.07% of fishermen had electricity and water supply facility.

As far as fuel facility for cooking is concerned (Table 10) 20.51% of respondents used tap water. 61.53% used tube well and 17.94% used dam water. During the study period, it was found (Table 11) that only 30.76% of fishermen solely depended on fishing while the rest 69.23% engaged in other part-time jobs along with fisheries such as agriculture, casual labor, fish vending, businessmen, etc.

As the fishermen of the rural area (Table 12) are not conscious of sanitation. In the study period, it was found that 17.94% of toilets were pakka. 38.46% were semi-pakka as it was made up of ring slap and wooden houses. 30.76% were kaccha and 12.82% of the fishermen had no sanitary facilities open.

5. Conclusion

The present study was conducted to assess the socioeconomic condition of fishermen dependent on the Lanjud dam near Khamgaon Dist. Buldhana. The fishing community of the study area was found very poor and illiterate. Due to illiteracy and non-mechanization of crafts and gears, they are falling behind in fish

production. Fishermen also lack technical knowledge of boat operation. The monthly income of fishermen was lower than the national per capita income. Government organizations, non-governmental organizations, and respective organizations or groups should take the necessary steps to assist the community in improving their livelihood.

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THE IMPACTS OF ENVIRONMENT ON PLANT & PLANT EFFECTS ON ECOSYSTEM PROCESSES

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ABSTRACT

These environmental modifications might become a greater cause of global species extinction than direct habitat destruction. The environmental constraints undergoing human modification include levels of soil nitrogen, phosphorus, calcium and pH, atmospheric CO₂, herbivore, pathogen, and predator densities, disturbance regimes, and climate. Extinction would occur because the physiologies, morphologies, and life histories of plants limit each species to being a superior competitor for a particular combination of environmental constraints. Plant species depend on specific environment conditions to optimum growing. There are various agricultural areas that comprised from plant species which originated in climatically quite different regions. Plants absorb many elements from soil which have biological function and some of them are known as toxic also at low amounts. In case of environmental conditions change, plants will response as changing some of their metabolic activities. So that some of the quality parameters will change. Some of the plants can adopt as well as reasonable values, but some of them will be affected negatively. Human-caused environmental changes are creating regional combinations of environmental conditions that, This paper introduces a thematic issue dedicated to the interaction between climate change and the biosphere. It explores novel perspectives on how ecosystems respond to climate change, how ecosystem resilience can be enhanced and how ecosystems can assist in addressing the challenge of a changing climate.

Keywords: Ecosystem, Human activities, Climate change impact, resilience.

1. Introduction

One of the greatest challenges facing humanity is to understand the mechanisms by which human activities are altering the environment and biota of our planet. Only through this understanding can we develop plausible projections of future changes and their impacts on society. Many of the impacts of human activities are well documented and understood (Vitousek et al., 1997). Fossil fuel combustion and deforestation have increased concentrations of carbon dioxide by 30 % in the past three centuries (more than half of this in the last 40 years). We have more than doubled the concentration of methane and increased concentrations of other gases that contribute to climate warming, with the prospect that climate will change more rapidly than at any time since the end of the last glaciation 18 000 years ago. Industrial fixation of nitrogen for fertilizer and other human activities has more than doubled the rates of terrestrial fixation of gaseous nitrogen into biologically available forms. Humans have transformed 40±50 % of the ice-free land surface and use about one-third of terrestrial net primary productivity. We use 54 % of the available fresh water, with use

projected to increase to 70 % by 2050. Finally, the mobility of people has transported organisms across geographic barriers that long kept the biotic regions of the earth separated. Consequently, over broad areas, many of the ecologically important plant and animal species have been introduced in historic time. Changes in the atmosphere and oceans can profoundly change the biosphere, the thin living film of life on Earth that is intrinsically coupled to the atmosphere and hydrosphere and provides the nourishing fabric within which human societies exist. Hence, degradation or restoration of parts of the biosphere are likely to have regional or planetary consequences. Anthropogenic greenhouse gas emissions, which drive both climate change and ocean acidification, increasingly threaten the viability and resilience of natural ecosystems, and the human societies that depend upon them. The effects of these threats can be profound and, in recent years, have become increasingly so. Environmental Constraints in Plant Communities: What are the major environmental variables that limit the abundance of terrestrial and aquatic plants, and which of these variables are being impacted

significantly by human actions? In essence, plants may be limited by nutrients and other resources, by pathogens and herbivores, by disturbances, by dispersal abilities, and by the physical environment, including its climate. These constraints are elaborated below. Features of the environment are determined by the contributions of factors that constitute it. Impact degrees of factors vary as depend on plant species. For example, while cool climate legumes (peas, broad beans, chickpeas and lentils) show the best developments around 18-20 °C, hot-climate legumes (beans, cowpeas) show a better development around 20-24 °C. This shows us the plants are

2. climate change threats and challenges to ecosystems

The Forum examined several aspects of the latest science on how climate change affects terrestrial, freshwater and marine ecosystems, often in interaction with other factors. In particular, it explored current research frontiers including the effects of change in climate variability and extremes; interactions of climate change with other human-induced stressors; thresholds and the potential for abrupt and irreversible change; and multi-trophic interactions. Ecosystems are rapidly changing in response to climate change and other global change drivers, not only in response to temperature changes but also associated changes in precipitation, atmospheric carbon dioxide concentration, water balance, ocean chemistry, and the frequency and magnitude of extreme events. Ecosystems vary in their sensitivity and response to climate change because of complex interactions among organisms, disturbance and other stressors. These interactive controls respond dynamically to any external change in state factors and to any change in other interactive controls. The composition of a plant community, for example, is influenced both by the global changes in climate and regional biota (state factors) and by nitrogen deposition, livestock density, fire suppression and timber harvest (interactive controls). Many of the resulting changes in the characteristics of the plant community cause further changes in other interactive controls, including the eco-system

goods and services that benefit society. The dynamic interplay among changes in interactive controls governs the transient dynamics of ecosystems in a globally changing environment

2. Some Quality Parameters And Effects Of Environment

A. Proteins

Plant products are cheap and high quality sources of protein. While cereal grains have around 11 % protein, legumes have 18-30 % protein average. Legumes have higher amounts of amino acids such as thryptophan, lysine and aspartic acid. However, cereals have methionine, cystine, and glutamic acid more than legumes. The negative effects of unbalanced amino acids suppose to eliminate for optimal nutrition [5]. Protein content is one of the most important criteria used in determining the quality of plant products. Protein content is influenced largely by environmental factors [6, 7, 8]. External factors that affecting the amount of protein, are also the factors which affecting the duration of plant maturing periods. Protein decreases in grains after pollination because of the environment conditions which have rainy weather, cool and damp weather. However, if the weather is much rainy during vegetative development and it is hot and dry during generative growth period, the protein content increases. Environmental conditions also have important effects on the amino acids [8]. It is known that environmental factors are effective on the amino acid content of legume

B. Mineral Substances

Agricultural products are quite rich in terms of minerals especially potassium, phosphorus, calcium and iron. Mineral contents of plants affect a lot due to genotype and nutrient elements in the environment where they are grown. The amount of mineral contents especially iron, phosphorus and zinc are also influenced very much by environment [16, 8]. It has been reported that most of macronutrients and micronutrients amounts were decreased in wheat and barley under high carbon dioxide concentrate and more affected in straw than in grains.

3. A Framework For Predicting Strong Effects Of Plant Species

Because interactive controls are the factors that directly regulate ecosystem processes, species that alter these controls generally have strong effects on ecosystems. This similar increases in productivity and alter many other ecosystem processes. Differences between species in the timing of resource capture can also alter the pool of resources captured annually to support primary production. In mixed grass-lands, for example, C 4 species are generally active in the warmer, drier part of the growing season than are C 3 species. Consequently, C 3 species account for most early-season production, C 4 species account for most late - season production, and the overall production is probably greater than if either C 3 or C 4 species were absent from the ecosystem . Litter quality, which influences the turnover rate of nutrients in litter and soil organic matter, is perhaps the best documented mechanism by which species alter resource supply rate (Melillo et al., 1982; Hobbie, 1992). Litter from low-nutrient-adapted species decomposes slowly because of the negative effects on soil microbes of low concentrations of nitrogen and phosphorus and high concentrations of lignin, tannins, waxes and other recalcitrant or toxic compounds.

4. Integrated Effects Of Plant Traits On Ecosystems

Given the large number of plant traits that influence interactive controls and the multiple interactive controls that influence ecosystem processes, how can one generalize about vegetation effects on ecosystem processes? The answer to this question depends on the spatial and temporal scales of comparison. In studies that compare current ecosystem processes across regions or continents, the traits of dominant plant species, particularly traits related to size and growth rate, have predictable effects on several ecosystem processes. These broad generalizations apply less readily to the transient dynamics of a single ecosystem, which depend on the properties of both the current dominants and the species that might become more common with community change. Even rare

species may play an important role as changes in conditions alter species composition (Walker et al., 1999). In addition, at the scale of an individual ecosystem, there is substantial variation in the trait combinations found among species within a given functional type, making it essential to consider the traits and abundances of individual species in evaluating the impacts of changes in species composition in a community (Eviner and Chapin, 2003a). In this section I focus on trait combinations that contribute to broad-scale patterns of ecosystem properties. This comparison suggests that certain suites of traits related to size and growth rate account for most of the global variation in plant effects on ecosystem processes.

5. Conclusion

The effects of species traits on ecosystem and regional processes are sufficiently well understood that they can be incorporated into regional and global models that link changes in vegetation with changes in ecosystem processes. In many cases, the traits of dominant species that determine ecosystem properties, such as total leaf area, can be sensed remotely and mapped at regional and global scales. This provides the basis for incorporating our current understanding of species effects into large-scale ecosystem and climate models to provide a more informed basis for developing policies that mitigate the undesirable effects of human activities on the global environment.

ENVIRONMENTAL ATTUNEMENT IN HEALTH AND SPORTS

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ABSTRACT

This Special Issue on environmental attunement introduces seven papers that interact with a variety of various insights and practices of nature-subculture and embodied connections to area throughout fitness, recreation and bodily schooling. We have organised the papers into 3 topics that discover opportunities for: (i) notions of the surroundings and `nature` in studies and exercise; (ii) opportunities and demanding situations of translating surroundings, sustainability and `nature` from coverage and curriculum files into exercise; and (iii) philosophical and theoretical hyperlinks to emplaced and embodied mastering – past-present-future. These are never distinctive topics and readers will comprehend different styles of theoretical and empirical opportunity in addition to essential geographical and contextual nuances that want to be explored in addition. Because of this, we are hoping that this series conjures up in addition submissions via an prolonged name for papers that interact with the demanding situations and the opportunities of ways we'd method the complicated environmental, ecological, political and cultural elements that form fitness, recreation and bodily schooling in modern times.

Introduction

This Special Issue, like many good ideas in academic spirit, was conceived through a themed symposium. We presented `Health as more-than-human: environmental attunement in health education` at the inaugural Critical Health Studies (CHESS) Conference in May 2018, Queenstown, New Zealand (Fitzpatrick et al., 2019) under a simple (and optimistic) conversational premise; to `grow new grass` rather than lament that `the grass is (or could) be greener` elsewhere. The purpose was to expand possibilities and practices of educational and embodied connections to environmental knowledge of place, space and nature¹ in health, sport and physical education.² Utilising the notion of attunement, helped us to explore the `epistemological habits` (Trout, 2008, p. 63) or `leaning in` to notions of environment that focus on a body-mind-culture-nature connection to the lands and waters in a deep sensory and even spiritual sense of care for others (Brymer et al., 2010). At the time, Nicole was working on bluespace research and collecting data on how notions of participation in National Parks and greenspace were being increasingly converged with health and fitness discourses through advertising and social media. Rosie had been engaging in health and food and nutrition education with Australian

Indigenous elders and making place-based links to environmental knowledge with field trips to gardens and farms. Through this practice with pre-service teachers, imagined possibilities for environmental attunement were materialised with students creating novel cross-curricular assessment for learning tasks that integrated and utilised the Australian Curriculum capabilities of Sustainability and Aboriginal and Torres Strait Islander Histories and Cultures (ATSIHC). Michael was rediscovering Ivan Illich, contemplating the rich multitude of possibilities of histories and purposes of health and physical education through time, and thinking about what we can learn from animals and multi-species in this endeavour.

Environmental attunement

While we accept that a person`s surrounding conditions constitute part of what we are referring to as `environment`, we want to call for a more expansive and political approach to the concept. The Introductory paper of this Special Issue takes this up in more detail to examine how within the field of health and physical education the term environment is often used in a generalist sense to describe a particular context that could influence performance or participation. In Sport, Education and Society, articles have examined sports or athlete environments, or non-competitive environments (e.g.

Dhillonet al., 2020), but few have examined the relationality of environment to pedagogy. The exceptions are Sanderud et al.'s (2020) work on Bildung and children's perspectives on nature-play relationships in snow-covered playgrounds which examines the way movement memories are entangled in the geographical materiality of weather. Other examples include recent valuable scholarship on informal sport (O'Connor & Penney, 2021), exercise and the environment (Hitchings & Latham, 2017), eco-motricity (Pazos-Couto et al., 2021), outdoor education (Dyment & Potter, 2015; Quay, 2016) and sustainability (Truong, 2017), all of which has included notions of the environment and nature as a unique and important (yet often marginalised) intersection with movement and physical education. This collection of literature explores both long-standing issues in the field, particularly those related to the marginalization of outdoor education, and recent empirical developments in tracking changing social and cultural practices of health and sport participation. pointing out. There are many other publications that complement this area that can be consulted for inspiration. For example, eco-friendly exercise and recovery and therapeutic landscapes (Olafsdottir et al., 2017), the natural environment and physical activity and health (Jansen et al., 2017; Merchant & Wiltshire, forthcoming), equity in children's health issues, and research on access to green spaces. Space (Feng & Astell-Burt, 2017). Also, the Sustainable Development Goals (Barakat et al., 2016) and the framework of social, environmental and commercial determinants of health that address health equity, policy and promotion (Baum, 2007; Maani et al., 2020; Friel et al., 2011; Schwerdtle et al., 2020). The first article in this issue clarifies our position on environmental sustainability by outlining his four statements:

- We live in a world that is constantly changing and challenging established approaches to human and environmental health care (Patrick et al., 2015). Our attunement must focus on the premise that

the environment shapes health and that human health depends on the natural world.

- Health, physical education, and environmental knowledge must be integrated through a holistic and participatory approach that recognizes changes in social and cultural practices in both the built and natural environments. This includes, among other things, a sensitivity to narrative and place ontology. In particular, indigenous peoples and indigenous land ontologies like country and practices like Dadiri or deep listening to build emotional relationships of 'love, compassion and solidarity' (Atkinson, 2002) (Renshaw & Tooth, 2017).

Sports and the environment

Sports occupy a special place in modern life, with millions of people around the world watching and participating in their favorite games. Ironically, despite its recreational and health-enhancing benefits, sports can also be harmful to the environment. To remedy this, professional teams and colleges across the country are transforming sport into a positive force for ecological change by adopting sustainable practices.

“If you build a stadium in the middle of a city and have 80,000 people in it a day, the environmental impact is huge.” University of Natural Resources, North Carolina. “Waste, water and air pollution are hard to argue. The challenge is to mitigate these negative impacts.”

A significant impact of football matches is air pollution, mainly from transportation and tailgating. Two years ago, Bunds and Jonathan Casper, an associate professor in the School of Parks, Recreation and Tourism Management, conducted an air pollution study at Carter Finley Stadium in North Carolina. The research ended with some interesting results.

Six hours before each game, the researchers used fixed and mobile air quality monitors placed around the tailgate seat. Monitors recorded relative humidity, ozone, temperature, and carbon dioxide levels. A spike in air pollution was recorded when fans gathered three hours before his start of the

game. The main culprits are charcoal grills, old generators and especially idling cars."It's kind of late to get to and from the event, so there's a lot of idling cars and clouds of air," Vans explained. We've seen a few games where it doesn't drop to low levels."

These pre-game pollutants were more than 20 times worse than acceptable levels for moderate air quality. Pollution levels also increased significantly as many fans left the game in their cars. Pollution inside the stadium does not appear to be affected by fan activity outside. The stadium itself produced excellent air quality. Both professional and college sports teams are working to reduce their environmental footprint by implementing sustainable practices, including solar panels at their facilities.

In North Carolina, for example, the Athletic Sustainability Council meets quarterly to review the latest metrics and explore ways to improve the environmental impact of Wolfpack sporting events. The council, which includes Bunds and Casper, was established in 2012 and includes members from the Sustainability Office, Waste Prevention and Recycling, and Athletic Departments. An important advance for North Carolina State University is the installation of solar panels at Carter Finley Stadium. The nearly completed installation provides a significant opportunity for the

university to reduce its environmental footprint and attract attention from both students and fans. The panels will be installed at the south end of the approximately 58,000-seat stadium atop the Murphy Center. Many professional sports teams also implement sustainable practices to reduce their environmental footprint. In the United States, the NFL's Houston Texans soccer team installed a 180 kW solar panel system in their stadium. The system will generate enough energy to power 22 households each year.

Conclusion

Taken together, the contributions in this special issue have taken various theoretical and empirical approaches to the concept of environmental sustainability in the fields of health, sport and physical education. All central topics of reader sports education and society. As noted in the abstract, there are many important geographical and contextual differences and similarities beyond this original collection that can be explored further. Therefore, we are responding to this first edition by expanding the call for papers to address the challenges and opportunities of how we can address the complex environmental, ecological, political and cultural factors that shape health. , hopes to inspire more diverse submissions...sports and sports practice in today's world.

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AN EVOLUTION OF ECO-CRITISM AND ECO-FEMINISM INTERMS OF LITERARY MOVEMENT

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ABSTRACT

*Ecocriticism is the study of literature and ecology from an interdisciplinary point of view, where literature scholars analyze texts that illustrate environmental concerns and examine the various ways literature treats the subject of nature. It was first originated by Joseph Meeker as an idea called "literary ecology" in his *The Comedy of Survival: Studies in Literary Ecology* (1972). It takes an interdisciplinary point of view by analyzing the works of authors, researchers and poets in the context of environmental issues and nature. Some ecocritics brainstorm possible solutions for the correction of the contemporary environmental situation, though not all ecocritics agree on the purpose, methodology, or scope of ecocriticism. In the United States, ecocriticism is often associated with the Association for the Study of Literature and Environment (ASLE), which hosts a biennial conference for scholars who deal with environmental matters in literature and the environmental humanities in general. Ecofeminism is a branch of feminism that sees environmentalism, and the relationship between women and the earth, as foundational to its analysis and practice. Ecofeminist thinkers draw on the concept of gender to analyse the relationships between humans and the natural world. Ecofeminist theory asserts that a feminist perspective of ecology does not place women in the dominant position of power, but rather calls for an egalitarian, collaborative society in which there is no one dominant group. Ecofeminist analysis explores the connections between women and nature in culture, religion, literature and iconography, and addresses the parallels between the oppression of nature and the oppression of women. These parallels include but are not limited to seeing women and nature as property, seeing men as the curators of culture and women as the curators of nature, and how men dominate women and humans dominate nature. Ecofeminism emphasizes that both women and nature must be respected. Charlene Spretnak has offered one way of categorizing ecofeminist work:*

Keywords: *Anthropocentrism, Hierarchical, Egalitarian, Paternalistic.*

Introduction

Ecocritics investigate such things as the underlying ecological values, what, precisely, is meant by the word nature, and whether the examination of "place" should be a distinctive category, much like class, gender or race. Ecocritics examine human perception of wilderness, and how it has changed throughout history and whether or not current environmental issues are accurately represented or even mentioned in popular culture and modern literature. Not only do ecocritics determine the actual meaning of nature writing texts, but they use those texts for analyzing the practices of society in relationship to nature. They also critique visions that are human-centered and man/male centered. Scholars in ecocriticism engage in questions regarding anthropocentrism, and the "mainstream assumption that the natural world be seen

primarily as a resource for human beings" as well as critical approaches to changing ideas in "the material and cultural bases of modern society." Recently, "empirical ecocritics" have begun empirically evaluating the influence of ecofiction on its readers. Other disciplines, such as history, economics, philosophy, ethics, and psychology, are also considered by ecocritics to be possible contributors to ecocriticism.

Ecofeminism is on the rise, mainly among young women, and is gradually leaving behind a long period when it was little known or poorly understood. It was believed that all forms of ecofeminist thought identified women with nature and that they were a kind of biologism. Observing reality shows us that there are so-called "ecowarriors", women like Berta Cáceres, murdered in 2016, who risk their lives to defend the environment and others who ignore or detest environmentalism. However,

the terms “women” and “ecology” are not synonyms. Being ecofeminist does not imply that women are innately more linked to nature and life than men. There are men who devote themselves to defending the environment and/or animals and women who are indifferent or hostile to these new forms of awareness. However, it is true that, statistically, at an international level, women are the majority in the environmental movements and in the defence of animals.

Ecocriticism’s second wave emerged in the 2000s through a more complex understanding of the overall history of global environmentalism and environmental justice. According to Lawrence Buell, former Harvard professor and proponent of ecocriticism, the second wave of ecocriticism aligns with public health environmentalism, with ethics and politics that are sociocentric rather than ecocentric. The second wave not only considers rural landscapes or wilderness, but also landscapes of urban and industrial transformation. It is inspired by writers such as Charles Dickens, who wrote about Victorian-era public health concerns, and the American novelist Upton Sinclair, as well as by global activists, such as Ken Saro-Wiwa, who was executed for his protests against ecological devastation in Nigeria, and Michiko Ishimure, who wrote about Minamata disease and the effects of mercury poisoning. The second wave of ecocriticism distinguishes itself from the first wave by prioritizing the exploration of issues such as environmental resource distribution, environmental justice, minority and socioeconomic impacts related to environmental circumstances. A representative of second-wave ecocriticism is the 2002 Environmental Justice Reader: Politics, Poetics, and Pedagogy.

Ecofeminist scholars often contend that the great plurality of beliefs within ecofeminism is one of the movement’s greatest strengths. They note that the myriad definitions and applications, which sometimes complement and sometimes conflict with one another, demonstrate the liberating and inclusive aspects of the movement. They also point to

the important commonalities shared within the various schools of ecofeminism. All ecofeminists, they say, work toward the development of theory and action that acknowledge the problems inherent in patriarchal and hierarchical systems. They advocate the revaluing of science to acknowledge the role of subjectivity and intuition. They also support the creation of a new worldview that celebrates all biological systems as inherently valuable. Finally, they insist on solving those problems through affirming and nonviolent means.

Ecocriticism investigates the relation between humans and the natural world in literature. It deals with how environmental issues, cultural issues concerning the environment and attitudes towards nature are presented and analyzed. One of the main goals in ecocriticism is to study how individuals in society behave and react in relation to nature and ecological aspects. This form of criticism has gained a lot of attention during recent years due to higher social emphasis on environmental destruction and increased technology. It is hence a fresh way of analyzing and interpreting literary texts, which brings new dimensions to the field of literary and theoretical studies. Ecocriticism is an intentionally broad approach that is known by a number of other designations, including “green (cultural) studies”, “ecopoetics”, and “environmental literary criticism.”

Western thought has often held a more or less utilitarian attitude to nature —nature is for serving human needs. However, after the eighteenth century, there emerged many voices that demanded a reevaluation of the relationship between man and environment, and man’s view of nature. Arne Naess, a Norwegian philosopher, developed the notion of “Deep Ecology” which emphasizes the basic interconnectedness of all life forms and natural features, and presents a symbiotic and holistic world-view rather than an anthropocentric one.

Ecofeminism is a branch of feminism that sees environmentalism, and the relationship between women and the earth, as

foundational to its analysis and practice. Ecofeminist thinkers draw on the concept of gender to analyse the relationships between humans and the natural world. The term was coined by the French writer Françoise d'Eaubonne in her book *Le Féminisme ou la Mort* (1974). Ecofeminist theory asserts that a feminist perspective of ecology does not place women in the dominant position of power, but rather calls for an egalitarian, collaborative society in which there is no one dominant group. Today, there are several branches of ecofeminism, with varying approaches and analyses, including liberal ecofeminism, spiritual/cultural ecofeminism, and social/socialist ecofeminism (or materialist ecofeminism). Interpretations of ecofeminism and how it might be applied to social thought include ecofeminist art, social justice and political philosophy, religion, contemporary feminism, and poetry.

One interpretation of ecofeminist theory is that capitalism reflects only paternalistic and patriarchal values. This notion implies that the effects of capitalism have not also benefited women and have led to a harmful split between nature and culture. In the 1970s, early ecofeminists discussed that the split can only be healed by the feminine instinct for nurture and holistic knowledge of nature's processes. Several feminists make the distinction that it is not because women are female or "feminine" that they relate to nature, but because of their similar states of oppression by the same maledominant forces. The marginalization is evident in the gendered language used to describe nature and the animalized language used to describe women. Some discourses link women specifically to the environment because of their traditional social role as a nurturer and caregiver. Ecofeminists following in this line of thought believe that these connections are illustrated through the coherence of socially-labeled values associated with 'femininity' such as nurturing, which are present both among women and in nature. Vandana Shiva says that women have a special connection to the environment through their daily interactions and this connection has been ignored. According to Shiva, women in

subsistence economies who produce "wealth in partnership with nature, have been experts in their own right of holistic and ecological knowledge of nature's processes". She makes the point that "these alternative modes of knowing, which are oriented to the social benefits and sustenance needs are not recognized by the capitalist reductionist paradigm, because it fails to perceive the interconnectedness of nature, or the connection of women's lives, work and knowledge with the creation of wealth Shiva blames this failure on the Western patriarchal perceptions of development and progress. According to Shiva, patriarchy has labeled women, nature, and other groups not growing the economy as "unproductive". In the 1993 essay entitled "Ecofeminism: Toward Global Justice and Planetary Health" authors Greta Gaard and Lori Gruen outline what they call the "ecofeminist framework". The essay provides a wealth of data and statistics in addition to outlining the theoretical aspects of the ecofeminist critique. The framework described is intended to establish ways of viewing and understanding our current global situations so that we are better understand how we arrived at this point and what may be done to ameliorate the ills.

Spiritual ecofeminism is another branch of ecofeminism, and it is popular among ecofeminist authors such as Starhawk, Riane Eisler, Carol J. Adams, and more. Starhawk calls this an earth-based spirituality, which recognizes that the Earth is alive, that we are interconnected, as well as a community. Spiritual ecofeminism is not linked to one specific religion, but is centered around values of caring, compassion, and non-violence. Often, ecofeminists refer to more ancient traditions, such as the worship of Gaia, the Goddess of nature and spirituality (also known as Mother Earth). Wicca and Paganism are particularly influential to spiritual ecofeminism. Most Wicca covens demonstrate a deep respect for nature, a feminine outlook, and an aim to establish strong community values. In her book *Radical Ecology*, Carolyn Merchant refers to

spiritual ecofeminism as "cultural ecofeminism." According to Merchant, cultural ecofeminism, "celebrates the relationship between women and nature through the revival of ancient rituals centered on goddess worship, the moon, animals, and the female reproductive system. In this sense, cultural ecofeminists tend to value intuition, an ethic of caring, and human-nature interrelationships.

Cultural ecofeminists, on the other hand, encourage an association between women and the environment. They contend that women have a more intimate relationship with nature because of their gender roles (e.g., family nurturer and provider of food) and their biology (e.g., menstruation, pregnancy, and lactation). As a result, cultural ecofeminists believe that such associations allow women to be more sensitive to the sanctity and degradation of the environment. They suggest that this sensitivity ought to be prized by society insofar as it establishes a more direct connection to the natural world with which humans must coexist. Cultural ecofeminism also has roots in nature-based religions and goddess and nature worship as a way of redeeming both the spirituality of nature and women's instrumental role in that spirituality.

Not all feminists favoured the bifurcation of ecofeminism. Some women, for instance, worried that cultural ecofeminism merely enforces gender stereotypes and could lead to further exploitation. Others wanted a greater emphasis on nature-based religion, while still others insisted that a celebration of Western organized religions could accommodate nature-based worship. Those same groups also differed with regard to the

romanticization of nature and the roles that various practices (such as vegetarianism or organic farming) ought to play in the application of ecofeminist principles. As a result, the movement continued to grow and expand in order to accommodate those variations, and most self-identified ecofeminists celebrate the myriad definitions and applications available under the general rubric of ecofeminism.

Conclusion

Many women remained unsatisfied with the limits of the movement. Of particular concern was the failure of women in developed countries to acknowledge the ways in which their own lifestyles were leading to further degradation of their counterparts in less-developed countries and of the Earth as a whole. Women from developing countries pointed to the effects of commercial food production, sweatshop labour, and poverty on their families and their landscapes. They accused white ecofeminists of promoting that exploitation by purchasing goods created as a result of inequity. They also took issue with the appropriation of indigenous cultures and religions for the purpose of advancing a philosophical position. Thus, contemporary ecofeminism must be developed to acknowledge the very real effects of race, class, ethnicity, and sexuality on a woman's social position. Women involved in environmental justice issues and women representing minority cultures have worked to establish their own sense of ecofeminism to include local cultures and spirituality, a celebration of their roles as mothers and caretakers, and a recognition of the ways in which Western colonization compromised those beliefs.

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EFFECT OF EXTRACTS OF SELECTED MEDICINAL PLANT PARTS ON SEED MYCOFLORA AND SEED GERMINATION OF CHILLI VAR. PUSA JWALA

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ABSTRACT

The common and dominant seed borne fungi were found to be inhibitory for seed germination and caused great loss in seedling vigor, seed and seedling rots of the Chilli Var. Pusa Jwala. The root stems, leaf and bark extracts of some common and easily available plants were screened for the Bio-control of the seed mycoflora of the Chilli VAR. PUSA JWALA. Root, stem and leaf extracts of all the test plants were found to be inhibitory in more or less degree for the incidence of seed mycoflora while with a few exceptions, they were found to be stimulatory for seed germination.

Keywords: *Capsicum annum.*, seed mycoflora, seed germination, seedling vigor, seedling emergence, leaf extract.

Introduction

Solanaceae family includes a large number of annual or perennial herbs, shrubs, small trees and climbers. More than seventy species belonging to twenty-one genera are found in India. Economically the family is fairly important, as it comprises several crops of food value, medicinal value, vegetables and ornamentals. Several plants of this family are cultivated all over the world for their economic importance.

Chilli (*Capsicum annum.*) is grown throughout the Marathwada region. It is consumed by every Indian. There is hardly a vegetable where Chilli is not used as a condiment while cooking. Chillies are used green as well as dry in the powder form. It is rich source of vitamin A and vitamin C among the vegetables. The Chillies are pungent due to the presence of the chemical capsaicin and the bright red colour at the ripening stage is due to the pigment capsanthin.

Materials and Methods

1. Collection of seed samples

The methods described by Paul Neergaard (1973) have been adopted for the collection of seed samples. Accordingly, seed samples of different var. of Chilli (Half kg each) were collected from ripe dried fruits from field, storehouses, market places and research

centers. A composite seed sample for each of the var. was prepared by mixing the individual seed samples together and preserved in gunny bags at room temperature during the studies.

2. Detection of seed mycoflora

The seed-borne fungi of different varieties of seeds of Chilli were detected by moist blotter (B) and agar (A) plate methods as recommended by ISTA (1966), De Tempe (1970), Neergaard (1973) and Agarwal et al. (1976). The procedure of moist blotter (B) and agar (A) plate methods are described as below.

3. Identification of seed-borne fungi

The seed-borne fungi were preliminary identified on the basis of sporulation characters like asexual or sexual spores or fruiting structures. Detailed examination of fungal characters was done under compound microscope and their identification was confirmed with the help of latest manuals [Subramanian (1971), Neergaard and Mathur (1980), Jha (1993) and Mukadam et al (2006)]. Pure cultures of the identified fungi were prepared and maintained on PDA (Potato Dextrose Agar) slants for further experiments.

4. Effect of culture filtrates on percent seed germination, root length, shoot length and seedling emergence.

Production of toxin was studied by growing some common and dominant seed-borne fungi of plants like *Alternaria tenuis*, *Aspergillus flavus*, *Curvularia lunata* and *Fusarium moniliforme* on liquid GN medium of pH 5.6 for ten days.

Twenty-five ml of the medium was poured in 100 ml borosil glass conical flasks, autoclaved and inoculated separately with 2 ml spore suspension of the test seed-borne fungus that was maintained on PDA slants for seven days. The flasks were incubated at room temperature ($27\pm 1^{\circ}\text{C}$) for ten days. After incubation, the culture filtrates were collected in pre-sterilized culture bottles from the flasks by filtering the contents through Whatman filter paper No.1 and treated it as crude toxin preparation.

5. Collection of plant material for extracts

During the present studies, ten common and easily available plants in the vicinity like *Acacia nilotica*, *Adhatoda zeylanica*, *Annona squamosa*, *Azadirachta indica*, *Curcuma longa*, *Lawsonia inermis*, *Murraya koenigii*, *Ocimum sanctum*, *Terminalia bellerica* and *Terminalia chebula* were selected. Their identification was confirmed using the 'Flora of Marathwada' (Naik, 1998). The roots, stems, leaves and barks of the selected plants were collected separately, surface sterilized with 0.1 % HgCl_2 and washed repeatedly with sterile distilled water for several times and kept for drying in hot air oven (Metalab) at 60°C temperature for 48 hours. After drying, the roots, stems, leaves and barks were preserved separately in polythene bags at room temperature ($27\pm 1^{\circ}\text{C}$) during the studies.

The dried roots, stems leaves and bark of selected plants were crushed separately in to fine powder with the help of blender (Remi). 5 gm powder each of the plant parts was dissolved separately in 100 ml sterilized hot distilled water in 250 ml borosil glass conical flasks. The flasks were kept in oven

(Metalab) for 24 hours at 60°C and the content was filtered through Whatman filter paper No.1. The filtrates were used as 5% aqueous plant extracts.

6. Effect of extracts of various plant parts on seed mycoflora and seed germination

During the present studies, the seeds of Chilli VAR. PUSA JWALA were placed on blotters in Petri plates as described earlier and irrigated just enough to keep blotters moist separately with the root, stem and leaf extracts (5%) of the selected plants. Percent seed germination and associated seed mycoflora were recorded on seventh day. Seed plates irrigated with sterile distilled water served as control.

Result and Discussion

In the present studies, the seeds of Chilli var. Pusa jwala were placed on blotters in Petri plates and irrigated with root, stem and leaf extracts of different plants (Total ten plants). The plates were incubated for seven days at room temperature and the incidence of seed mycoflora and seed germination was studied. The plates irrigated with sterile distilled water served as control. The results are presented in Table .

From the results it is evident that, the root, stem and leaf extracts of all the test plants were found to be inhibitory in more or less degree for the incidence of seed mycoflora while with a few exceptions, they were found to be stimulatory for seed germination.

The seeds treated with leaf extracts of *Azadirachta indica*, leaf and root extracts of *Ocimum sanctum* and leaf extracts of *Murraya koenigii* showed very reduced incidence of seed mycoflora and maximum seed germination while, the seeds treated with the stem and root extracts of *Lawsonia inermis* and *Acacia nilotica*, leaf extract of *Curcuma longa* and *Terminalia bellerica* showed maximum incidence of seed mycoflora and reduced seed germination.

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TABLE-EFFECT OF EXTRACTS OF SELECTED MEDICINAL PLANT PARTS ON PERCENT SEED MYCOFLORA AND PERCENT SEED GERMINATION OF CHILLI VAR. PUSA JWALA ON BLOTTER PAPER

Sr.No.	Source plant	Part used for extracts	% Seed mycoflora	% Seed germination
1	<i>Acacia nilotica</i>	Root	75	42
		Stem	82	37
		Leaf	69	47
		Bark	71	57
2	<i>Adhatoda zeylanica</i>	Root	62	31
		Stem	67	47
		Leaf	46	65
3	<i>Annona squamosa</i>	Root	54	55
		Stem	45	62
		Leaf	30	74
4	<i>Azadirachta indica</i>	Bark	15	91
		Leaf	08	96
		Kernel	14	98
5	<i>Curcuma longa</i>	Dried rhizome	39	79
		Leaf	65	33
6	<i>Lawsonia inermis</i>	Root	59	47
		Stem	84	27
		Leaf	40	62
7	<i>Murraya koenigii</i>	Root	19	88
		Stem	28	79
		Leaf	08	98
8	<i>Ocimum sanctum</i>	Root	07	93
		Stem	11	90
		Leaf	05	95
9	<i>Terminalia bellerica</i>	Root	54	37
		Bark	56	49
		Leaf	62	24
10	<i>Terminalia chebula</i>	Root	50	41
		Bark	46	55
		Leaf	44	31
	Control (sterile distilled water)	--	100	28

A CRITICAL EVALUATION OF THE FOREST RIGHTS ACT, 2006 AND ITS IMPACT ON FOREST SYSTEM IN INDIA WITH SPECIAL REFERENCE TO CHANDRAPUR DISTRICT IN MAHARASHTRA

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Introduction

A country's progress is directly proportional to protection of human rights of its citizens. Citizens here include every person of a country irrespective of its descent, place of birth or standard of living. Like every country India has taken various measures for the protection of human rights of its citizens. India has made special provisions to protect the interest of tribal people as these are the most vulnerable groups.

Since colonial time India has made constant efforts in protecting the rights of the tribal people. Forests maintain the ecological balance & life-support systems which is essential for food production, health as well as overall development of human kind. India is among few countries who is having the National Forest Policy. India's forests have been the location of more social conflicts and ecological changes than other landscapes in history, and more particularly in tribal areas.

Time and again India has strived towards overcoming the challenges and conflicts in forests. Passing of the Forest Rights Act, 2006 was a landmark step in the forest history. The Ministry of Tribal Affairs aims at acknowledging the organic linkages between conservation and community rights. Under the provisions of the Act, rights can be acquired by individuals or communities on forest land that have been traditionally used by them. This act was enacted in 2006 recognises the rights of forest-dwelling tribal communities and other traditional forest dwellers to forest resources on which these communities were dependent for a variety of needs, including livelihood, habitation and other sociocultural needs.

Aims and objectives of the study

The study is carried with the following objectives.

I) To study the injustice caused to traditional forest dwellers before the passing of the Act.

II) To study the impact of the Act for protection of rights and the environmental balance.

III) To study the challenges before Forest Rights Act-2006.

IV) To come out with suggestions to make the Act useful and to achieve the utility for which it was passed.

Methodology

The research methodology used for the present research article is Doctrinal and Empirical research method. As the information has been sought from the available literature by referring books, articles, journals from the library of Christ University and a field survey through interview of forest officials and the people benefitted under the Act at Brahmapuri range from Chandrapur Forest division in Maharashtra by considering the limitation of time and word limit in the paper.

Conceptual study of the Forest Rights Act, 2006:-

In 1865 the British legislature for the very first time enacted the India Forest Act, 1865. The Act regulated the forest in the country which was totally non-regulated till the passing of the said Act. It restricted the activity of all the people into forest including the forest dwellers, who were traditionally dependent on forest produce for their livelihood. Subsequently, the legislature enacted various forest laws including the Indian Forest Act of 1927 to strict compliance and prohibition of unlawful entry

into the forest by inserting the provisions of trespass. The forest dwellers who from their generations were dependent upon the forest produce were deprived from their basic human rights. Finally, by the adoption of the Constitution of India in 1950 citizens were given Fundamental Rights irrespective of religion, race, caste, sex or place of birth, but unfortunately the forest dwellers were far away from getting the benefit of the Fundamental Rights.

Since beginning the Forest dwellers were claiming for their rights but were ignored by the Britishers and after independence by the Indian legislators as well. In 1972, India signed a convention which reflected the growing interest in environment conservation issues and the necessity for humanity to safeguard it.

The direct effect of signing the Convention was seen through change in policies which brought forest into concurrent list of the Constitution from the state list of the Government of India and subsequently landmark step was taken by enacting the Conservation Act in 1980. Further, a step forward was taken by the Government of India by enacting the Forest Policy of 1988. In both of the above enactments, Government of India took the drastic departure from protection of forest to conservation. For the very first time, the rural and tribal people were taken into consideration for their utilisation of forest and in return of protection of certain basic rights of the tribal people. To achieve this objective, Joint Forest Management system was introduced first time in state of West Bengal. In Joint Forest Management a partnership between the villagers and the Forest Authority to use the forest resources and to divide the profit after conserving and protecting the forest.

Another landmark step in this chain was passing of the Forest Rights Act, 2006 which fulfilled the 141 year old demand of the traditional forest dwellers to give them certain rights for their livelihood.

Rights protected in the Forest Rights Act,

2006:-

I)Right to hold and live in the forestland for a common occupation for livelihood.

II)Right to collect the minor forest produce for the purpose of livelihood.

III)Right to seek redressal at village level and to be heard.

IV)Right to access biodiversity and to maintain the ecological balance.

V)Community rights.

Injustice caused to forest dwellers and its impact on forest:-

Since the passing of the Indian Forest Act, 1865 the forest dwellers who were traditionally and culturally dependent upon the forest produce were deprived from their livelihood. The forest dwellers claimed for their rights which were not taken into consideration, instead if any such person traced out in the forest he was considered as trespasser and prosecuted accordingly. The forest which was the area of forest dwellers was taken away by the legislatures by enacting the laws. As these people were not familiar with any other means of livelihood, they have faced the challenge of struggle for existence.

Even after having the global instrument in the form of Universal Declaration of Human Rights these people deprived from their basic human rights. Neither at international level nor at national level after adoption of the Indian Constitution, the problem of the forest dwellers was solved. Even all the three Forest Policies passed after independence could not redress the problem of suitable means of livelihood of the forest dweller. Thus, the forest dwelling tribes have been living in the forests for generations, were in a very miserable state of conditions.

Constitutional Safeguards

Constitution is the grund norm of the country. It has given certain fundamental rights to every citizen. The Fundamental Right of right to life has been provided under Article 21 of the Constitution of India, which has been widely interpreted so as to

encompass all the facets of living a dignified life. Article 39 of the Constitution, more specifically directs the State to distribute ownership and control of the material resources of the community for the common good of the society. Thus, land reforms are contemplated under the Directive Principles of State Policy. Further, Article 48 casts a duty on the State to take care of the environment and forest eco-system and Article 38 puts an obligation on the State to promote a social order wherein justice social, economic and political is met to one and all. It expands the mandate of the Fifth and the Sixth Schedules of the Constitution that protect the claims of indigenous communities over tracts of land or forests they inhabit. The Constitution further envisages, a special responsibility of the State for protection and advancement of tribal people, particularly regarding the administration of scheduled areas and for peace and good governance under the fifth and sixth Schedules. Even the Indian Courts have recognised agriculture as the only source of livelihood for the Scheduled Tribes apart from collection and sale of minor forest produce to supplement their income and land is their most important natural and valuable asset and imperishable endowment from which the tribal derive their sustenance, social status, economic and social equality, permanent place of abode, work and living.

The impact of the Act for protection of rights and the environmental balance

The Forest Right Act, 2006 was passed with twin fold objectives. Firstly, to recognise the rights of the forest dwellers on the land and to remove the historical injustice and secondly, to maintain the balance of ecology. In *State of Tripura v/s Sudhir Kumar Ranjan Nath*, Supreme Court recognised the role of the forests as an important element in maintaining ecological balance. In this case the Court didn't dismiss the Forest Act, 2006 as a mere taxing enactment, but considered it as one to preserve, protect and promote, the forest wealth in the interest of the nation. The Forest Rights Act endows the tribals and other forest dwellers with individual and

community rights coupled with certain duties. Thus, the said law is an attempt to recognise the symbiotic relationship of tribal people and the forest. In addition, the forest administration has been divided into three tier system, wherein the lower one is Gram Sabha who are empowered to make decisions to regulate the access to community resources and stop any activity which adversely affects the wild animal, the forest and the bio diversity. Empowering the Gram Sabha to take important eco-decisions is a step forward in the direction. They have started to make the decisions involving a meaningful forest management in their respective localities. Thus, The Forest Rights Act has the potential for conservation of forest villages into revenue villages. Which in turn restores the tribals to their original position as before 1865. In the past tribal people were considered as protectors of forests. However, when needs of development started to displace them from their habitat, the tribal people were seen as a group posing a threat to the environment. Thus, the Act has bridged the gap which was in existence for 141 years.

During the field visit in Brahampuri tehsil of Chandrapur District the researchers had taken the interview of two forest dwellers 1) Ganesh Gangude and 2) Balaji Zampalwar who was allotted the forest land of 10 hectares each under the provisions of the Forest Rights Act, 2006. They produced tendupatta and have taken the crop of around 10 lakhs for past three years. The possession of the land was allotted to both of them in February 2011 and after their 5 years of hardwork, they converted the empty land into the crop permitted in the Act and have earned 10 lakhs in past two years. Ganesh Gangude has paid the income tax as well for around 1 lakhs which he proudly claims. Thus, the impact of the Act can be clearly seen wherein, the forest villages have been converted into revenue villages.

Evaluation of working of the Forest Rights Act, 2006:-

Undoubtedly, the passing of the Forest Rights Act, 2006 is a landmark step which is

equally controversial as well. The Act is trying to maintain the ecological balance and the protection of the rights of the tribal people who are dependent upon the forest produce since generation to generation. The recognition of CFR rights would shift forest governance in India towards a community conservation regime that is more food security and livelihood oriented.

Large-scale awareness and information dissemination campaigns are required at local level informing both tribal and lower level officials. It is important to develop a detailed strategy of training and capacity building of people responsible for implementing the FRA, such as Panchayats, Gram Sabha, village level Forest Rights committee etc.

The eligibility criteria set under the Act to take the forest land is that the person must prove that he was residing there before 13th December 2006. The proof which are required to claim is normal voter id card, passport, aadhar card, which are in real sense not the enough proof to claim. The second observation is that tri level committee is set up to solve the dispute must be elected by the authorities within 2 years. This is mandatory for village level, tehsil level and the district level. But unfortunately at Brahmapuri where the research is being carried the elections has not been conducted after the first elections which were held during 2008.

But this is only one side of the picture. There are some administrative problems associated with the implementation of the Forest rights act-2006 specially related to identifying the claims, proper settlement machinery, and mis-utilisation of the provisions of Act by the politicians for their greedy purpose.

Concluding remarks and suggestions

During the research work carried by the researchers, it has been noticed that the Act was passed with a high expectations to curb the injustice caused to the tribal people. Though the Government of India passed the Act, but the implementing part has been

challenged at every point for following reasons.

I) The overall picture of the implementation of the Act is very poor in the state of Maharashtra,

II) The object of historic interest in overlooked in the state.

III) The villagers are saying that there has been a large phase of interference by the Forest department which is not allowing the Gram Sabha and the villagers to work properly.

IV) The contrary statement has been given by the Forest Department that Gram Sabhas are dominating and is not ready to cooperate the Forest Department.

IV) The act is talking about individual rights and community rights. But the community rights have been ignored while grating the rights over the land. The tribal people are also showing more interest in the individual rights than the community rights which is not good for the soul of the Act.

V) The democratic nature of the tri level committees are also not fulfilled properly. Some of the committees have not elected the members since they have taken the charge first time. It means for 12 years they are continuously working which is the not only violation of the provisions of the act but against the spirit of the Act as well.

VI) It was observed that the high rank officers in the Forest department are also considering this Act against the forest department which in real sense is not correct.

Suggestions

I) Proper machinery is required to settle the claims. The Forest officers are not only required to give the training of legal provisions but the application of GPS system to identify the proper maps.

II) The Co-ordination between the Forest department and the Village people is required, otherwise the implementation of the act is impossible and we cannot achieve the desirable result.

III) The work carried by the two villagers Ganesh Gangude and Balaji Zampalwar is a remarkable step as the positive effect of the act but unfortunately their examples are not considered either by nearby villages in Chandrapur or the Forest Department as well. If it is possible for these two villagers to get the real fruit of the Act just by working in the right direction, it is easily possible for others as well.

IV) If the land is wrongly identified and if it is passed the other laws and the court procedure is taking long time to settle the claims. Even today only in Nagpur circle of Maharashtra, where Chandrapur comes more than 10000 cases are pending under the Forest rights act-2006.

V) Still it has been a decade only of the enactment of this Act. We need to give proper time and implementation in right direction to get the desired result under the Act.

VII) Perhaps the major dispute in the Forest Rights act-2006 has been about settlement of land rights, most of the important provisions of the Act are being

entirely side-lined. The Forest officials are also seemed to be quite reluctant to organise awareness campaigns at the village level to educate the villagers about the important provisions of the Act. As a result, the forest villagers are totally unaware about the other empowerment and conservation elements of the Act such as the right to community forest resource, right to protect and manage forests and the Gram Sabha's role in biodiversity, water and forest conservation.

VIII) Providing clarity on the time limit for settling claims the act does not specify any time limit for resolving claims. In most of the areas, both the officials and beneficiaries are unaware of this fact.

IX) Centre should take more proactive role in pushing states to honour a law that could change the lives of millions.

Hence, it can be said that though the Government have taken various measures for protection of rights of the tribals and conservation of forests, but still there is a need for proper implementation of laws and general awareness among tribals.

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ENVIRONMENT AND STRATEGIES FOR SUSTAINABLE DEVELOPMENT

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Introduction

The main profitable issues faced by the Indian frugality. The profitable development that we've achieved so far has come at a veritably heavy price — at the cost of environmental quality. As we step into a period of Globalization that promises advanced profitable growth, we've to bear in mind the adverse consequences of the once experimental path on our terrain and purposely choose a path of sustainable development. To understand the unsustainable path of development that we've taken and the challenges of sustainable development, we've to first understand the significance and donation of terrain to profitable development. The first part deals with the functions and part of terrain. The alternate section discusses the state of India's terrain and the third section deals with way and strategies to achieve sustainable development.

Environment — Description and Function

Environment is defined as the total planetary heritage and the summation of all coffers. It includes all the biotic and abiotic factors that impact each other. While all living rudiments the catcalls, creatures and shops, timbers, fisheries etc. — are biotic rudiments, abiotic rudiments include air, water, land etc. jewels and sun are exemplifications of abiotic rudiments of the environment. A study of the terrain also calls for a study of the interrelationship between these biotic and abiotic factors of the terrain.

Functions of the Environment

The terrain performs four vital functions

i) it supplies coffers then include both renewable and non-renewable coffers. Renewable coffers are those which can be

used without the possibility of the resource getting depleted or exhausted. That is, a nonstop force of the resource remains available. Exemplifications of renewable coffers are the trees in the timbers and the fishes in the ocean. Non-renewable coffers, on the other hand, are those service which get exhausted with birth and use, for illustration, reactionary energy

ii) it assimilates waste

iii) it sustains life by furnishing inheritable and bio diversity.

iv) it also provides aesthetic services like decor etc.

The terrain is suitable to perform these functions without any interruption as long as the demand on these functions is within its carrying capacity. This implies that the resource birth isn't above the rate of rejuvenescence of the resource and the wastes generated are within the assimilating capacity of the terrain. When this isn't so, the terrain fails to perform its third and vital function of life food and this results in an environmental extremity. This is the situation moment each over the world. The rising population of the developing countries and the rich consumption and product norms of the advanced world have placed a huge stress on the terrain in terms of its first two functions. Numerous coffers have come defunct, and the wastes generated are beyond the absorptive capacity of the terrain. Absorptive capacity means the capability of the terrain to absorb declination. The result — we're moment at the threshold of environmental extremity. The once development has defiled and dried up gutters and other aquifers making water An profitable good. Either, the ferocious and expansive birth of both renewable non-

renewable coffers has exhausted some of these.

Vital Coffers and we're impelled to spend huge quantities on technology and exploration to explore new coffers. Added to these are the health costs of demoralized environmental quality — decline in air and water quality(seventy per cent of water in India is defiled) have redounded in increased prevalence of respiratory and water-borne conditions. Hence, the expenditure on health is also rising. To make matters worse, global environmental issues similar as global warming and ozone reduction also contribute to increased fiscal commitments for the Government.

Study Objective

- assay the causes and goods of ‘ environmental declination ’ and ‘ resource reduction ’
- understand the nature of environmental challenges facing India
- relate environmental issues to the larger environment of sustainable development.

Global Warming

Global Warming is a traditional increase in the average temperature of the earth's lower atmosphere as a result of the increase in hothouse feasts since the Industrial Revolution. important of the recent observed and projected global warming is mortal-convinced. It's caused by man-made increases in carbon dioxide and other hothouse feasts through the burning of fossil energies and deforestation. Adding carbon dioxide, methane and similar other feasts(that have the eventuality to absorb heat) to the atmosphere with no other changes will make our earth's face warmer. The atmospheric attention of carbon dioxide and CH₄ have increased by 31 per cent and 149 per cent independently abovepre-industrial situations since 1750. During the once century, the atmospheric temperature has risen by 1.1 °F(0.6 °C) and ocean position has risen several elevations. Some of the longer-term results of global warming are melting of polar ice with a performing rise in

ocean position and littoral flooding; dislocation of drinking water inventories dependent on snow melts; extermination of species as ecological niches vanish; further frequent tropical storms; and an increased prevalence of tropical conditions. Among factors that may be contributing to global warming are the burning of coal and petroleum products(sources of carbon dioxide, methane, nitrous oxide, ozone); deforestation, which increases the quantum of carbon dioxide in the atmosphere; methane gas released in beast waste; and increased cattle product, which contributes to deforestation, methane product, and use of fossil energies. A UN Conference on Climate Change, held in Kyoto, Japan, in 1997, redounded in a transnational agreement to fight global warming which called for reductions in emigrations of hothouse feasts by industrialized nations.

Ozone reduction

Ozone reduction refers to the miracle of reductions in the quantum of ozone in the stratosphere. The problem of ozone reduction is caused by high situations of chlorine and bromine composites in the stratosphere. The origins of these composites are chlorofluorocarbons(CFC), used as cooling substances in air- conditioners and refrigerators, or as aerosol forces, and bromofluorocarbons(halon), used in fire extinguishers. As a result of reduction of the ozone subcaste, more ultraviolet(UV) radiation comes to Earth and causes damage to living organisms. UV radiation seems responsible for skin cancer in humans; it also lowers product of phytoplankton and therefore affects other submarine organisms. It can also impact the growth of terrestrial shops. A reduction of roughly 5 per cent in the ozone subcaste was detected from 1979 to 1990. Since the ozone subcaste prevents most dangerous wavelengths of ultraviolet light from passing through the Earth's atmosphere, observed and projected diminishment in ozone have generated worldwide concern. This led to the relinquishment of the Montreal Protocol banning the use of chlorofluorocarbon(CFC)

composites, as well as other ozone depleting chemicals similar as carbon tetrachloride, dichloromethane(also known as methyl chloroform), and bromine composites known as halon

State of India's Environment

India has abundant natural coffers in terms of rich quality of soil, hundreds of gutters and feeders, lush green timbers, plenitude of mineral deposits beneath the land face, vast stretch of the Indian Ocean, ranges of mountains, etc. The black soil of the Deccan Plateau is particularly suitable for civilization of cotton, leading to attention of cloth diligence in this region. The Indo-Genetic plains — spread from the Arabian Sea to the Bay of Bengal — are one of the most rich, intensely cultivated and densely peopled regions in the world. India's timbers, though inversely distributed, give green cover for maturity of its population and natural cover for its wildlife. Large deposits of iron-ore, coal and natural gas are set up in the country. India accounts for nearly 8 per cent of the world's total iron-ore reserves. Bauxite, bobby, chromate, diamonds, gold, lead, lignite, manganese, zinc, uranium, etc. are also available in different corridor of the country. still, the experimental conditioning in India have redounded in pressure on its finite natural coffers, besides creating impacts on mortal health and well-being. The trouble to India's terrain poses a contradiction — trouble of poverty-convinced environmental declination and, at the same time, trouble of pollution from influx and a fleetly growing artificial sector. Air pollution, water impurity, soil corrosion, deforestation and wildlife extermination are some of the most burning environmental enterprises of India. The precedence issues linked are

- i) land declination (ii) biodiversity loss
- iii) air pollution with special reference to vehicular pollution in civic metropolises
- operation of fresh water v) solid waste operation. Land in India suffers from varying degrees and types of declination stemming substantially from unstable use

and unhappy operation practices

Sustainable Development

Environment and frugality are interdependent and need each other. Hence, development that ignores its impacts on the terrain will destroy the terrain that Sustain life forms. What's demanded is sustainable development development that will allow all unborn generations to have an implicit average quality of life that's at least as high as that which is being enjoyed by the current generation. The conception of sustainable development was emphasized by the United Nations Conference on Environment and Development(UN CED), which defined it as ' Development that meets the need of the present generation without compromising the capability of the unborn generation to meet their own requirements '. Read the description again. You'll notice that the term ' need ' and the expression ' unborn generations ' in the description are the catch expressions. The use of the conception ' needs ' in the description is linked to distribution of coffers. The seminal report — Our Common Future — that gave the below description explained sustainable development as ' meeting the introductory requirements of all and extending to all the occasion to satisfy their Bourne for a better life '. Meeting the requirements of all requires redistributing coffers and is hence a moral issue. Edward Barbie defined sustainable development as one which is directly concerned with adding the material standard of living of the poor at the lawn root position — this can be quantitatively measured in terms of raised income, real income, educational services, health care, sanitation, water force etc. In further specific terms, sustainable development aims at dwindling the absolute poverty of the poor by furnishing lasting and secure livelihoods that minimize resource reduction, environmental declination, artistic dislocation and social insecurity. Sustainable development is, in this sense, a development that meets the introductory requirements of all, particularly the poor maturity, for employment, food, energy, water, casing,

and ensures growth of husbandry, manufacturing, power and services to meet these requirements.

Strategies For Sustainable Development

- Use of Non-conventional Sources of Energy
- LPG, Gobar Gas in Rural Areas
- CNG in Urban Areas
- Wind Power
- Solar Power through Photovoltaic Cells
- Traditional Knowledge and Practices
- Mini-hydel shops
- Bio composting
- Biopest Control

Conclusion

profitable development, which aimed at adding the product of goods and services to meet the requirements of a rising population, puts lesser pressure on the terrain. In the original stages of development, the demand for environmental coffers was lower than that of force. Now the world is faced with increased demand for environmental coffers but their force is limited due to overuse and abuse. Sustainable development aims at promoting the kind of development that minimises environmental problems and meets the requirements of the present generation without compromising the capability of the unborn generation to meet their own requirements.

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USE OF MOBILE TECHNOLOGY IN LIBRARY FOR PROVIDING LIBRARY SERVICES

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ABSTRACT

Libraries have always adopted new technology to assist in their objective of providing clients with effective and efficient services as well as timely access to needed information. Implementation of information and communication Technologies. Has changed the way people access to relevant information. Users want easy and instant access to relevant information putting pressure on library and information science professionals to think out of the box for meeting their information needs. Application of mobile phones to provide library and information services are a significant step in this direction. The development of mobile technology has resulted in shifting the academic environment from traditional to mobile learning. This paper describes mobile Technology application in library & information services. Finally, it conceives the future of mobile library technology.

Introduction

Library is a social institution which connects people with information. Information plays a very important role in today's era of technology. Most of the people are hungry for ready-made information. Now a days library and information center are facing lots of problem like funds, low user and low use of libraries. Development and innovation in information communication technology brings the faster access to information for the user. That's why the most of user are avoiding libraries because libraries are not fulfilling the need of faster accessibility of information for user. Libraries have to adopt the new technology for providing the various information services to user at their door.

Now days libraries are working on the user centric, technology-based services and providing personal value-added services. Digital libraries, Internet and network of libraries provide library services to user at their doorsteps wherever they are. And development of smart phone technology lots of services can be provided to user with minimum cost and maximum accessibility. Library and Information Science professionals are no more only for books. It is going beyond the books and journals. They do the challenging non-profitable business of satisfying information needs of users. Therefore, today's LIS professionals look forward to assume new earnings of

communication to reach the maximum users to take information at their ease.

Mobile devices can be a best medium to provide instant library services to user. Most of the library user has the smartphones or tablets. 3G and 4G technology brings the tremendous development in mobile technology. With a signal 3G or 4G connection user can access the information from the library like e books, e journal, database, OPAC or multimedia content. Mobile can access network and download the content streaming over the network. It is very convenient technology for user. Development in mobile technology brings the new opportunity for libraries to sustain in this era. Libraries can use this mobile technology to promote library services and outreach the most user of information.

Requirement for the implementation of Mobile Technology in Library :

Following things are required for the implementation of mobile technology and services in the libraries

- The first most important things that require in the library is the identification of services that can be given to the user through mobile and equipment required for it
- Libraries must have the information collection in digital form which can be provided to user through mobile
- Most important things required in the library

is the sufficient hardware and software technology for the mobile library services.

- Libraries must create the digital environment to use the mobile technology in library services
- Library must have its own website which contains the most of the information of libraries.
- Web OPAC facility
- Electronic information delivery system and access system
- Libraries require the skill full professional staff who can handle the technical operation of information delivery and access.

Advantages of Mobile Technology Services:

- 1) Time Saving
- 2) Personalized Service
- 3) User friendly service
- 4) User Participation
- 5) Ability to access information
- 6) Student campus information service

Limitation or barriers of Mobile Technology in libraries:

- High-cost

- Requirement of advanced hardware and software technology
- Problem of content ownership
- Digital right management
- issues related to trust and security
- Issue related user privacy
- Lack of staff awareness and familiarity
- Increasing staff reductions and other cutback

Conclusion

Mobile Technology has become a very important part of our lives nowadays. Mobile phones were developed primarily for communication purpose. Mobile phones have gained importance in both the developed and developing countries. The mobile phone is a device that enables users to communicate, transact and innovate. Mobile device and mobile technology have potential to facilitate the teaching & learning process in a great way this increase use of mobile phones provides an untapped resource for delivering library resources to patrons. The mobile web is the next step for libraries in providing universal access to resource and information.

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ECOCRITICISM, ENVIRONMENTALISM WITH REFERENCE TO CLIMATE CHANGE

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ABSTRACT

Eco criticism is literary and cultural criticism from an environmentalist point of view. Texts are studied & evaluated in terms of their environmentally harmful or helpful effects. Beliefs and ideologies are assessed for their environmental implications. Eco-criticism analyses the history of concepts such as nature; in an attempt to understand the cultural developments that have led to the present global ecological crisis. Direct representations of environmental damage or political struggle are of close interest to Eco critics. The whole array of cultural and daily life for what it reveals about implicit attitudes that have environmental consequences. Of the radical movements that came to the prominence in the years respectively 1960s and 1970s; environmentalism has been the slowest to develop a school of criticism in the academic streams of humanities.

Keywords: environmentalism, eco-criticism, ecology, ecosystem, ecological niche, ecofeminism.

Introduction

The term Eco criticism seems to have been used first by US critic William Rueckert in 1978. A few works of literary criticism may be said to have Eco criticism before the said term was invented, including in Britain Raymond Williams's *The Country and The City*, 1973 and in the USA Annette Kolodny's *The Lay of the Land*, 1975; a feminist study of the literary metaphor of landscape as female. These were informed by environmentalist ideas and asked some of the questions that were to become important in Eco criticism; but it was not until the beginning of the 1990 that Eco criticism became a recognized movement.

So far, eco criticism has grown most rapidly in the United States. The Association for the Study of Literature and Environment (ASLE), now the major organization for Eco critics worldwide was founded in 1992 at a meeting of the US Western Literature Association. Eco criticism's early bias towards the study of US nature writing in the tradition of Thoreau, Muir, Abbey and Dillard, and Native American writing reflects this origin. Other points of emergence were feminist theory and study of Romantic literature. The first British critic to use the term, tentatively, was Jonathan Bate in *Romantic Ecology*, 1991.

Review of Literature

1. "One effect of global warming will be a powerful increase in the severity of winds in northern Europe; the swallow, has great difficulty in coping with wind, so there is a genuine possibility that within the lifetime of today's students Britain will cease to be a country to which this bird migrates. Keats's *Ode To Autumn* is predicated upon the certainty of the following spring's return; the poem will look very different if there is soon an autumn when 'gathering swallows twitter in the sky' for the last time". Jonathan Bate, *Romantic Ecology* (London: Routledge, 1991), p.2.

2. By changing the weather, we make every spot on earth man-made and artificial. We have deprived nature of its independence, and that is fatal to its meaning. Nature's independence is its meaning without it there is nothing but us. Bill McKibben, *Hope, Human and Wild* (Boston: Little Brown, 1995), p.1

3. Weakened sense of our embeddedness in nature responsible for 'the cultural phenomenon of ecological denial which refuses to admit the reality and seriousness of the ecological crisis'. Plumwood, *Environmental Culture*, p.3.

4. Dena Phillips observes that nature writing, with its Romantic inheritance, is

conspicuously dependent on the momentary epiphany. Using terms from Walter Benjamin's analysis of metropolitan artistic alienation, Phillips calls this epiphany *Erlebnis*, as distinct from *Erfahrung*: 'Experience as *Erfahrung* is know-how, expertise, skill; experience as *Erlebnis* is adventure, chance, occurrence, and a passing sensation'. The nature writer is a version of Benjamin's flâneur, a visitor or tourist bringing an urban sensibility to nature and seeking 'fleeting moments of sensuous disorientation' rather than practice over a long period of time. - Dena Phillips, *The Truth of Ecology* (New York: Oxford University Press, 2003), pp. 190-03.

Research Work

Searching for alternative to the most destructive forms of industrial development many Eco critics have looked to indigenous non-industrial cultures, exploring the possibility of alliance between these cultures and wider environmental movement. Text such as Leslie Marmon Silko's *Ceremony*, 1977 and Linda Hogan's *Solar Storms*, 1995, two novels in which the environmental values of Native American culture are set against those of white industrial capitalism are important presences in the new Eco critical Canon. It is part of a broader attempt to bring together the different environmentalisms of rich and poor. The Environmental Justice Movement is a collective term for the efforts of poor community to defend themselves against the dumping of toxic waste, the harmful contamination of their air, food and water; the loss of their lands and livelihoods and the indifference of governments and cooperation. Eco critics responsive to the environmental justice will bring questions of class, race, gender and colonialism into the Eco critical evaluation of texts and ideas challenging versions of environmentalism that seem exclusively preoccupied with preservation of wild nature and ignore the aspirations of the poor.

Robert Pogue Harrison's *Forests*, 1992; a study of the meaning of forests in western culture from antiquities to postmodernity,

shows wild nature in a dialectical relationship with Civilization. Wild places provide solace for exiles; release for repressed feelings and space for adventurous forays beyond restrictions of law and domesticity, but the discovery made there are like Robin Hood and his followers, eventually re-assimilated by civilization; which will then make new exercise. Environmental crisis is a new context, a new face of the dialectic, in which the pleasures and desires involved in the love of nature have the potential to produce radical critique of dominant values. However psychological & Marxist critics have seen writing about the natural world as primary metaphorical and symbolic, a displacement of other, unstated desires and institutional sentiments. That environmental crisis demands a return to literary reading. Wordsworth's *Owls* and Keats's *Swallows* should be read first and far most, as real owls and swallows. To read them otherwise is now the evasive reading.

Tracy Brain makes an Eco critical reading of Sylvia Plath's poetry. Johan Henchman reads *The Silence of the Lambs* from an animal rights perspective. Karla Armbruster analyses television wildlife documentaries. Barbara Adam discusses cultural aspects of the BSE crisis in Britain. Cheryl Glatfelter criticizes the denigration of desert landscapes. Greg Garrard sees the *Eden Project* in Cornwall as a new version of *Georgic*. In all this work the priority is to find ways of removing the cultural blockages that thwart effective action against environmental crisis.

Environmentalism

Environmentalism began to take shape in the second half of the 20th century, in response to perceptions of how dangerous environmental damage had become. This movement grew partly out of traditions of enthusiasm for wild nature, but is distinct from those traditions. The threats that preoccupy environmentalists are not only to wildlife and wilderness but also to human health, food and shelter and they are global as well as local. Rachel Carson's *Silent*

Spring (1992), wildly credited, because of the international response it received, with the first rallying of environmentalism as a public movement, was a study of the toxic effects of residues of industrial and agricultural chemicals in animal and human bodies.

Industrial pollution is the main threat, along with the destructive ways of consuming natural resources, such as excessive fishing and clear cut logging of forests. These are modern phenomenon, products of industry and the application of industrial methods to traditional harvest and husbandry. Environmentalism is both a critique of industrial modernity and another product of it, a distinctively modern movement in which an indispensable role is played by science; by the methods and technologies, for example, that can identify chemical traces or analyze atmospheric data. Essential, too, are modern forms of communication, especially television, with its power of sending iconic images across the world to mass audiences. These Technologies have helped to create the global perspective that is fundamental to environmentalism; the sense of relationship between the most local things- some too small for the human eye - and the most large ground. It is important to insist on invented environmentalism's modernity, because the movement is often accused of nostalgia and hostility to modern culture and technology.

In the late 1980, reports begin to appear of concern among scientist about climate changes thought to be occurred because of increasing levels of carbon dioxide in the earth's atmosphere. Among the possible consequences are flooding, desertification, famine, eco wars over diminishing resources and millions of environmental refugees. Many features of global warming defy response and cultural representation. Its extent is global; fifty years may pass, or more, before the effects become plain. It confronts us with possibilities to frightening as to demand urgent action, yet even few scientists deny that is happening, a degree of uncertainty remains that those who want to

do nothing can seize upon.

Ecology

Ecology is the scientific study of natural interdependencies; of life forms as they relate to each other and their shared environment. Creatures produce and shape their environment, as their environment produces and shapes them. Ecology developed in reaction against the practice of isolating creatures for study in laboratories, is based in field-work, and draws on a range of specialist disciplines including geology, zoology, and botany and climate studies. Concepts that explain its work include the following ways.

Ecosystem

An ecosystem is a local set of conditions that support life. Tropical rainforest, for example, is a biome, a generic type of ecosystem. More locally, we may refer to the ecosystem of a particular forest, wetland, heat land or desert. The word system is misleading; Ecosystems are full of variables, often in flux and subject to forces outside the boundaries. New species arriving in an ecosystem will change it. Each local ecosystem is in this way, part of a large one, and all together constitutes the global ecosystem, called the 'ecosphere or biosphere'.

Ecological Niche

The niche within the ecosystem is the space the species occupies; the combination of factors that makes a population viable including food, shelter, temperature and number of predators and competitions. Again, the concept should not imply stability. The word 'niche' may suggest a clever neatness of fit and an overall design in nature that furnishes a place for every species, but all the conditions that constitute a niche may fluctuate and a niche can suddenly disappear. The startling fall in numbers of house sparrows in London, for example due to factors not yet identified; indicates that these Birds' local niche is disappearing.

Food Chain

The term describes one of the sets of relationships that make an ecosystem; the way in which energy circulates. One creature eats another and is in turn eaten or rots down into nutrients. Food chain is an important concept for ecologists investigating pollution, because of effects such as bio magnification, in which some poisons become more concentrated as they pass of the food chain to the few top predators. This was one of Rachel Carson's concerns in *Silent Spring*. Ecologist and environmental justice campaigner Sandra Steingraber points out in *Having Faith*, 2001; that contrary to the usual diagrams, it is not 'man' at the top of the food chain, but the breastfed infant.

The word Ecology is frequently used in connection with the 'green' movement. Deep Ecology, for example, is a radical version of environmentalism, conceived in early 1970's by the Norwegian philosopher Arne Naess and developed in the 1980s by the US environmentalists Bill Devall and George Sessions. Deep Ecologists reject merely technological and managerial solutions, because these constitute yet another form of human dominance. Instead Deep Ecologists advocate a biometric view, which recognizes the non-human world as having value dependently of its usefulness to human beings, who have no right to destroy it except to meet vital needs. Deep ecology proposes drastic changes in our habits of consumption; not only to avert catastrophe but as spiritual and moral awakening. Social Ecology; mainly associate with the US anarchist writer Murray Bookchin emphasizes the link between environmental

Degradation and the exploitation of human beings; that better treatment of the environment can only come with the abolition of oppressive hierarchies in human society.

These philosophies have used the word Ecology in a much looser sense than the scientific. The practices somewhere between seeing culture as manifestation of ecology and using ecology as metaphor for culture - is common in Eco criticism.

Anthropocentrism & Eco centrism

Interpretation is considered as the place of humanity at the center of everything, so that other forms of life will be regarded only as resources to be consumed by human beings. As the environmentalist historian Lynn White Jr. has described Christianity as the most anthropocentric of religions, because of God's command, in Genesis 1:26, that man should have dominion over the other creatures of the earth.

Anthropocentrism's opposite is egocentrism. We cannot escape the human viewpoint and migrate to another, but we can be mindful of the existence of other viewpoints. Eco criticism means attempting at least as an imaginative gesture, to place the ecosystem rather than humanity at the center. An ecosystem has no center, except in the purely spatial sense and hierarchical distinctions between center and margin, or foreground and background should collapse. Landscape in a novel, for example should not function merely as setting background or symbol.

Lawrence Buell, who has done more than any other critic to give Eco criticism an explicit method, has set out a rough checklist of criteria to determine how far a work is environmentally oriented.

1. The human environmental present not merely as a framing device but as a presence that begins to suggest that human history is implicated in natural history.

2. The human interest is not understood to the only legitimate interest

3. Human account related to the environment is part of the text ethical orientation for some sense of the environment as a presence process rather than a constant or even is at least implicit in the text.

These principles amount to Guide to the avoidance of heedless anthropocentrism.

Ecofeminism

In 1974, an influential essay by Sherry B. Ortner, "Is Female to Male as Nature Is to Culture?" sought to explain, in terms of

structuralism anthropology, the presence in diverse cultures of the idea that women subordinate to men. The underlying idea or Ortner discovers, is that woman is closer to nature. This helps to explain the acquiescence of women in their own subordination; they accept the general logic of human domination of nature. Beliefs that legitimate the oppression of women also legitimate environmental degradation. This is eco feminism's key insight. Certain fundamental binary oppositions fit over one another, creating the ideological basis for both sorts of harm:

Male / female; culture / nature; reason / emotion; mind/ body.

These are considered to be environmental hazards.

Kolodny's *The Lady of the Land* examines the way in which colonial nature writers in the USA represented the land as female. Louise Wastling's *The Green Breast of the New World* 1996 extends this analysis to 20th century novels. Some Eco feminists argue that the identification of women with

nature should now be seen as a source of strength. Other such as Janet Biehl, are wary of any strategy that by accepting women as essentially estranged from nature than men and problematizing rationality to prohibitively risks leading women back into the old cultural spaces. Notable examples of Eco feminist criticism include Marti Kheel's critique of the masculine 'heroic' genre, into which many fictional representations of environmental problems fall and Gretchen Legler's analysis of the transgressive erotic in contemporary women's nature writing.

Conclusion

Ecologists set out to reveal the ways in which niches are created, and the chain of dependency that links even the creatures that seem most distinct from each other; Eco critics to unmask the dependency between different niches in cultural ecosystems, so that nature will not be seen only as the space of leisure where we entertain romantic feelings that we must leave behind when we return to work.

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ALTERATIONS IN SERUM PROTEINS AND IMMUNOLOGICAL PROTEINS AFTER INFECTION WITH *H. POLYGYRUS* IN MICE

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ABSTRACT

Initially, much of the work on immuno-adaptation was focused on mechanism by which parasites evade or inactivate specific host effector responses. In the past decade the emphasis has shifted towards understanding how parasite might directly regulate the induction of these responses, a trend that reflects the current fascination with the interaction of parasite with the regulatory cytokine network. The development of effective vaccines for the protection against nematodes has a high priority, because of serious limitations in the use of anthelmintics due to the emergence of drug-resistant parasites. The development of such vaccines depends on a detailed understanding of the host defense mechanism, identification of immunogens and target sequences, which induce protection.

Keywords: Vaccine, *H. polygyrus*, serum protein, immunological protein.

Introduction

Nematodes occupying the gastrointestinal (GI) tract of animals shed an undefined array of chemicals into their environment. To combat effectively the potentially debilitating disease caused by infection with these organisms we must (a) define the parasite products chemically, (b) determine their ability to induce protective immunity (or to counter a protective immune response) and (c) establish their potential for the diagnosis of infection. Whilst it has become clear that “antigens” can be derived from within the parasite and from the turnover of external cuticular components, further work is necessary to establish the significance of these molecules to the survival of the parasite.

Gastrointestinal (GI) parasites play an important role in the allergic and hypersensitive reactions. The prevalence of intestinal protozoans and helminths in stool samples of individuals with allergic symptoms was evaluated as a possible link between parasites and allergy (Giacometti, *et al.*, 2003). A wide variety of clinical findings related to the whole body are encountered in parasitic diseases. Hypersensitive reactions may start out in the host against the chemical substances excreted by the parasites. In addition allergic reactions may occur (Falcone, *et al.*, 2004). There has been an increase in the past

few decades. T helper 2 (Th2) responses associated with allergic diseases (Black, 2001). Th2 cells elaborate cytokines such as IL-5 which works with toxic mediators of innate immune cells. Th2 cytokine involvement in allergy makes these cytokines attractive therapeutic targets, which protect against gastrointestinal worms (Finkelman, *et al.*, 2001; Fallon, *et al.*, 2002). Immunological interventions could be designed to avoid induction of pathology while retaining protective responses (Garside, *et al.*, 2000).

Materials and Methods

Experimental Animal –

The Swiss albino mouse, *Mus musculus albinus* of either sex were selected as an experimental animal for the present investigation. The mice were obtained from the Institute of Nutrition (NIN) Hyderabad, India and were kept in the animal house under local conditions of light, temperature ventilation and food. Food and water were provided *ad libitum*. Male and female healthy mice of 6-8 weeks old and 15-20 gms in weight were used according to the need of the experimental design. Animal experimentations were conducted according to INSA ethical guidelines for the use of animals for scientific research purpose, after permission from the ethical committee.

The Parasite: *Heligmosomoides polygyrus*-

Heligmosomoides polygyrus is a mouse intestinal nematode that establishes a chronic infection in the deodenum. It is a common nematode found in the duodenum and small intestine of woodmice and other rodents. They are 5-20 mm in length and bright red due to the pigmentation of their tissues. They are usually heavily coiled, with the female having 12-15 coils and the male 8-12. The male can be distinguished from the female by a prominent copulatory bursa and two long, thin spicules at the posterior end.

Experimental protocol-

The mice were divided into following six groups –

1) Non Infected Non Vaccinated Control – 1

This group was utilized for collection of the blood to find out the differential counts of non-infected non-vaccinated mice (NINVC 1).

2) Infected Non –Vaccinated Control –2

300 viable infective L3 larvae were orally inoculated directly into stomach

of mice by 0.1 ml syringe having a blunt rubber catheter. On day 1 and day 5 post infection (pi) the mice were sacrificed for larval recovery, at the same time collection of blood and separation of serum for the assessment of other test parameters was also done. On day 13 (pi), the next batch of mice were sacrificed and adult worms were counted. Collection of blood and separation of serum for assessment of other test parameters was also done. Intestine was removed for histology. This group of mice is also called as (INVC-2).

3) Infected Vaccinated with Larval Somatic Antigens

Mice were vaccinated on day 0 with L-3 larval somatic antigen containing 20,40,60,80,100 µg protein + FCA. At the same time control mice were given culture medium + FCA. On day 5, again a booster dose of L-3 larval antigen containing the same amount of protein without FCA was given to experimental mice. The control mice were given only culture medium. On day 26 the mice were challenged with 300 L-3 larvae. On day 27 and 31, mice were sacrificed for larval recovery and assessment of

the test parameters. On day 39 adult worms were recovered. Collection of blood and separation of serum for assessment of other test parameters were done. This group is also called as (IVLSAg).

4) Infected Vaccinated with Adult Somatic Antigens

First dose of homogenate, whose protein contents were preassessed containing 20,40,60,80,100 µg protein of mature worms with FCA was administered on day 0 to experimental mice (IVASAg). Culture medium + FCA was given to control mice. Again on day 5, a booster dose of vaccine in five grades without FCA was administered to experimental mice and only culture medium to control mice. On day 26 the mice were challenged with 300 L3 larvae.

On day 27 and 31 (pi), mice were sacrificed for larval recovery, collection of blood and separation of serum for assessment of other test parameters. On day 39 adult worms were recovered, collection of blood and separation of serum was done for assessment of other test parameters.

5) Infected Vaccinated with Larval ES Antigens

Different concentrations of ES antigens from L-3 larvae stage + FCA were administered on day 0. On day 5, booster dose without FCA was vaccinated. On day 26, each mouse was challenged with 300 viable L-3 larvae. Mice were sacrificed on 27 and 31 day for the recovery of L-3 larvae and collection of blood and separation of serum for assessment of other test parameters. On day 39 adult worms were recovered. Collection of blood and separation of serum was done for assessment of other test parameters. On day 39 adult worms were recovered and test parameters were assessed. This group is called as (IVLESAg).

6) Infected Vaccinated with Adult ES Antigens

Different concentration of ES antigens from adult worm stage + FCA were administered on day 0. On day 5, booster dose without FCA was vaccinated. On 26 day each group of mice was challenged with 300 viable L-3 larvae. Mice

were sacrificed on day 27 and 31, for the recovery of L-3 larvae. Collection of blood and separation of serum was done for assessment of other test parameters. This group of mice is also called as (IVAESA_g).

Maintenance of the strain of *H. polygyrus* in mice-

Heligmosomoides polygyrus strain was originally obtained from the Experimental

Parasitology unit, Department of Zoology, S.V. Veterinary University, Tirupati. *H. polygyrus* was maintained in the Helminthology-Immunology laboratory by infecting fresh batches of 25 young mice with 300 larvae/mice after every three months. Third stage infective filariform larvae were obtained by the petridish method of Van Zandit (1961). Faecal pallets from infected mice were collected on a damp filter paper. Two pieces of Whatmann filter paper No. 40 were placed in sterilized culture dishes with the faecal pallets placed in the centre and covered with thoroughly washed activated charcoal. The mixture was kept moist by 0.5% saline, aerated during the entire culture period daily for 30 minutes and incubated at 21-30°C for about 6 days by the end of which larvae were flushed out into a jar containing distilled water. They were allowed to settle for sometime, the supernatant was discarded and the larvae re-suspended in distilled water and stored in cold.

Preparation of inoculums for infection-

A larval suspension of about 100 ml was prepared in a glass stoppered measuring cylinder of 100 ml capacity. The numbers of actively motile larvae were counted by the dilution method of Scott (1928). After vigorous shaking, 1 ml of the suspension was pipette out, transferred onto several glass slides with squares already made on their reverse with a glass marking pencil and the larvae in all squares were carefully counted under a suitable dissecting microscope. Three such counts were repeated and the average count in 1 ml was multiplied by the total volume to get the total number of the larvae. An inoculum containing the desired number of actively motile larvae was adjusted in 0.2-0.3 ml to be given to each mouse. Each mouse was orally inoculated

directly into stomach with the desired number of larvae (300) by 1 ml syringe having a blunt 18 gauge-feeding needle. After inoculation, mice were kept in cages in groups of five and labeled according to the design of experiments and were fed routinely with the same standard diet.

Estimation of total Protein in Serum-

Protein in the serum of control as well as experimental male and female

albino mice was estimated by Biuret Method.

Principle-

Proteins react with cupric ions in alkaline medium to form a violet coloured complex. The intensity of the colour produced is directly proportional to proteins present in the specimen and can be measured on a photometer at 530 nm (or by using a green filter).

A) Reagents-

Stock Biuret Reagent.

Working Biuret Reagent

Protein Standard, (6.0 gm/dl).

B) Preparation of the reagents-

Stock Biuret reagent- Dissolved 45 g of Rochelle salt in about 400 ml of 0.2 N sodium hydroxide and added 15 g of copper sulphate by stirring continuously until the solution is complete. Added 5 g of potassium iodide and make up to a litre with 0.2 N sodium hydroxide.

Working Biuret reagent- Diluted 200 ml of Stock reagent to a litre with 0.2 N Sodium hydroxide which contains 5 gm of potassium iodide per litre.

Protein standard- 6.0 g/dl: 6 g of bovine albumin dissolved in 100 ml of normal saline, containing 0.1 g/dl, sodium azide.

C) Procedure-

- 1) Took three test tubes Blank (B), Standard (S), Test (T)
- 2) Added Working Biuret reagent 5.0 ml to each tubes.
- 3) Added 0.05 ml serum to the test tube (T).

4) Added 0.05 ml protein standard to the test tube (S).

5) Added 0.05 ml distilled water to the test tube (B).

Mixed thoroughly and keep at room temperature ($25^{\circ}\text{C} \pm 5^{\circ}\text{C}$) for exactly 10 minutes. Measured the intensities of the test and standard by setting blank at 100 %T, at 530 nm (Green filter) wavelength.

D) Calculations-

O.D. of Test

$$\text{Serum Proteins, g/dl} = \frac{\text{O.D. of Test}}{\text{O.D. of Std.}} \times 6$$

Observations and Result

1. Alterations in serum proteins and immunological proteins:

1.1 Alterations in serum total proteins and immunological proteins from infected mice (with 300 larvae of *H. polygyrus*) after 1, 5 and 13 days of administration of L-3 larval somatic antigens:

vaccination with larval somatic antigens (IVLSA). The A:G ratio was significantly declined after 13th day (1.73%) of infection and vaccination [Table – 4.13, Fig. 4.13.1-4.13.6].

1.2 Alterations in serum total proteins and immunological proteins from infected mice (with 300 larvae of *H. polygyrus*) after 1, 5 and 13 days of administration of adult somatic antigens:

The mice infected with 300 larvae of *H. polygyrus* showed significant increase in serum protein after 1, 5 and 13 days. α , β and γ globulin proteins increased significantly at all the durations and albumin was found to be decreased. The A:G ratio was declined in mice infected and vaccinated with adult somatic antigens (IVLSA) after 1, 5 and 13 days of infection and vaccination. Significant decline in A:G ratio after 13 days of infection was 1.51% [Table – 4.14, Fig. 4.14.1 - 4.14.6].

1.3 Alterations in serum total proteins and immunological proteins from infected mice (with 300 larvae of *H. polygyrus*) after 1, 5

and 13 days of administration of L-3 larval ES antigens:

The mice infected with 300 larvae of *H. polygyrus* showed significant increase in serum protein, decrease in albumin and increase in α , β and γ globulin percent after 1, 5 and 13 days of infection and vaccination with larval ES antigens (IVLESA). A:G ratio declined after all the durations. After 13 days, it was 1.55% [Table – 4.15, Fig. 4.15.1 - 4.15.6].

1.4 Alterations in serum total proteins and immunological proteins from infected mice (with 300 larvae of *H. polygyrus*) after 1, 5 and 13 days of administration of adult ES antigens:

The mice infected with 300 larvae of *H. polygyrus* showed significant increase in serum protein and α , β and γ globulin after 1, 5 and 13 days of infection and vaccination with adult ES antigens (IVAESA). A:G ratio declined after all the durations of infections. Lowest A:G ratio was 1.90% after 13 days of infection and vaccination.

Summary and Conclusion

Significant alterations in serum protein of mice following *H. polygyrus* infection were observed. These changes were recorded as decrease in albumin and increase in gamma globulin. The alpha-1 and alpha-2 globulins did not show definite profile during infection. The beta globulin was predominantly increased. A/G ratio was decreased indicating the tissue injury.

During the development of larvae, new proteins are synthesized as per the development need and these newly developed stage related can give one of the clue for development of vaccine. The better protection given by ES antigens might have resulted from the excretory contents of parasites (larvae as well as adult), molting tissues, reproductive secretions and body surface secretions. In the present investigation, these antigens are proved to be more immunogenic and hence need isolation and purification to develop full proof effective vaccine.

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Fig. : Alterations in serum total proteins from infected mice after 1, 5 and 13 days of administration of L-3 larval somatic antigens

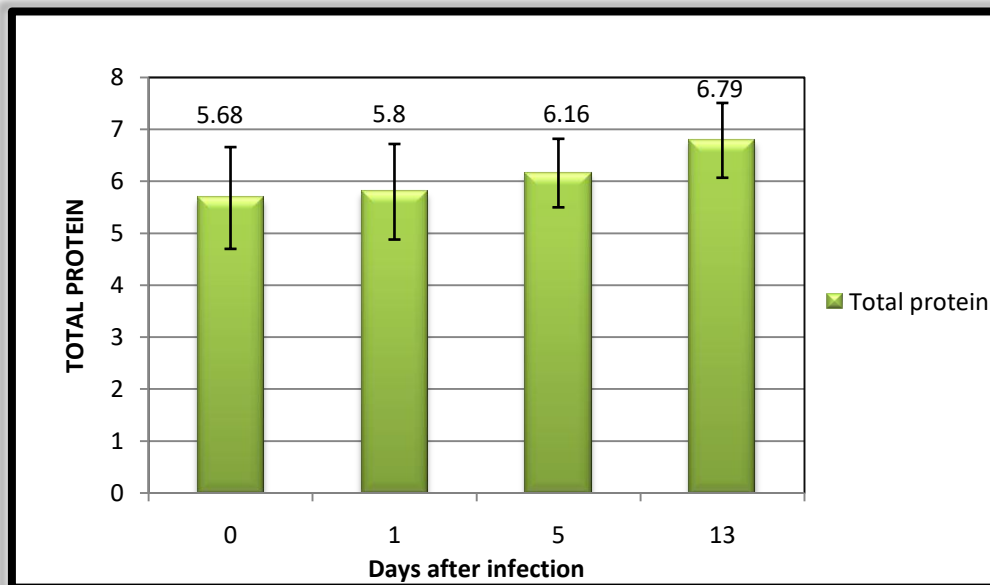


Fig. : Ratio of albumin and immunological proteins from infected Mice after 1, 5 and 13 days of administration of L-3 larval somatic antigens

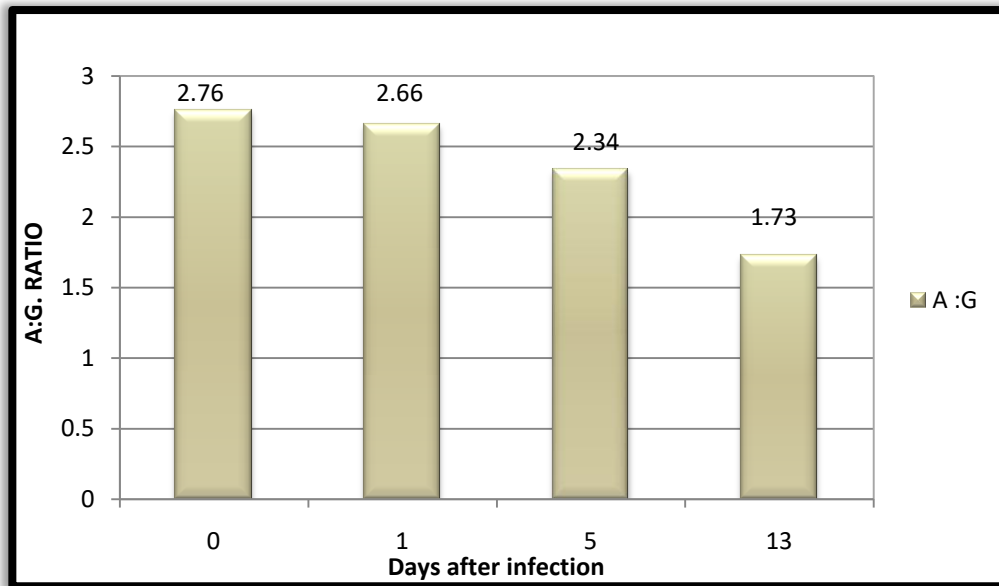


Fig. : Alterations in serum total proteins from infected mice after 1, 5 and 13 days of administration of adult somatic antigens

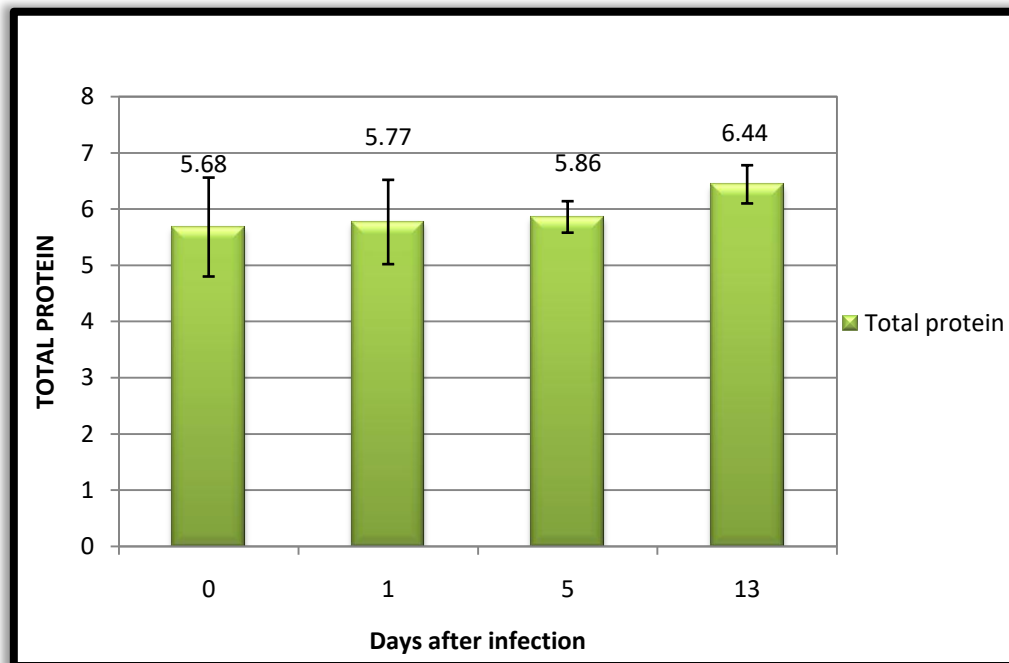


Fig. : Ratio of albumin and immunological proteins from infected Mice after 1, 5 and 13 days of administration of Adult somatic antigens

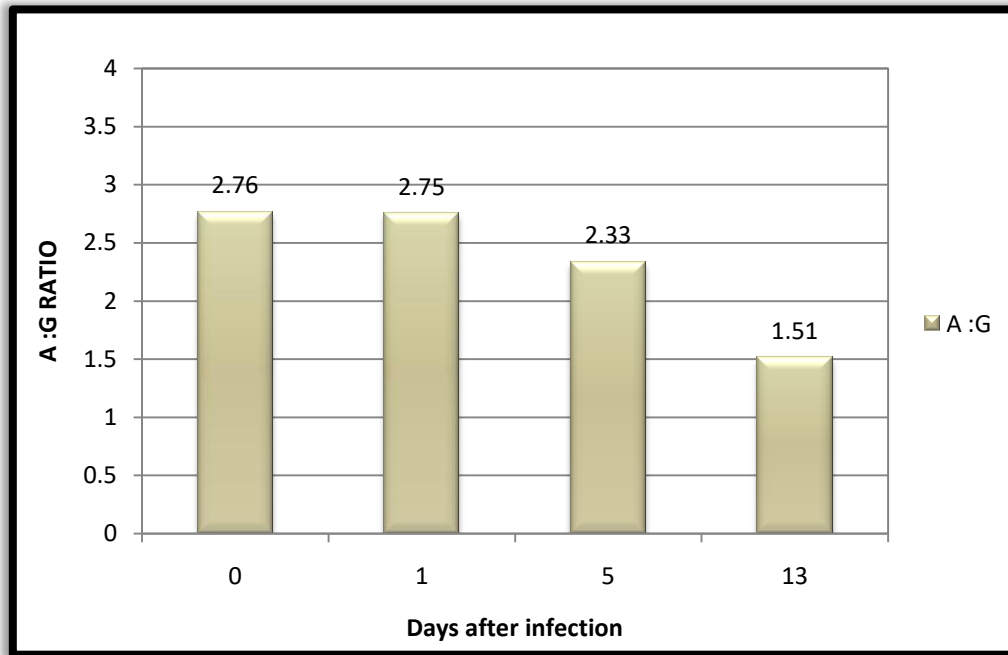


Fig. : Alterations in serum total proteins from infected mice after 1, 5 and 13 days of administration of L-3 larval ES antigens

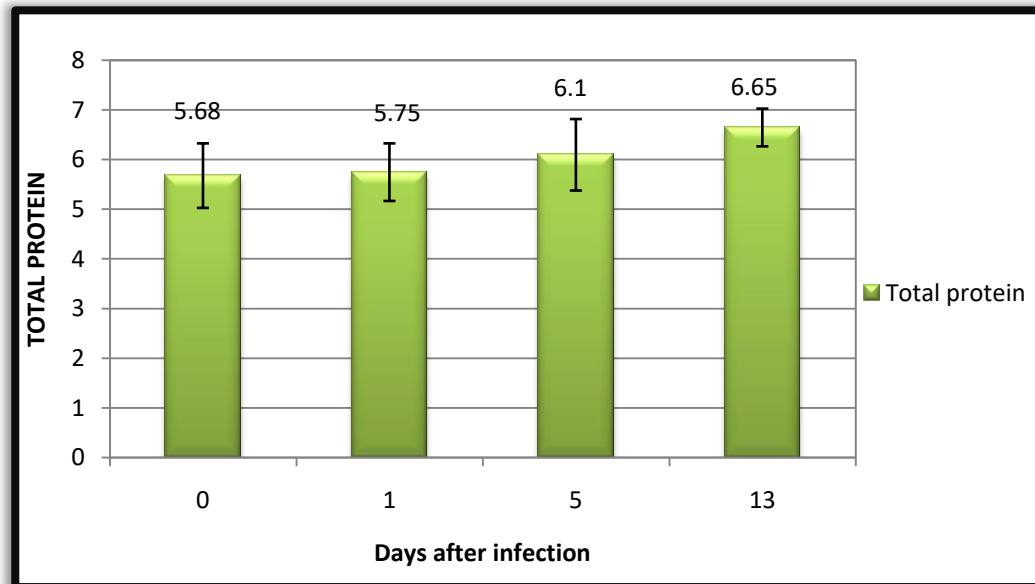


Fig. : Ratio of albumin and immunological proteins from infected mice after 1, 5 and 13 days of administration of L-3 larval ESantigens

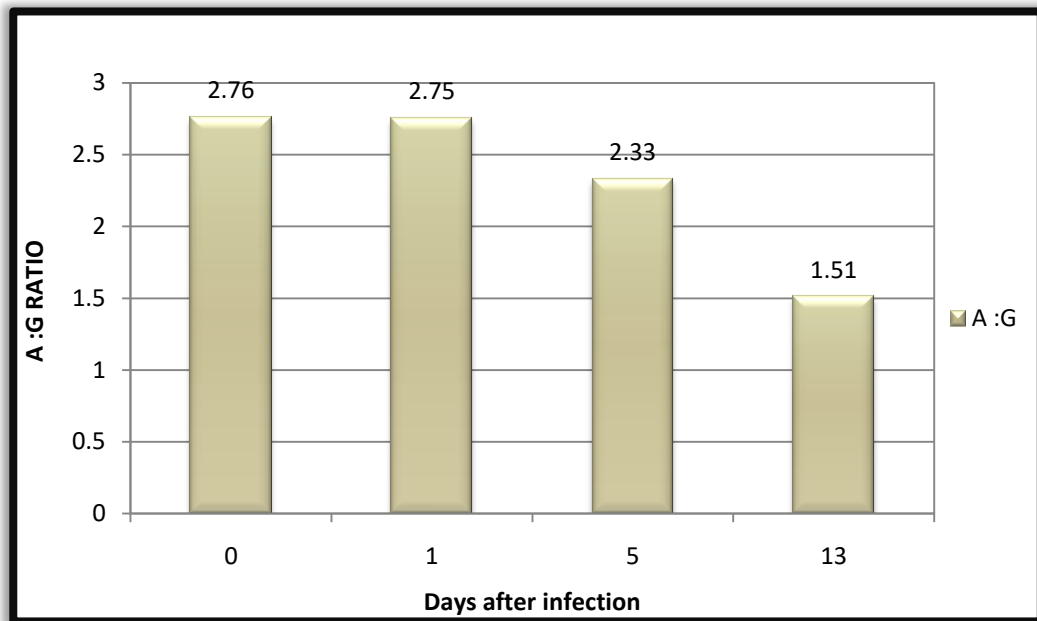


Fig. : Alterations in serum total proteins from infected mice after 1, 5 and 13 days of administration of adult ES antigens.

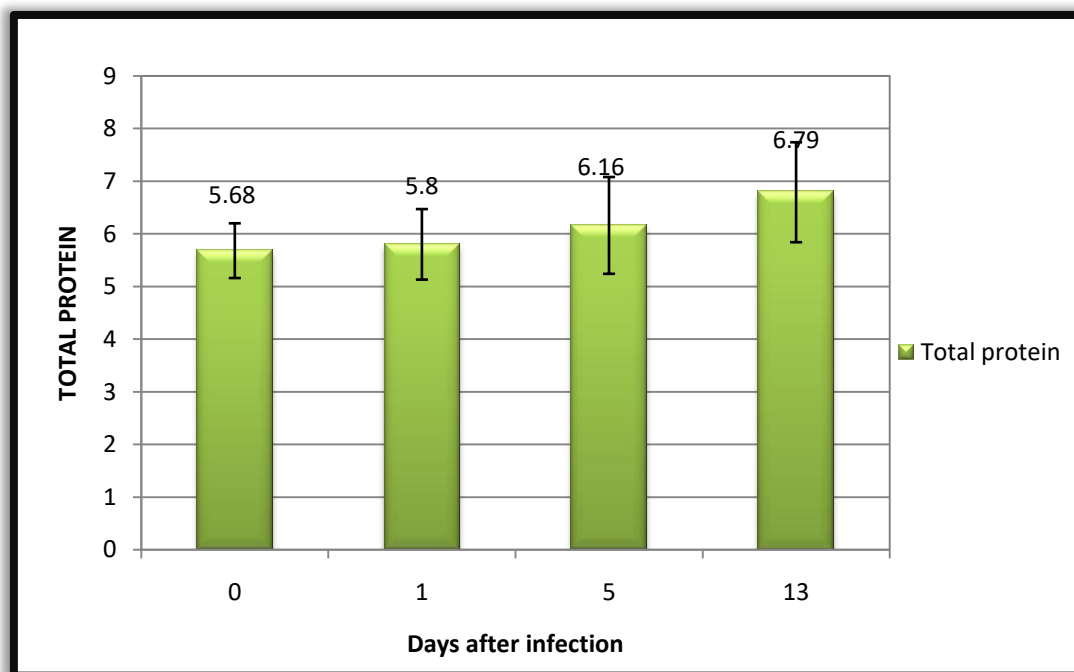
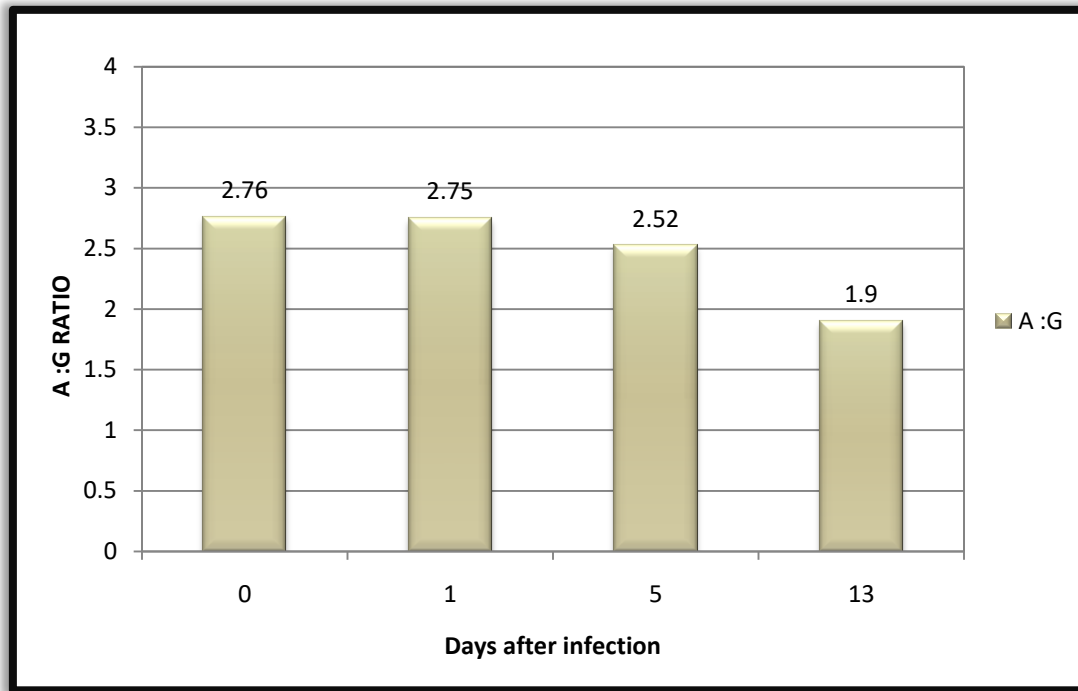


Fig. : Ratio of albumin and immunological proteins from infected mice after 1, 5 and 13 days of administration of adult ES antigens



ENVIRONMENT AND POLLUTION: DEVELOPMENT IN ECOLOGICAL SUSTAINABILITY

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ABSTRACT

A protected, intact, healthy and economic environment is essential for the full enjoyment of a wide range of common freedoms, including the rights to life, well-being, food, water and fertility. Without a stable climate, our longings cannot be fulfilled. Environmental rights are shared liberties, and individual employment, well-being, and mere existence here and there depend on tolerance to nature and its prevailing climate, and recognition of privileges regarding data, benefits, safety and security. depends. change. These unsafe materials are called contaminations. Toxins can be characteristic, for example, volcanic debris. They can likewise be made by human movement, for example, refuse or spillover created by industrial facilities. Toxins harm the nature of air, water, and land. Numerous things that are helpful to individuals produce contamination.

Introduction

Ecological rights mean access to uncontaminated and normal commodities that enable endurance, such as land, cover, food, water and air. They also include simpler biological rights, such as the ideal of certain eerie crawling animals and the right of humans to appreciate pristine landscapes. Our vision of ecological rights includes political rights such as the rights of indigenous and diverse populations, the privilege of data, the interest in dynamism, the opportunity to speak and clarify, and the option to oppose the transformation of undesirable events. It is included. We also hold fair beliefs to ensure remedies for abusive rights, including the rights of expatriates and those displaced by natural depletion, options to guarantee biological obligations, and the privilege of ecological justice. A variety of these rights, especially political rights, are regulated and maintained in various shows and arrangements. The establishment of some of these rights, and the recognition of others that have not yet been legally exercised, can be attributed to the ongoing struggles of networks and indigenous peoples around the world. Other 'new' rights, including rights, have emerged in recent years due to the accelerating pace of financial globalization and ongoing ecological and social disruption. As well as one side guaranteeing a biological

commitment, yet another has resulted from a long struggle by Friends of the Earth and others to recognize the effects of resource depletion in the North and the normal crushing of Southern nations. rice field.

Ecological issues, prominently contamination and environmental change, embroil financial, social, and social rights, including the rights to wellbeing and water. Procedural rights, for example, the rights to get together, articulation, and data, are basic to natural security. Numerous constitutions and various territorial basic freedoms systems fuse an autonomous right to a satisfactory and solid climate, demanding the inseparable connection between basic liberties and the climate. Over the most recent couple of many years, basic freedoms advocates are progressively testing movement bringing about ecological damages as common liberties infringement under the watchful eye of public and worldwide courts and commissions. The International Human Rights Clinic has interceded in the space of basic liberties and the climate through prosecution, documentation, exploration, and promotion in zones, for example, environmental change, strategic approaches, and the lingering impacts of equipped clash.

Pollution contaminating Environment

Toxins can be characteristic, for example, volcanic debris. They can likewise be made by human movement, for example, refuse or

spillover created by industrial facilities. Vehicles regurgitate poisons from their fumes pipes. Consuming coal to make power dirties the air. Businesses and homes create trash and sewage that can dirty the land and water. Pesticides—substance harms used to execute weeds and bugs—saturate streams and damage natural life. Every living thing—from one-celled organisms to blue whales—rely upon Earth's gracefulness of air and water. At the point when these assets are contaminated, all types of life are compromised.

CONSUMPTION HABITS TO COPE WITH POLLUTION

Eating a lot of meat, fish and natural product

These nourishments are basic for our eating routine, despite the fact that they are not extremely solid for the regular habitat. In a 2018 report, Greenpeace cautioned that 14.5% of all ozone harming substance discharges (GHG) come from mechanical stock cultivating. The meat business, for instance, adversely influences land use as somewhere in the range of 75 and 80% of the world's farming area is utilized for stock rearing. However, on the off chance that this equivalent land were utilized for developing vegetables, there could be nourishment for 4 billion individuals more. Overfishing doesn't assist with dealing with the climate, either, since it hurts the biodiversity of marine environments. You can likewise be a capable organic product customer by picking occasional assortments.

Purchasing espresso cases and teabags

Around the globe we discard more than 7 billion espresso cases a year, or around 13,500 per minute, as per computations by Halo, the main British bundling maker. These cases are generally made of aluminum and plastic, a reality that makes them an exceptionally clear adversary of the climate. The United States, Italy and Spain are the nations with the most elevated utilization of these single-portion compartments, which we likewise tend not to reuse, or do so seriously, since enactment doesn't think of them as

bundling and they should be set in extraordinary assortment focuses. Teabags additionally help to deliver ecological contamination: the packs are destructive for the planet since they contain nylon or polyethylene terephthalate (PET), a kind of oil based plastic.

Another progression you can take to diminish your utilization of this sort of items is to pick more manageable other options, as customary espresso producers and free tea.

Utilizing paper packs

We imagine that since they are made of paper they are not as hurtful as the five billion plastic packs that we use far and wide every year, as indicated by the UN. In any case, the fact of the matter is totally different: they are seldom reused and will in general wind up in the natural waste canister.

Likewise, the measure of energy expected to fabricate a paper sack is multiple times more than for a plastic pack and its creation requires a lot of water and wood, discharges destructive gases into the air and uses synthetics that dirty water courses and damage environments.

Washing with non-natural cleansers and conditioners

Most clothing cleansers are harmful, as they contain colors and other contaminating substances, for example, phosphates, surfactants, 1,4-dioxane dissolvable or optical whiteners that never separate. These parts cause disturbance and hypersensitivities, dirty the water and mischief marine biological systems.

The carbon impression brought about by the utilization of cleansers simply in the United States is 218 kg for every family every year, to which we have to add the energy utilized by washers and dryers. The arrangement is to utilize biological clothing cleansers with normal, biodegradable fixings.

Drinking filtered water

As indicated by Greenpeace, they take around 500 years to decay. These jugs, 500 billion of which are made every year around

the world, can influence our wellbeing due to the microparticles that they leave in the filtered water.

Conservation of Environment

Environment protection acts in India are as follows:

1. The Forest Conservation Act, 1980
2. The Prevention of Air and Water Pollution, 1974, 1981 (The Central Pollution Control Board) (CPCB) was comprised under this demonstration.
3. The Atomic Energy Act. 1982.
4. The Environmental Protection Act, 1986. (It came into power not long after the Bhopal Gas Tragedy).
5. The Environmental Conservation Act. 1989.
6. The National Environmental Tribunal, 1995.
7. Public Environmental Appellate Authority Act, 1997.
8. Public Environment Management Act (NEMA), 1998
9. Dealing with and Management of Hazardous Waste Rule in 1989.
10. The Biological Diversity Act 2002.

The Indian Constitution is among the couple of on the planet that contains explicit arrangements on ecological protection. Laws made by public, commonplace and neighborhood government add to the rights and duties that are essential for the constitution and the precedent-based law. These laws additionally called enactments must conform to the constitution yet they can

alter change the basic hand.

Security of Life and Personal Liberty is exemplified in Article 21. It expresses, No individual will be denied of his life or individual freedom besides as indicated by strategy set up by law. The Indian Constitution ensures the privilege to equity to all people with no separation. This demonstrates that any activity of the State identifying with climate must not encroach upon the privilege to fairness as referenced in the Article 14 of the Constitution. The Stockholm Declaration, 1972, likewise perceived this standard of uniformity in ecological administration and it called up all the universes countries to submit to this rule. In the Constitution of India it is plainly expressed that it is the obligation of the state to ensure and improve the climate and to defend the woodlands and untamed life of the nation. It forces an obligation on each resident to ensure and improve the regular habitat including woodlands, lakes, streams, and natural life.

Conclusion

Environmental rights are common freedoms, as individuals' jobs, their wellbeing, and some of the time their very presence rely on the nature of and their admittance to the general climate just as the acknowledgment of their privileges to data, investment, security and change. A protected, intact, healthy and economic environment is essential for the full enjoyment of a wide range of common freedoms, including the rights to life, well-being, food, water and fertility. Without a stable climate, our longings cannot be fulfilled.

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ECOFEMINISM : IN THE INDIAN PERSPECTIVE

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ABSTRACT

Ecofeminism emerged in the mid-1970's in the west as a result of the dual challenges faced by women in both the feminist movement. Ecofeminism combines the theory and practice of feminism and environmentalism, and is believed to be coined by French scholar Françoise Le Eeminisme. But when we talk about in the Indian context it is a great history of women's struggle against environmental degradation, destruction and exploitation. Like 'Narmada Bachao Andolan', 'Chipko Andolan' and many other movements that women are playing a vital role, to save nature. Women have taken a leading and an important positions in these struggles where their lives are related and connected with nature. In the Indian perspective some literary fictions explore many aspect of this nature. In the theory we find spiritual and material ecofeminism. Such as nature is harmed their lives as well as urban. Urbanity is presented with both positive and negative aspects. In the context of Indian women writers it is quite impossible to define Ecofeminism in the normal terms. The Indian women fiction writers have helped to shape the ecofeminism theory in Indian writing in English with Indian villages since 1940's to 2000 with women protagonists of various familial background.

Keywords : Ecofeminism, Environment, Exploitation, Villages, Nature, Andolan, Third World.

Introduction

Ecofeminism in an important way is a reaction against western ideas of development and what the West thinks as knowledge. On the one hand ecofeminism believes that all are connected- it disrupts the dualisms of self and other. On the other hand it tries to retain the elements of enchantment within nature by considering nature as sacred. Western ecofeminists such as prominent French critic and the proponent of the theory of western ecofeminism Françoise d' Eaubonne, American activist and writer Hazel Handerson, British critic Starhawk and Indian activist Vandana Shiva they all agree that there is a sacredness in nature and that's why they all see Eastern cultures as something that stands opposed to western cultures that see nature as a resource. These ecofeminists come together in reemphasizing on this inherent spirituality related to nature: Hazel Handerson thinks that ecofeminism actually restores the primitive cultures that worship nature, cultures that are predominantly matriarchal. She also thinks that the whole natural order, its functions are not fully knowable. Humans are an integral part of the order and that's why it is impossible for him to understand the

workings of nature. Starhawk defines this idea of goddess worship as a part of spiritual ecofeminism and stresses on the goddess tradition, nature theology, and indigenous spirituality. What these thinkers believe is that when we start to see earth as alive, we act to preserve it. Vandana also has similar viewpoints regarding this. She writes in her book *Staying Alive: Women in India* are an intimate part of nature, both in imagination and in practice. At one level nature is symbolized as the embodiment of the feminine principle and at another she is nurtured by the feminine to produce life and provide sustenance...Prakriti is worshipped as Aditi, the primordial vastness, the inexplicable, the source of abundance, she is worshipped as Adi Shakti, the primordial power. All forms of nature and life in nature are the forms, the children of the Mother Nature who is nature itself born of the creative play of her thought.

When we talk about ecofeminism in the Third World countries like India, it presents a rather different picture. India is a land of diversities; diversities in cultures, economic positions, faiths and propagandas. Thus it becomes difficult to measure or define Indian Ecofeminism from a fixed theoretical point of view that speaks of Third world in

general. We tend to generalize and include the question of India within the parameters of Ecofeminism in third world. What we ignore is that India can offer a very different scenario when we talk about Ecofeminism in the third worlds. As a theoretical frame work ecofeminism emerged in the west. And all the contemporary discussions on Indian ecofeminism is done on the frameworks laid by the west. Not only that ecofeminism has given a new direction to feminism. Feminism emphasizes on equality in an already existing system. Ecofeminism strives to dismantle the predominant power structure, for ecofeminists equality is not emancipation. They explain it in the following way: with the power of reason and rationality, the very weapons of enlightenment, man has made it clear that emancipation can happen only by dominating nature, being free from nature; progress comes from using and exploiting nature. Feminism never questions this, rather they demand equal power to dominate and there lies a problem. The idea of "catching up" with the men in this very power dominated society, within the existing paradigms will help to strengthen clutches of false, manipulative development processes. The system will remain the same. I quote from Ecofeminism by Shiva and Mies : " So the question is can the concept of emancipation be compatible with a concept of preserving the earth as our life base?" (7) This is not the objective of ecofeminism : not to equate equality to emancipation but to seek emancipation of all through preservation. True emancipation does not lie in having equal rights in already existing order rather it lies in a change of that order which sees nature as inferior to culture and woman to man, animals to humans.

This relationship is a complicated one and its many complexities are explored by Indian women authors. Many of these writers were writing long before ecofeminism as a theoretical approach emerged in the west. For example the works of Kamala Markandya were writing in the 1950s. But her works reflect an acute sense of eco-

consciousness. Her women characters are portrayed as an integral part of nature. The world of Markandya is a rural world where industries are making its presence felt very subtly. The issues that Markandya brings forward are very similar with many approaches discussed in western ecofeminism as well as in contemporary Indian attitudes. This happens because there has always been an eco-consciousness in Indian psyche as our cultures have always given importance to nature, seen nature as something divine, worshipped it as a goddess. Thus what western eco-feminism terms as spiritual ecofeminism comes very naturally to the Indian women authors who have portrayed human characters within the circle of nature. These women authors wrote in the 1950s, 1970-80s and very recent 2000s. They all share a common thing and that is eco-consciousness. They explore in their works the many faceted, multi-dimensional Indian ecofeminism and make us stand face to face to this extraordinary world where women and nature connect in so many diverse ways. The literary texts of these writers become sites of resistance that question and critique the dualisms such as man/woman, culture/nature. Markandya's *Nectar in a Sieve* is a classic example of what happened in postcolonial India as it moves from agriculture to industry. Through the life and struggle of the central character Rukmini we witness a world that is ravaged by industry. Exploitation of land invariably entangles with exploitation of women. We see that when the local and self-sustaining economy collapses the women and the children suffer the most. Many women characters in the novel that include Rukmini's elder daughter Ira turn to prostitution to survive and provide for the family members. With no way left for them to earn they are compelled to sell their bodies. We encounter many deaths of little children in the village. And finally they have to leave their land, the last ray of hope vanishes with them. Rukminin rightfully explains the expansion of the factory as the growth of an untended weed that destroys the

lives of every other life-form that comes in its way.

"It had changed the face of our village beyond recognition and altered the lives of the inhabitants in

a myriad way. Some- a few- had been raised up; many others cast down, lost in its clutches."(136)

Nature too is not left unaffected. The tannery not only changed the lives of the villagers it has also left its mark in many damages it caused in nature. Rukmini reminiscences: "At one time there had been kingfishers here, flashing between the young shoots of our fish; and paddy birds; and sometimes, in the shallower reaches of the river, flamingos, striding with plumage of a glory not of the earth. Now birds came no more, for the tannery lay close- except crows and kites and such scavenging birds." (71)

They move now to the city. Ecofeminists view urbanity not as a space of opportunity but as one of the reasons of environmental pollution and an inhabitable place for poor villagers. But in the novel the city space emerges as a multi-dimensional world that is unforgiving and yet offers enough for Rukmini to return to her roots and begin afresh. Rukmini returns and sees a different kind of modernity that is being set up in the village, the hospital for the poor. This idea of an alternative modernity is offered by the women writers and thereby it helps to broaden the scope of ecofeminist theory as a whole.

In Anita Desai's *Fire on the Mountain* the connection is explored in a private space; her world is a domestic world where women from different background relate to nature differently. This novel touches upon issues of gender, urbanity, and along with very subtly industry and exploitation. Nanda, Raka and Ila they all relate to nature in indifferent ways. Thus to say that this connection is a uniform one as they all are women from third world is a wrong assumption. Nanda Kaul the protagonist of

the novel finds the stark, rugged mountain village as welcoming because she searches for a place that is devoid of human interaction and relationship. We come to know that she has been a wife of a vice chancellor and spent much of her life in the closed doors of a mansion. She is disillusioned with the urban, high society life that may seem as a place for the privileged but in actuality she is frustrated with its double standard that subjugates women and forces them to play roles dictated by the society. And when the news arrives of the coming of Raka, her grand-daughter she is visibly depressed as she no longer wants human company. Raka on the other hand connects to nature differently. She is lost within the wilderness and loves the company of every entity within nature. Desai writes : " She would return with her brown legs scorched, her knees bruised, sucking a finger stung by nettles, her hair brown under a layer of dust, her eyes very still and thoughtful as though she had visited strange lands and seen fantastic improbable things that lingered in the mind." (50)

It is through the eyes of Raka that we also see that nature in the high altitude is also being harmed by so called development. Raka in spite of being one from the city realises the importance of saving nature and each of its inhabitant. Desai successfully adds to the existing paradigm of ecofeminist theory the fact that to consider that women's connection to nature is monolithic specially in the third world is wrong.

Anuradha Roy on the other hand has chosen to explore the connection in an urban setting in her novel *Folded Earth*. She voices her concerns on globalization and growing industrialization in India and its impact on gender, family relations, animals and birds and the environment understood in its broadest sense. Here the most significant character other than the protagonist Maya is Diwan Sahib and a social outcaste Puran. These male characters are extremely conscious of ecology and the importance of maintaining balance and harmony within

nature. Puran shows a remarkable capacity to love and care for animals. His bond with nature is almost spiritual. He loves an orphan fawn with such care and gentleness that we instantly recognize that Puran has deep connection with nature. And DiwanSaheb understands all the nuances of this connection shared by man and nature. He has seen a lot of change taking place in the area and could also foresee what fate has in store for the people and the place. Female characters are portrayed within nature too. Charu, a village girl and a friend of Maya also is able to have a deep connection with nature. Both Chant and Puran are people whose connection to nature cannot be explained only in terms of materialist aspect. Roy explains: "he could not talk to people, but he could talk to animals. Animals trusted him. Foxes came to him if he called them. Injured birds arrive on his doorstep to be cured. Dogs with broken legs found their way to his cowshed." (170)

When her cow that she names Gauri is lost in the woods she spends sleepless nights. She even stays with her wounded cow till its death. On the other hand Chant's mother is completely unable to have a bond with nature though she too belongs to the same place that Chant inhabits. Thus the ecofeminist assumption specially of materialist ecofeminists that women of working class background has a connection with nature as they work within it can also be questioned. Roy refuses to accept that there is a simplistic and monolithic connection between women and nature. She recognizes that women's position in different cultures and societies can alter or change the modes of this connection. She touches upon issues of corruption, class struggle and shows that an ecofeminist concern encompasses all struggles against domination. It also shows that in the study of ecofeminism ecology is not always an external environment, a big outside that we go into. It's a study of interrelationship. And in here she contributes to the whole gamut of ecofeminist theory.

There has been a progress since independence, in terms of industry, economy and technology. These process influences lives of different people differently. There is an accepted notion within ecofeminist theory of third world which is seen as unaffected by outward changes has remained unchanged and has been able to preserve the culture that worships nature. This idea of third world is a western projection that do not take into account that India is a land of many diverse cultures and women have different social positions and thereby one synchronized connection with nature is not possible. There is no one synchronized development, there are many. These effects are varied in nature as the subject or the characters of a text speak from urban as well as rural positions, public and personal spheres, spiritual along with material perspectives. These are all different angles from where Indian Ecofeminism can be approached. Thus what we get from the study of the works of these women writers is a picture of Indian Ecofeminism complete with its many dimensions, perspectives and diversities.

Along with ecofeminist approaches we find that their works raise issues such as gender, race, class etc. They present an image of India which is different from dominant cultural representations. It shows a land besides mystery, a real world of struggle, sufferings, economic imbalance, material inequality, sexual discrimination, and survival. Indian ecofeminism thus becomes one such distinct approach that not only explores many bonds between nature and women but also connects all, all marginal entities together. This aspect of ecofeminism also broadens the peripheries of feminism itself. It forces us to see that emancipation doesn't mean having equal rights in already existing social system which today is a capitalist and patriarchal system. True emancipation will come from a radical change in that very structure that subverts all marginal subjects. Ecofeminism encompasses all those issues that are in this establishment marginal, inferior, less

valuable.

Conclusion

Indian women writers both in theory and literature of post-independence era have been dealing with connection that man shares with nature. These writers are looking at things a bit differently. They have been able to reflect on a definite eco-consciousness in their works. This consciousness sees human lives as a part of a larger nature and realizes that when this nature is exploited human lives are affected. These writers have gone against the norm; when growing industrialism was looked upon as an optimistic change in the lives of poor Indians these writers showed the worse effects industrialism, development projects of free India. This eco-

consciousness of the writers of both 1940s as well as of 2000s is uniquely Indian that can't be compared with any other forms of eco-critical writings. Whereas this eco-consciousness is uniquely Indian and can also be analyzed in terms of the very recently developed theories of eco-criticism and ecofeminism. The aim is to find out the ways in which the works of these Indian women writers can be in some ways categorized as ecofeminist as the theory dictates and at the same time deviate from many aspects of ecofeminism. And through this process of finding similarities and dissimilarities one can see how Indian women writers have managed to create a unique form of eco-critical writing which is definitely Indian in nature.

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ECO-FRIENDLY NATURAL DYES AND THEIR APPLICATION ON TEXTILES

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ABSTRACT

Natural Dyes are derived from natural materials such as plant leaves, roots, bark, insect secretions, and minerals. In the earlier days, dyes were derived only from natural sources. Natural dyes are cheap, easily obtainable. These dyes are easily decomposed in nature and they do not pollute the environment while destroying them after end use. Clothing with natural dyes provide excellent feel of nature that cannot be obtained by synthetic dyes. Due to their excellent nontoxic and non-allergenic characteristics, people of all ages can use the clothing dyed with natural dyes. These dyes are harmless to the baby skin. They have wonderful capabilities to protect humane from ultra-violate radiation and extreme sun burning. Shades created by natural dyes comfortable and soft feel. They produce exceptional color ideas and these shades are normally harmonious. The world is in the age of environmental and ecological consciousness. Environment pollution is gaining importance as being one of the most challenging problems facing the human race at present.

Keywords: Sustainability; Eco-friendly, Natural dyes, mordents.

Introduction

The textile industry has a heavy impact on the environment. Every year 1 million tons of different types of chemical dyes are used across the globe. The dyeing and bleaching of fabrics involve chemicals, energy and huge amount of water. The European and Asian countries including India have banned the manufacture and use of azo dyes. This move on the dominating section of the world has created unstinted demand for natural dyes as researchers are looking forward for eco friendly products and technologies.

The history of natural dyes dates to prehistoric times, India the country whose dyeing practices have exercised the greatest influence on European Dyers from the 16th century, appears to have had a dye industry long before its transactions were recorded in writings, perhaps extending to the period of the Indus valley civilization 2500 BCE.

Throughout history, people have dyed their textiles using common, locally available materials, but scarce dye stuffs that produced brilliant and permanent colors such as the natural invertebrate dyes.

As interest in natural dyes grew, information from the old literature was collected and traditional dyeing practices in different regions

were documented and compiled by various researchers.

First natural dye use was found around 2600 BC. Originally, dyes were made with natural pigments mixed with water and oil used to decorate skin, jewelry. Natural dyes are color substances obtained from natural sources. Natural dyes are used for all types of textile dyeing and printing until the middle of the nineteenth century. The use of natural dyes was reduced due to the advent of synthetic dyes, though they were economical and possess excellent fastness properties. However, the growing consumer awareness of the harmful impact of synthetic dyes, concern for the environment worldwide, and stringent environmental laws lead to the revival of natural dyes. Coloring matter extracted from the roots, stems, leaves, or barriers and flowers of various plants has various expectations.

Until 1856, natural dyes and pigments were used as coloring agents. The majority of natural dyes are vegetable dyes from plant sources and other organic sources such as fungi and lichens. With the improvement of living standards, everybody is very much conscious about environmental protection and health safety. Natural dyes have attracted more attention to the industry due to exhibiting better biodegradability and more compatibility with

the environment. This paper contains classification and types of natural dyes, brief review of natural dyes. Applications of natural dyes on textiles and their advantages and disadvantages .

Review of Literature

SujataSaxena and A.S.M. Raja published book on natural dyes sources, chemistry, application and sustainability (2014)

This book attempts to review the current status of natural dyes and various sustainability issues involved their production and Application and examines their future prospects.

Aseem Kumar Roy Choudhary, (6 March 2018) studied on eco friendly dyes and dyeing. He discussed the environmental benefits and possibility of revival of natural dyes.

Shweta S., Geeta Margaret S. (2016)published paper on scope of natural dyes in present scenario.

In this review paper discussed about the scope of natural dyes, sources and extraction, advantages and disadvantages of natural dyes.

Classification of Natural Dyes

1. Vegetable dyes
2. Animal dyes
3. Mineral dyes

1. Vegetable Dyes-

Historically, plants have been used for the extraction of a majority of natural dyes. Various plant parts including roots, leaves, twigs, stems, heartwood, bark, wood shavings, flowers, fruits, rinds, hulls, husks, like serve as natural dye sources. A renewed interest in natural dyes has increased their commercial availability.

Indigo-

Indigo is the only important natural blue dye. It is extracted from the leaves of the leguminous plant, Indigoferatinctoria. This very important dye popularly known as the “king of natural dyes” has been used from ancient times till now for producing blue color and is today’s most popular for denim fabrics. It is suitable for dyeing cotton and wool..

Madder-

Madder is the red color producing natural dyes from the plants of various Rubia species. The dye is obtained from the roots of the plant. It is also popularly known as the “queen of natural dyes”. Dye is usually extracted by boiling dried root chips or stem pieces with water. Alum can be used as a primary metallic salt in combination with other mordants to develop a range of red shades. Dyed materials possess good fastness properties. Alum is widely used to get pink and red shades. A mixture of alum and iron produces purple shades.

Morinda-

The root and bark of the tree Morindacitrifolia growing in India and Sri Lanka is used for getting red shades. Maximum colouring matter can be obtained from the 3 to 4-year-old tree. Mature trees have very little dye. Dye is extracted from the chipped material with water after a preliminary wash to remove free acids. Various shades including purple and chocolate can be produced with the use of mordants.

Safflower-

Safflower is an annual herb known to have originated in Afghanistan. The safflower florets were traditionally used for extracting dye which was valued for its bright cherry-red color. Safflower has been employed to give cherry-red direct dyeing on silk and cotton. The dye is extracted from dried safflower florets by continuously washing it with acidulated water to remove all the water-soluble yellow coloring matter. The washing and light fastness of the dye is poor.

Turmeric-

Turmeric is a well-known natural dye. The dye is extracted from the fresh or dried rhizomes of turmeric. The dye present is chemically curcumin belonging to the Diaroylmethane class. It is a substantive dye capable of directly dyeing silk, wool, and cotton. The shade produced is fast to washing but its fastness to light is poor. Turmeric dyeing can be over dyed with indigo for production of fast greens. The natural mordants such as tannin obtained from myrobolan can be used to improve the fastness

properties.

Pomegranate-

Rinds of pomegranate (*Punicagranatum*) fruits are rich in tannins and are used for mordanting purposes. A yellow dye is also present which can be used to dye wool, silk, and cotton with good fastness properties. It is also used along with turmeric for improving the light fastness of the dyed materials.

Myrobolan-

Dried myrobolan (*Terminaliachebula*) fruits have high tannin content and also contain a natural dye that is used for producing bright yellow shades for all textile materials. Myrobolan is also used as a natural mordant to fix different natural dyes on textile materials.

Marigold-

Marigold (*Tagetus spp.*) is a bright yellow flower-yielding plant. It is commonly used for making garlands and floral decorations. It is available in different colors including yellow, golden yellow, orange. The main coloring component is quercetagetol, a flavonol along with two of its glycosides and lutein. It dyes wool and silk in deep yellow colors with good fastness properties

Flame-

The flame of the forest (*Buteamonosperma*) tree, locally known as tesu in India, produces bright orange color flowers. The dye extracted from the flowers can be used for dyeing all natural fibers. Bright yellow to brown and orange colors can be produced with suitable mordant.

Kamala-

The dried fruit capsules of kamala (*Mallotusphillipensis*) yield a red-orange powder. That can be used for dyeing wool and silk to bright orange-yellow and golden-yellow colors. Colors produced on cotton are not so good with moderate fastness properties.

Onion-

The outer skin of onion (*Allium cepa*) which is generally thrown away as waste can be used to extract yellow color natural dye. The dye is flavonoid in chemical constitution, and

produces bright colors on wool and silk. Cotton can be dyed with suitable mordant. The washing and light fastness of the shade produced are moderate.

Barberry-

The barberry plant roots bark and stems are used to extract the dye. The main constituent of the dye is berberine which is an alkaloid. It is a basic dye and can be used to dye silk and wool directly. The dye produces a bright yellow colour with good washing fastness and average light fastness. Cotton can be dyed after mordanting.

Annatto-

Annatto *Bixaorellana* is a small tree belonging to the family *Bixaceae*. The tree is known for the yellow orange dye obtained from its seeds. It is extensively used for the dyeing of cotton, wool, and silk. The alkali extraction method is used for extracting dye at boiling conditions. It produces reddish orange shades on cotton, wool, and silk.

Saffron-

It is a spice derived from the flower of *Crocus sativus*, commonly known as the "saffron crocus". It produces from yellow color. Saffron is an ancient yellow dye belonging to the family *Iridaceae*. It is used for cooking as well as medicinal purposes. The dye is extracted from the stigmas of flowers by boiling them in water. It imparts a bright yellow color to the materials. It can directly dye wool, silk, and cotton. Alum mordant produces an orange yellow known as saffron yellow.

Animal Dyes-

Insects were the main source of natural dyes of animal origin and most of these provided red colors

Cochineal insect -

Good examples of animal dyes are cochineal, which is a brilliant red dye produced from insects known as *coccus cacti*. The dye is obtained from the bodies of female insects that live on cactus (*Opuntia species*). The principal coloring matter is carminic acid. The cochineal dye produces crimson red color on animal

fibers and has good washing and light fastness properties.

Lac insect -

This dye is extracted from the fluid secreted by the lac insect (*Lauiferlacca*), which lives on the banyan trees. Lac was also well known in ancient times for coloration of animal fibers. Traditionally, it was used for coloration of animal fibers only as it had good affinity for those but it has now also been used to color cellulosic fibers such as cotton.

Kermes-

Kermes consists of dried bodies of a variety of insects which lives on a species of Oak. The dye is obtained from the body of a small insect called *coccuslaccac*. Kermes is another animal origin crimson red dye derived from the insect *Kermes liscis*. This dye has been known since ancient times to color animal fibers.

Tyrian purple-

This dye is extracted from the sea snails found in the Mediterranean Sea. The amount of dye produced was very limited and therefore very expensive. Hence it was considered a symbol of royalty and was used to color the clothes of the royal family. It is the most highly prized ancient dye stuff, obtained from the juices of certain species of snails found in the waters of the Mediterranean Sea. It is tremendously costly, as 12,000 animals were needed to obtain one gram of dye stuff. This dye produced a very fast deep violet color on fabrics.

Mineral Dyes-

These include various metal salts and metal oxides. Minerals provide such dyes as Persian blue, chrome yellow, and iron buff. Tribes and nations in different parts of the world have found out the art of coloring and staining textiles with mineral compounds.

Iron buff-

Iron springs, containing iron salts in solution are found in many countries with colour sediments left when the water stands exposed to the air. Dipping clothes in these springs and then exposing them to the air dyed them in iron rust color commonly called as "iron buff".

Mineral khaki, a mineral coloring matter has been used to dye military uniforms. Today instead of iron scrap, ferrous sulphate is being used. Some mineral pigments found in nature such as cinnabar, red ocher, yellow ocher, raw sienna, malachite, ultramarine blue, azurite, gypsum, talc, charcoal black, and so on, have been used for coloration purposes. Apart from the red ocher that was used by the monks for coloration of their robes, these were mainly used in paintings and murals along with gum as binder

Microbial and Fungal Origin-

Bacteria produce collared substances as secondary metabolites. *Bacillus*, *Brevibacterium*, *Flavobacterium*, *Achromobacter*, *Pseudomonas*, *Rhodococcus* are some of the pigment-producing bacteria. Microbes as a dye. Source offer an advantage as these can be easily grown on cheap substrates under controlled conditions.

Extraction Methods-

The extraction of color component from the dye source is an important aspect as it influences the shades and controls the cost of the dye and dying process. The objective of extraction is to extract maximum colour from the source even though the method depends on the chemical composition of the dyes. The following methods of extraction are Aqueous extraction, alkaline extraction, acidic extraction, solvent extraction, ultrasound assisted extraction, enzyme assisted extraction, super critical fluid extraction.

Aqueous extraction is commonly employed in small scale industries which sometimes are assisted with acid or alkali as the natural dyes are pH sensitive.

However, if it is to be used at a later date for dyeing or in dye extract producing units, it has to be converted into either powder form or concentrated solid rich form for long-term storage and ease of transport. The following techniques are generally used for converting natural dye extracts into powder form or concentrates.

- Spray drying

- Drying under vacuum
- Freeze drying.

Extraction of colour from the raw material

The required quantity of natural product is taken (usually 80%) and is soaked in hot water for 24 hours. Next day the same is heated for 1 to 2 hours to extract the maximum quantity of colour from the natural product. The solution is then filtered.

Mordanting-

Textile fibers, especially cellulose, do not have much affinity for the majority of the natural dyes; hence these are subjected to an additional step known as mordanting. Mordants are the substances that have affinity for both textile fibers and dyes. There are three types of mordants, namely metal mordant, oil mordant and tannic acid.

Oak galls are rich in tannin and are used for mordanting. They can also be used to get a brown color. Catechu or cutch obtained from the heartwood of Acacia catechu is used to dye cotton, wool, and silk to brown color directly. It is also rich in tannins and can be used to get black color with iron mordant. Black color can also be obtained from many yellow and red dyes by iron mordanting. Famous logwood black color having very good fastness properties was obtained by using iron mordant and the extract of logwood obtained from the heartwood of the tree to 20 % tannin which is of the gallotannin type. It has an olive-green color.

Methods of Mordanting-

There are three **types** of mordants based on the time of their usage. They are

Pre mordanting- In this method, the fabric is first mordanted and then dyed.

Simultaneous mordanting- In this method, the mordant is simultaneously added to the dye bath and the fabric is dyed.

Post mordanting method- In this method the fabric is first dyed and then mordanted.

Fastness properties of natural dyes-

The inherent instability of the chromophores in the natural dyes has resulted in poor fastness to washing and light. Use of mordants improves the fastness of dyes to certain extent. Majority of the natural dyes produce satisfactory fastness to serviceable conditions such as sunlight, washing, rubbing and perspiration. Major problem of fastness is found with weight rubbing and alkaline perspiration. Neutral soap can be used for laundering.

Application of Natural Dyes on Textiles-

Natural dyes can be used for coloring apparels, home textiles, children's garments, functional clothing and medical textiles. However the selection should be based on the specific end use.

Many natural dyes require the use of chemicals called mordants to bind the dye to the textile fibers; tannin from oak galls, salt, natural alum, vinegar and ammonia. Natural dyes are mostly employed for dyeing of natural fiber textiles to enhance their eco-friendly characteristics. They are usually applied to textiles by dyeing.

Dyeing is normally carried out by these artisans by hand in large vessels. Iron, stainless steel, copper, and aluminum vessels are used. Dyeing in copper vessels is considered to produce bright shades. Aluminum vessels are normally stained with a particular dye, hence should be used if only one type of dye is used. Stainless steel vessels are most preferred for the natural dyeing process. On a larger scale, hand-dyeing machines have been successfully used.

It is set with 1: 20 ml ratio and the filter solution of the natural product is then added and the dyeing is started. The dyeing may be started at 50° C and slowly the temperature is raised to boiling. Dyeing is then continued for an hour and material is then taken out of the dye bath,

Advantages of Natural Dyes-

Natural dyes are extracted from natural sources and hence they are eco-friendly. Natural dyes are UV resistant and provide protection to the wearer. Natural dyes are biodegradable and disposing them does not cause pollution. Some natural dyes possess mosquito repellent and flame resistant property. These dyes are come

from natural sources, natural dyes are not harmful to the environment, which makes it so appealing for consumers.

Disadvantages of Natural Dyes-

There are many limitations in the usage of natural dyes. Some of which are listed below

Natural dyes are difficult to store. Dye extraction is a time-consuming process. Reproducibility of the same color shade is difficult. Impurities in natural dyes fade away the color produced. Availability of these dyes depends on the seasons. The natural dyeing process is difficult to standardize.

Conclusion

In conclusion, natural dyes offer a host of benefits for human use. Recently a lot of concern and awareness towards maintenance of ecological balance has led to revival of natural colorants. Replacement of synthetic dyes by natural dyes should be made. Reconstruction of ancient and traditional dyeing technology should be made, it is essential that there should be intense work on natural dyes as well as on their dyeing behavior and fastness properties, which will be helpful for their best practical application. The natural dyes should be used by all the manufactures to make them eco-friendly. Thus there is a need for many more active types of research to build knowledge

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ENVIRONMENT AND SPORTS: ATTUNEMENT IN HEALTH AND SPORTS

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ABSTRACT

Sports occupy a special place in modern life, with millions of people around the world watching and participating in their favorite games. Ironically, despite its recreational and health-enhancing benefits, sports can also be harmful to the environment. To remedy this, professional teams and colleges across the country are transforming sport into a positive force for ecological change by adopting sustainable practices.

"If you build a stadium in the middle of a city and have 80,000 people in it a day, the environmental impact is huge." University of Natural Resources, North Carolina. "Waste, water and air pollution are hard to argue. The challenge is to mitigate these negative impacts."

A significant impact of football matches is air pollution, mainly from transportation and tailgating. Two years ago, Bunds and Jonathan Casper, an associate professor in the School of Parks, Recreation and Tourism Management, conducted an air pollution study at Carter Finley Stadium in North Carolina. The research ended with some interesting results.

Introduction

This Special Issue, like many good ideas in academic spirit, was conceived through a themed symposium. We presented 'Health as more-than-human: environmental attunement in health education' at the inaugural Critical Health Studies (CHESS) Conference in May 2018, Queenstown, New Zealand (Fitzpatrick et al., 2019) under a simple (and optimistic) conversational premise; to 'grow new grass' rather than lament that 'the grass is (or could) be greener' elsewhere. The purpose was to expand possibilities and practices of educational and embodied connections to environmental knowledge of place, space and nature¹ in health, sport and physical education.² Utilising the notion of attunement, helped us to explore the 'epistemological habits' (Trout, 2008, p. 63) or 'leaning in' to notions of environment that focus on a body-mind-culture-nature connection to the lands and waters in a deep sensory and even spiritual sense of care for others (Brymer et al., 2010). At the time, Nicole was working on bluespace research and collecting data on how notions of participation in National Parks and greenspace were being increasingly converged with health and fitness discourses through advertising and social media. Rosie had been engaging in health and food and nutrition education with Australian Indigenous elders and making place-based links to environmental knowledge

with field trips to gardens and farms. Through this practice with pre-service teachers, imagined possibilities for environmental attunement were materialised with students creating novel cross-curricular assessment for learning tasks that integrated and utilised the Australian Curriculum capabilities of Sustainability and Aboriginal and Torres Strait Islander Histories and Cultures (ATSIHC). Michael was rediscovering Ivan Illich, contemplating the rich multitude of possibilities of histories and purposes of health and physical education through time, and thinking about what we can learn from animals and multi-species in this endeavour.

While we accept that a person's surrounding conditions constitute part of what we are referring to as 'environment', we want to call for a more expansive and political approach to the concept. The Introductory paper of this Special Issue takes this up in more detail to examine how within the field of health and physical education the term environment is often used in a generalist sense to describe a particular context that could influence performance or participation. In Sport, Education and Society, articles have examined sports or athlete environments, or non-competitive environments (e.g. Dhillon et al., 2020), but few have examined the relationality of environment to pedagogy. The exceptions are Sanderud et al.'s (2020) work on Bildung

and children's perspectives on nature-play relationships in snow-covered playgrounds which examines the way movement memories are entangled in the geographical materiality of weather. Other examples include recent valuable scholarship on informal sport (O'Connor & Penney, 2021), exercise and the environment (Hitchings & Latham, 2017), eco-motricity (Pazos-Couto et al., 2021), outdoor education (Dyment & Potter, 2015; Quay, 2016) and sustainability (Truong, 2017), all of which has included notions of the environment and nature as a unique and important (yet often marginalised) intersection with movement and physical education. This collection of literature explores both long-standing issues in the field, particularly those related to the marginalization of outdoor education, and recent empirical developments in tracking changing social and cultural practices of health and sport participation. pointing out. There are many other publications that complement this area that can be consulted for inspiration. For example, eco-friendly exercise and recovery and therapeutic landscapes (Olafsdottir et al., 2017), the natural environment and physical activity and health (Jansen et al., 2017; Merchant & Wiltshire, forthcoming), equity in children's health issues, and research on access to green spaces. Space (Feng & Astell-Burt, 2017). Also, the Sustainable Development Goals (Barakat et al., 2016) and the framework of social, environmental and commercial determinants of health that address health equity, policy and promotion (Baum, 2007; Maani et al., 2020; Friel et al., 2011; Schwerdtle et al., 2020). The first article in this issue clarifies our position on environmental sustainability by outlining his four statements:

- We live in a world that is constantly changing and challenging established approaches to human and environmental health care (Patrick et al., 2015). Our attunement must focus on the premise that the environment shapes health and that human health depends on the natural world.
- Health, physical education, and environmental knowledge must be integrated through a holistic and participatory approach that recognizes changes in social and cultural

practices in both the built and natural environments. This includes, among other things, a sensitivity to narrative and place ontology. In particular, indigenous peoples and indigenous land ontologies like country and practices like Dadiri or deep listening to build emotional relationships of 'love, compassion and solidarity' (Atkinson, 2002) (Renshaw & Tooth, 2017).

This Special Issue on environmental attunement introduces seven papers that interact with a variety of various insights and practices of nature-subculture and embodied connections to area throughout fitness, recreation and bodily schooling. We have organised the papers into 3 topics that discover opportunities for: (i) notions of the surroundings and 'nature' in studies and exercise; (ii) opportunities and demanding situations of translating surroundings, sustainability and 'nature' from coverage and curriculum files into exercise; and (iii) philosophical and theoretical hyperlinks to emplaced and embodied mastering – past-present-future. These are never distinctive topics and readers will comprehend different styles of theoretical and empirical opportunity in addition to essential geographical and contextual nuances that want to be explored in addition. Because of this, we are hoping that this series conjures up in addition submissions via an prolonged name for papers that interact with the demanding situations and the opportunities of ways we'd method the complicated environmental, ecological, political and cultural elements that form fitness, recreation and bodily schooling in modern times.

Sports are closely tied to nature. Healthy sports require a healthy environment. For many athletes, this proximity to nature is a source of motivation and inspiration.

Sports facilities, events, activities and the manufacture of sporting goods have an impact on the environment. Energy use, air pollution, greenhouse gas and ozone depleting emissions, waste disposal, waste use and impacts on biodiversity are all issues that the sport community must address. UNEP has been actively involved in work on sport and the

environment for over ten years. UNEP is committed to: Use the popularity of sports to promote environmental awareness and care among the general public, especially young people. Promote the development of green sports facilities and the production of green sports equipment.

Six hours before each game, the researchers used fixed and mobile air quality monitors placed around the tailgate seat. Monitors recorded relative humidity, ozone, temperature, and carbon dioxide levels. A spike in air pollution was recorded when fans gathered three hours before his start of the game. The main culprits are charcoal grills, old generators and especially idling cars."It's kind of late to get to and from the event, so there's a lot of idling cars and clouds of air," Vans explained. We've seen a few games where it doesn't drop to low levels."

These pre-game pollutants were more than 20 times worse than acceptable levels for moderate air quality. Pollution levels also increased significantly as many fans left the game in their cars. Pollution inside the stadium does not appear to be affected by fan activity outside. The stadium itself produced excellent air quality. Both professional and college sports teams are working to reduce their environmental footprint by implementing sustainable practices, including solar panels at their facilities.

In North Carolina, for example, the Athletic Sustainability Council meets quarterly to review the latest metrics and explore ways to improve the environmental impact of Wolfpack sporting events. The council, which includes Bunds and Casper, was established in 2012 and

includes members from the Sustainability Office, Waste Prevention and Recycling, and Athletic Departments. An important advance for North Carolina State University is the installation of solar panels at Carter Finley Stadium. The nearly completed installation provides a significant opportunity for the university to reduce its environmental footprint and attract attention from both students and fans. The panels will be installed at the south end of the approximately 58,000-seat stadium atop the Murphy Center. Many professional sports teams also implement sustainable practices to reduce their environmental footprint. In the United States, the NFL's Houston Texans soccer team installed a 180 kW solar panel system in their stadium. The system will generate enough energy to power 22 households each year.

Conclusion

Taken together, the contributions in this special issue have taken various theoretical and empirical approaches to the concept of environmental sustainability in the fields of health, sport and physical education. All central topics of reader sports education and society. As noted in the abstract, there are many important geographical and contextual differences and similarities beyond this original collection that can be explored further. Therefore, we are responding to this first edition by expanding the call for papers to address the challenges and opportunities of how we can address the complex environmental, ecological, political and cultural factors that shape health. , hopes to inspire more diverse submissions...sports and sports practice in today's world.

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ENVIRONMENTAL EDUCATION AND THEIR STRATEGIES FOR DEVELOPMENT

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ABSTRACT

Environmental education is a dynamic process. The priority of such education is to develop cautious mind of people about their total surrounding. Its main task is to impart proper knowledge and training to solve various problems of our environment systematically. Environmental education should constitute a comprehensive lifelong education, one responsive to changes in a rapidly changing world. It should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values.

Keywords: Environmental education, Goals, Strategies for Environmental Education.

Introduction

The first environmental initiatives appeared about 200 years ago due to the need to rescue endangered species. Over time, reasons that have imposed nature protection have diversified. Since 1970 there have been clear signs of planet deterioration: Thinning of the ozone layer, global warming, acid rain, and water, air, and soil pollution. People began to understand the need to behave more responsibly towards nature, but the responsibility of man for the protection of the environment is both individual and above all collective: Nature protection engages mutual collaboration and support on the ground, local, county, national, and especially, international levels. Literature about environmental education (EE) defines it in multiple ways and, for the purposes of this research, we understand EE to be a collaboration of content and pedagogy that engages students in a study of the environment to “encourage behavioural change and action”.

In a UNESCO study from 1985, it is shown that students from several developed European countries have attitudes towards the highly developed environment, but the inclination to act to solve environmental issues or to be active in environmental organizations is very low.

The aim of environmental education is to teach and educate the public about the function of

natural environments and, particularly, how human beings can manage their behaviour and ecosystem. Akinci *et al*; from Turkey understood that in order to ensure the sustainability of education in the direction of the findings obtained, besides fulfilling the expectations of the economic sector, it is very important to determine and fulfil the expectations of the education students.

Proponents of environmental education have seen it as a movement which seeks to establish a new social order and promote the values which will hasten this change. As such it is more aligned with the social reconstructionist debate which saw schooling as changing rather than reproducing society. Such a view has continued with the 1987 World Commission on Environment and Development report arguing that the world’s teachers have a crucial role to play in helping to bring about the extensive social changes needed for sustainable development to be achieved.

The ongoing issues and challenges for the future of environmental education are numerous, but some points are clear. Firstly, the ‘environmental crisis’ won’t go away. Survey after survey indicates that there is sustained, and generally increasing, community concern about the state of the environment. Environmental groups, industry conflicts and political confrontations over the environment are a constant feature of media reporting. And the scientific community continues to remind

us that the environment is in a continuing state of degradation. Whether schools have as their curriculum focus social reproduction or reconstruction, the environment should be looming large in their agenda. There is some general agreement that confronting the environmental crisis requires dramatic changes in people's attitudes and behaviours towards the environment, and that education has a key role in achieving these changes.

Goals of Environmental Education

- To foster clear awareness of and concern about economic, social, political and ecological interdependence in urban and rural area.
- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment and
- To create new patterns of behaviour of individuals, groups and society as a whole towards the environment.

Objectives

- Awareness : to help social groups and individuals acquire an awareness of and sensitivity to the total environment and its allied problem.
- Knowledge : to help social groups and individuals gain a variety of experience in and acquire a basic understanding of, the environment and its associated problems.
- Attitudes : to help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.
- Participation : to provide social group and individuals with an opportunity to be actively involved at all levels in working toward resolutions of environmental problems.

Guiding Principles of Environmental Education

- Consider the environment in its totality, natural and built technological and social structures.

- Environmental education to be a continuous lifesaving process.
- Environmental education to be interdisciplinary in its approach.
- Examine major environmental issues from local, national and international point of view.
- Environmental education to focus on current and potential environmental situations.
- Promote the values and necessity of local, national and international cooperation in the prevention and solution to environmental problems.
- Explicitly consider environmental aspects of plan for development and growth.
- Enhance the position of learners in making decision concerning their environment and accept responsibility.
- Education from the environment Education about the environment and Education for the environment.
- Enable learners to discover symptoms and real and potential causes of environmental problems.
- Enhance the learner's ability to develop critical thinking and problem solving skills.
- Utilize different learning environment and approaches to learning/teaching about and form of the environment with emphasis on first hand information.

Strategies for Environmental Education

Authorisation

For the incorporation of EE into education process it is process it is essential to establish the needed mandate or authorisation and responsibility for educational institutions to abide with. Without authorisation and responsibility, Environmental Education will stay a peripheral subject or activity and it may never be established as a needed part of core of education curriculum for students and teachers. The formulation of the mandate and guidelines for environmentalisation of education may be achieved by a high level education committee. This committee has to be assigned by the

decision makers at the highest level.

Curriculum Renewal

- To examine the curriculum of the primary and middle schools and identify the environmental education concepts already covered so that it could serve as one of the basis upon which the environmentalisation of school curriculum could be based.
- To identify local environmental problems, additional EE contents required, appropriate activities, time needed for different subjects and topics, instructional methodologies, appropriate instructional techniques.

Teacher Training Renewal

There is urgent need to renovate teacher training with the incorporation of environmental education. It is the teacher who makes a curriculum function. This can be done if the teacher is trained through pre service and in service programmes. If teacher can train in EE they can also help in formulation and development of suitable curriculum and teaching materials referred to earlier. The involvement of teacher in curriculum and materials renewal will lead to teachers commitment and responsibility for the effective implementation of the curriculum and teaching materials. Teachers should be trained through in-service and pre-service environmental education programmes.

Teaching Methods

Teaching method that can be used in environmental education are lecture, demonstration, discussion, field trips, projects, games, stimulations, debates, case studies, competitions, exercises and laboratory work. One or more methods may be opted for that may match and facilitate/learning of a curriculum element.

However, EE advocates the use of the environment as a living laboratory in the teaching/ learning process at all levels of education. This approach has its unique place in education if learning by doing is opted for as a teaching method and strategy.

Evaluation

Evaluation in this context is the process of

finding out if environmental education objectives in the context of teaching/learning have been fulfilled. Results of an evaluation are feedback indicating the achievement and weakness of the student and the productivity of the efforts of the teachers. Evaluation instrument in education may be revised and renewed to accommodate environmental questions based on objectives and contents of environmental education that have been incorporated into education.

Educational Implications

Teacher (independent of gender differences) can play an important role in educating their students about environment, which is possible only when the teacher themselves have the necessary level of environmental education awareness. This suggests the need for introducing and enriching environmental education programmes in both in-service and pre-service elementary teacher education programmes. More effort has to be implemented to encourage female teachers as they get fewer opportunities than their male counterparts for performing and participating in environmental activities and actions. A possible future study would be to compare gender differences along with the area to which they belong as well as their age.

Conclusion

Environmental education is a dynamic process. The priority of such education is to develop cautious mind of people about their total surrounding. Its main task is to impart proper knowledge and training to solve various problems of our environment systematically. In order to enable people to enjoy good health and a high quality of life, it is vital to prevent harmful effects to human health or damage to the environment caused by pollution of air, water and soil, noise, vibration, noxious smells etc. Environmental Education is a methodology in which people pick up familiarity with their surroundings and secure learning, abilities, values, experiences, and passion, all of which will empower them to act separately and aggregately and to take care of present and future environmental issues. It is the study of relationship and interactions between natural

and human systems. Environmental education should constitute a comprehensive lifelong education, one responsive to changes in a rapidly changing world. It should prepare the individual for life through an understanding of

the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values.

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ECOFEMINISM IN THE SELECTED NOVELS OF ARUNDHATI ROY AND ANITA NAIR

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ABSTRACT

Ecofeminism is a term that is concerned with the interconnection between the domination and exploitation of women under paternal society. Selected Indian women writers are considered for analyzing their treatment of women as well as nature in their fictional writings. Ecofeminists point out that women and nature are often shown as anarchic and illogical, while men are described as rational and ordered thereby having the capability to control both women and nature. The main objective of the paper is the survey of how women and nature are dealt with in the novels of Indian women writers. It also focuses on how women of various social, economic and cultural backgrounds interacted with their environment. The aim and main objective of the present study is analysis and interpretation of the textual and conceptual essence of ecofeminism in brief in the selected novels of 'The Better Man, and Mistress' by Anita Nair and Arundhati Roy's latest novel 'The Ministry of Utmost Happiness'. To achieve this, it is essential to explore relevant ecofeminist theories and perspectives through a thorough and vast literature survey.

Keywords: environment, exploitation, anarchism, exploitation, ecofeminism.

Introduction

In the context of India or any other developing nation, ecofeminism is vital to unveil the exploitations and attack over our ecology and its resources by the developed countries in the name of globalization, urbanization and development. In the same way, gender issues can be questioned and analysed by looking into our relationship towards nature, other living being and the opposite sex. The marginalized are the first victims of any form of disasters; therefore, analyzing this connection is essential. Marginalization geometrically increases to form a multiple layered structure when some of the combinations like women, children, disabled, poor, black and dalit intersect. Vandana Shiva in her book, *Staying Alive: Women, Ecology and Survival in India*, criticizes the western ideology of development and its negative impacts on both women and nature in the third world countries.

In the book *Ecofeminism*, Vandana Shiva and Maria Mies criticize the existing theories and practices and propose practical as well as ideological ecofeminist perspectives rooted in sustainability to practice in everyday life. Ecofeminism is based in literature also. Ecocriticism and feminist literary criticism

have contributed to the linguistic as well as literary aspects of theories and ideologies in literature. Ecofeminist literary criticism is not new, but still it is at a formative stage, especially in the context of post-colonial literature. Arundhati Roy's *The Ministry of Utmost Happiness* and Anita Nair's *The Better Man, and Mistress* consists of numerous level narratives ranging from ancient history to the present time through flashbacks. It examines various environmental and feminist issues.

This study attempts to focus on the selected novels of Anita Nair and Arundhati Roy's, which are written on the premise that not only empowerment of women is the ultimate but essential necessity also. The novels raise the basic issue of the impact of attack (social, political, economic and psychological) on women and the environment, in an ecofeminist view. It seeks to bring out the major ecofeminist theories, especially in the Indian context and tries to analyse the novels with the light of that. This research area is not extensively researched so far. It is, thus, a fresh and original area to be explored. The present research work is interdisciplinary in character, and its scope is actually wide.

Objectives

To investigate the evidence of ecofeminism in “The Ministry of Utmost Happiness”, The Better Man, and Mistress .

To examine whether or not narratives by Arundhati Roy manifest and even contest the ways, ecofeminist perspectives are spoken about and theorized.

To analyze Indian female characters and their life in Indian society.

To study aspects of womens’ liberation by preserving their value and dignity in Anita Nair’s novels.

Review of Literature

Ecofeminism as an ideology and movement finds that the oppression of women is interlinked to the oppression of nature with the same masculine centered attitudes and practices linked to the patriarchal society. The eminent French feminist Françoise d'Eaubonne while coining the term “ecofeminism” in her 1974 book *Feminism or Death* has explained the important role of feminism in addressing environmental and gender issues. Gradually, it has grown out of the definition of mere women and environment. The late 20th century has identified Ecofeminism as a movement that speaks for women, environment and all the marginalized groups, including queers. There are three major wings of ecofeminism, which are of prime importance in defining the connection between woman and nature. Cultural/Spiritual Ecofeminism emphasizes on the natural connection between women and nature as exclusive and unique and supports the concept of “Mother Earth” and “femininity of nature”. They argue that traditional wisdom of preserving and protecting nature as well as respecting women should be practiced in our contemporary society. Vandana Shiva describes in her book *Staying Alive: Women, Ecology and Survival in India* that “Forests have always been central to Indian civilization. They have been worshiped as Aranyani, the Goddess of the Forest, the primary source of life and fertility, and the forest as a community has been viewed as a model for societal and civilizational evolution. The diversity,

harmony and self-sustaining nature of the forest formed the organizational principles guiding Indian civilization; the *aranyasamskriti* (roughly translatable as 'the culture of the forest' or 'forest culture') was not a condition of primitiveness, but one of conscious choice.” (Shiva, 53) Mary Daly, who is a radical lesbian feminist, in her much critically acclaimed book *Gyn/ecology* analyzes the concept of femininity, its origin and roots. She explains, with the help of theology, how notions of virtuous womanhood have arrived and perpetuated which forms the basis of patriarchy. Susan Griffin and Starhawk write on the spiritual woman-nature connection. Constructivist ecofeminists like Simone de Beauvoir and Sherry B Ortner reject the essential connection of women and nature by stating that the connection is a mere social creation and not natural. They emphasize the essentialist and negative impact of connecting women with nature as this could alienate her from culture by widening the man-woman and culture-nature binaries. In her book *The Second Sex*, Simone de Beauvoir points out how man is equated with culture and women, nature, animals etc are separated from it.

Socialist ecofeminism stands somewhere in between Cultural and Constructivist ecofeminism. It neither accepts or rejects the natural connection between women and nature, by de-emphasizing the connection. Socialist ecofeminists, like Karen J Warren and Maria Mies, focus on the critical analysis of the western philosophies of “development”. Maria Mies writes about this nature-culture dilemma:-

“Since the Age of Enlightenment and the colonization of the world the White Man’s concept of emancipation, of freedom and equality, is based on dominance over nature, and other peoples and territories. The division between nature and culture, or civilization, is integral to this understanding. From the early women’s movement up to the present, a large section of women has accepted the strategy of catching-up with men as the main path to emancipation. This implied that women must overcome within themselves what had been defined as nature, because, in this discourse, women were put on the side of nature, whereas

men were seen as the representatives of culture.” (Mies, 65)

In the novel, *The Ministry of Utmost Happiness* Roy explores the environment degradation and the plight of women and their conflicts with the outside world. She has depicted a series of shattered stories revolving around different characters, multiple issues, concerning self and society, and highlighting the sufferings of natural habitat and women who have been denied access to education, equal rights, right to work and freedom to choose for a long passage of time. Roy describes a transwoman, Anjum, a ‘dual being’ swinging between hope and despair is one of the so-called ‘others’ in society. Transgender people are the individuals who identify their roles as the opposite of their biological sexes and their behavior differ from the stereotyped gender norms. Roy deals with many such characters with complex gender history. Roy, with the central character Anjum born Aftab with partial female sex organs together with the male, manifests a journey of self-discovery in which the social structures of normality and otherness are revealed. Anjum who is an intersex, with both male and female crotch, leaves her mother, Jahanara Begum baffled who expected a son but the birth of a hermaphrodite was less acceptable by the father, Mulaqat Ali who tries to modify Anjum’s biological sex organ into the male organ which is against the nature and contemplates this would bring shame on the rest of the family. According to him, a person who is perceived by the majority of people as a traditional man should act like one. “He chose to sever all ties with his son. He never met Anjum...Occasionally they would pass each other on the street and would exchange glances, but never greetings” (Roy 25).

Indian patriarchal society remains a society where traditional values, orthodoxy, social circle and social expectations construct a significant role of an individual’s identity. Additionally, concepts such as disgrace and honour plays an important role in all frames of references and social obligations in order to protect the family’s honour also comprise gender performance.

The novel deals with the modern people torn between society norms. Roy incarnates the place of women in the aforesaid society who believes that women are subject to violence and can be moulded accordingly. There are rigid gender roles, where women are liable to have a passive role and husband an active dominating role. Marriage and motherhood are the major status roles for women. The husband-wife relationship has been taken up to uncover the exploitative leanings of the patriarchal society in which male play the dominating role and proves that man has not yet evolved and are still animals. Even after emerging as a rebellion against their exploitation, women have to compromise for the sake of solidarity of the family.

Roy asserts the social, economic, political and cultural conditions of the Adivasi women highlights the fact that until the exploitation and oppression of the landholders, industrialists and the imperialists ends and the patriarchal oppression is controlled, Adivasi women cannot be liberated. Both these struggles have to be practiced mutually by men and women.

Anita Nair is a Bengaluru settled writer and ex-columnist from Kerala. She has published various novels, short stories, collections of poems, children’s stories and travelogs. She is well known for her novel *Ladies Coupe* (2001), which was translated into more than twenty-five languages all over the world. It narrated the lives of six women who happened to share a coupe in a railway compartment. Her major novels on women, environment and empowerment that I have taken for the present paper are her first two novels, namely *The Better Man* (2000), and *Mistress* (2005) which are majorly written in the premise of Kerala like Sarah Joseph’s works.

The Better Man is Anita Nair’s first novel and narrates the story of Mukundan, who after retirement from Government service, has come back to his native place in Kerala. The novel records his voyage through memories, regrets and revelations. He takes back his old house where all his childhood memories lay and makes Bhasi, an outcast painter, to help him with the renovation, which starts questions on

his evolution to become a better man like his father. Anita Nair's character portrayal, expressions and plot make the novel rich and earthy. The novel also focuses on one's connection to his/her land and legacies and the attachment which continues for a lifetime. The major female characters in the novel, their controlled and exploited life, their yet achieved boldness and actualization are narrated along with the insecure and confused life of Mukundan. Anita Nair, as a person, believes that there is no particular connection between women and nature that men do not possess. She, ideologically, does not support any kind of essentialism, but feels that women are more affected by both the positive and negative impacts of nature. According to her, "Whether it is environmental protection or anything, women are the primary agents of change. Whatever rules are made, ultimately, women are the practitioners of change as they are engaged with the daily aspects of life on a daily basis.....Women, whether they belong to rural or urban areas, they can initiate change." (Krishna and Jha, 148)

The novel *Mistress* roams around the contradicting and complimentary life situations of travel writer Christopher Stewart, a Kathakali dancer whom he meets in Kerala named Koman, and the niece of Koman, Radha, who happened to be locked up into the traditional housewife's role. Stewart's and Radha's affection for each other, the perplexed situation of Radha's husband Shyam and Koman's life story and his relationships, are slowly revealed in the story. The novel repeatedly questions paternity ranging from Stewart to the unborn child of Radha. Written against the background of Kathakali, repressed emotions of characters are shown through Navrasas or the nine emotions of Kathakali in the novel. Simone de Beauvoir in her famous book, *The Second Sex*, analyzes the social identification of women as the Other. The title of the novel "Mistress" itself states the dubious

status of a woman who is opted out from the prime position. The three major female characters in the novel namely Saadiya, Angela and Radha who belong to different time and space, yet connected to one another, as they can be roughly introduced as Koman's mother, Chris mother/Koman's ex-girlfriend and Koman's niece/Shyam's wife respectively, are getting affected by the shift of environment from their natal place to marital life. But they deserve their distinctive identity that is not essentially attached to these titles in the novel. While defining them, it is crucial to comprehend how their identity as women in the society, devoid of space and time, is inevitable in analyzing their actions and reactions. Saadiya was too young and capable of opting life to death. Angela managed not to lose grip out of her life, because she was emotionally and intellectually balanced. And Radha never cared for society or anyone else. She married Shyam just to get away from the memories of her old love. But her education, experiential wisdom with age, and comprehension of self-actualization, enable her not to take life as it comes. Here, Radha's individuality overpowers her female insecurities constructed by society.

Conclusion

Arundhati Roy and Anita Nair are not only finely interweaving various ecofeminist and feminist theories in their novels, but also seeking possibilities and solutions for empowerment of women and environment. They clearly presented before us the irreparable aftermath that can germinate from the oppression of women and nature and spread to the future like a terminal disease, which can put the whole development and technology that man has created till this date, into question. They also suggest that only through changing our day-to-day relationships as well as activities towards more harmony and sustainability, can we contribute to both the well-being and overall empowerment of the whole ecological system.

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AN ECO-FEMINIST PERSPECTIVE & CHIPKO MOVEMENT

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ABSTRACT

The word eco-feminism denotes the concept of connecting aspects of environmental issues and feminism. The contribution of women in resolving issues regarding environment at large scale. This movement is differentiating from any other movement. This connection draws the attention towards the united struggle about sustainable development, protection and preservation of environment. In this context Chipko Movement in 1973 was a major milestone in the history of environmental movements and feminism. A major effect of the Chipko movement was that it forced and prompted the Union government to amend the Indian Forest Act, 1927, and introduced the Forest Conservation Act 1980; this movement indicated the close relation between environment and women. This remarkable participation of women in the movement proved that bypassing the womanhood; women are against the damage of environment is a feminist issue which is one of the most urgent social issues worldwide today. Hence this discourse aims to show the role of Chipko Movement in the promotion of eco-feminism.

Keywords: Chipko Movement existence Feminism, Eco-Feminism, Environment, Movement, suppression.

Review of Literature

The research articles of Vandana Shiva who is an environmental activist and ecofeminist is referred. Secondly the Chipko Movement and Khajadi village movement is observed from <https://www.mindbodygreen.com>. The article on Chipko Movement all about Andolan' published in India today.in.

Introduction

In the history of Environmental movement Chipko movement is the initiative to protect and preserve the beauty of environment. The way of the movement is silent and non-violent protest. This movement was led and monitored by her they literally stickled to the hugged trees and interposed their bodies between the trees and loggers to prohibit cutting natural element and stopped the deforestation. The widely participation of women in this movement was broadly accepted by the social scientist, scholars. They differentiated this movement from others movement. This movement was remarkable for step of woman towards the environmental consciousness. Ecofeminism and Chipko movement and have been related each other. The fundamental aim of the movement as the prevention to the exercise in the following lines from a famous poem by Raturi the folk –poet involved in the

themovement

'Embrace the trees in the forests

And save them from being felled!

Save the treasure of our mountains

From being looted away from us!!'

A Glance on History of Chipko Movement

The Chipko movement has its birth in the region of Himalayan of Uttarkhand in 1973 and later largely spread through the Himalayan on the bank of Bhagirithiriver in India. The Chipko is hindi word has its meaning to hug or stick. This was the primary practice to embrace the trees. They wanted to protect the trees from commercial timber cutters who intended to cut and sell the woods to urban companies. The movement followers embraced the trees and interrupted the axe men. After the Utterpradesh it was also located in the western part of Nepal. The people had free entry to the forest and allowed to use its wealth for general usage upto 1821.the problem was rendering from the colonial period. After the 'trial settlement' there was beginning of controlling over the forest area by the Government authorities. In 1962 the dispute of Indian - Chinese border was compromised, network of roads was constructed in overall the region. An extensive environmental demolition brought by road

building and other necessary amenities on the roadside. It resulted the enormous erosion of soil water sources and forest other forest products by labor crews and military units Asia's largest earth-filled dam the Tehri Dam, is being structured on the Bhagirathi River. Due to these constructions ten thousand acres of agricultural land is being used and near about forty thousand people became homeless. As commercial development took place outside entrepreneurs had opportunities for profit. The holy places like Badrinath, Kedarnath, Gangotri, Jumnotri, and other places auspicious to Hindus made to travel and the mass tourism taxed the capacity of the Himalayan environment heavily by populating the pilgrimage. The foreigners had fist of mountain climbing Snow views, trekking, hunting, fishing, etc. the localities became wage less sometimes they had small incomes due to illiteracy and low standard of living etc. In this process actually the women were main victims of this de-forestation. They were strongly willing to go against this activity. They became united and organized in smaller groups and tightening their wrist to oppose commercialization that made their livelihood uncomfortable. In October 1971 the activist from Sangh held strong march and demonstration in Gopeshwar contrary to the policies the Forest Department. In the month of March the gang of woodcutters came at Gopeshwar they were threatened by beating drums and shouting slogans to go back. this the first step of confrontation of the movement, the agreement of cutting was cancelled at the local place afterward the same company was awarded more ash trees, in the Phata forest, 80 km away from Gopeshwar. But local opposition was strong they retreated after couple of days. To tackle such calamities the villagers of Phata and Tarsali founded a vigilance committee and looked over the trees till December, this was the successful stand by the villagers. On March 26, 1974, the lumbermen arrived to cut the trees at Reni village. The men of this village and DGSS workers were in Chamoli, distracted by state government and contractors. This incident was observed by small girl and informed to Gaura Devi leader of MahilaMangal Dal at Reni

village. She united the 27 women and reached to the site and resisted the loggers. The news was in the nearby villages and people joined the movement including Henwalghati. The contractors was convinced the activist but it was in vain. Soon they left the villages with empty hands. This incident was notified by Chief Minister, HemwatiNandanBahuguna and formed committee to look the issue and the decision was inclined to local people. This act was a turning point in the history of eco-development struggles in the region and around the world.

Nature of Movement

The social movements sometimes bring the changes in society or change in the social institutions. The Chipko movement fulfilled both the purpose it was an ecological movement related with the conservation and preservation of forest from which the heritage of nature and natural balance in sub-Himalayan region where the relation between villagers and environment settled in positive way. So the hilly people strive to maintain the conventional and harmonious relationship in environment and society. Apart from this women also demanded the equal opportunity in each sector whether in decision making process along with men as they became bold and dared. It was change for existed male dominated society. The Satyagraha was strategy in this movement the women /villagers silently resisted to protect the environment .hence it is the very crucial movement in the history of Indian movement.

Ecofeminism and women's movement

The term Ecofeminism coined was the seventies by the French author and feminist Francoise'Eaubonne (<https://www.britannica.com>)which study the correlation between women and nature. in 1974 she denoted the term in her book *Le Feminismeou la Mort*. '*It is movement that observes a connection between the exploitation and degradation of nature and its element and subordination and suppression of women it emerged in the mid -1970s along with feminism and green movement*'. It is natural that man is the representative of nature/culture; male

domination over the natural wealth is ancient as such women got a secondary place in society equated with nature. But Vandana Shiva (1989) stated that women have special concern to the environment through the daily interconnection with it. Vandana Shiva was very active role in Chipko Movement and started ecology movement by volunteering in the movement .the male migration from the hilly area has the motto ot serve in the armed forces and other jobs. Women looked after to the farm /land. In 1970 the Forest Department announced an auction of almost 2500 trees in the Reni forest overlooking the Alaknanda River, which had flooded in the same year. The women Gaura Devi who took initiatives to protect the trees she strongly opposed the authority and contractors by organizing the women from her village and demonstration had been done by women. As result the Government ordered a 10-year ban on all tree-felling in an area of over 1150 km afterward it was located at atParsari (Joshimath) in August 1979, and at DongriPaintoli in February 1980, women took the lead in Chipko demonstrations and saved forests from felling ((1989) was due to absence of men folk and DGSS activists. Shobita Jain was considered this movement as feminist movement due to spontaneous participation of women and absence of men. Some scholars have claimed that this movement was totally directed and controlled by women sorole of men in leadership was and underreported. But in Reni village there were no men in the village around to do so. In Dongri and Paintoli, the picture was different there; the decision had been taken in the absence of men, the women stood up against decisions made by their own men. Although they faced opposition from men, they did not have voice to oppose them.

The women from Chamoli recognized the importance of trees and the felling of trees is harmful to their well-being, and they simply

acted according to that belief. They sang their folk songs and stick to the trees. As there was the interaction with government officials men are convinced due to great powers of the Government The women were inspired and had deep impact because the women had responsibility of cultivation and the gathering of fodder, fuel, and water, tasks made much more time-consuming as the forests became denuded.

In Jodhpur, Rajsthan the women and some men from Bishnoi community had laid down their lives for Khajadi trees in Khajadli Village. The King ordered to cut the trees for use at fort. The movement was headed by Amrita Devi. She embraced the tress with her three daughters the order was passed by the Diwan soldiers hacked their heads. After this incident one by one villager came forward to save the Khajadi trees. After this the unity of Bishnoi community organization became strong and active. In this 363 villagers devoted their lives to preserve the trees. This movement was started and monitored by lady united with other women of village. They were very conscious about the natural element and other sources.

Conclusion

The Chipko movement is acclaimed for the participation of women in the huge number and important factor to Ecofeminism in the absence of men at Reni village. Their indigenouse struggle and courage inspired them to spread the movement to their parts of region though they faced the strong opposition from the authorities and woodcutter contractors. The dependence and attachment of women towards nature is incomparable. This makes more consciousness and aware about nature. This resistance and collective protest of women is social practice of spontaneous rural outburst to avoid and eliminate all the forms of domination and other overpowered institutions hanging over them from ages to ages.

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NATURAL RESOURCE MANAGERMENTS

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Introduction

Natural resource management (NRM) is the management of natural resources such as land, water, soil, plants and animals, with a particular focus on how management affects the quality of life for both present and future generations. Natural resource management deals with managing the way in which people and natural landscapes interact. It brings together natural heritage management, land use planning, water management, biodiversity conservation, and the future sustainability of industries like agriculture, mining, tourism, fisheries and forestry. It recognizes that people and their livelihoods rely on the health and productivity of our landscapes, and their actions as stewards of the land play a critical role in maintaining this health and productivity.

Natural resource management specifically focuses on a scientific and technical understanding of resources and ecology and the life-supporting capacity of those resources. Environmental management is similar to natural resource management. In academic contexts, the sociology of natural resources is closely related to, but distinct from, natural resource management.

Natural resource management issues are inherently complex and contentious. First, they involve the ecological cycles, hydrological cycles, climate, animals, plants and geography, etc. All these are dynamic and inter-related. A change in one of them may have far reaching and/or long term impacts which may even be irreversible. Second, in addition to the complexity of the natural systems, managers also have to consider various stakeholders and their interests, policies, politics, geographical boundaries and economic implications. It is impossible to fully satisfy all aspects at the same time. Therefore, between the scientific complexity and the diverse stakeholders,

natural resource management is typically contentious.

After the United Nations Conference for the Environment and Development (UNCED) held in Rio de Janeiro in 1992, most nations subscribed to new principles for the integrated management of land, water, and forests. Although program names vary from nation to nation, all express similar aims.

The various approaches applied to natural resource management include:

Top-down (command and control)

Community-based natural resource management

Adaptive management

Precautionary approach

Integrated natural resource management

Ecosystem management

Community-based natural resource management Edit

The community-based natural resource management (CBNRM) approach combines conservation objectives with the generation of economic benefits for rural communities. The three key assumptions being that: locals are better placed to conserve natural resources, people will conserve a resource only if benefits exceed the costs of conservation, and people will conserve a resource that is linked directly to their quality of life. When a local people's quality of life is enhanced, their efforts and commitment to ensure the future well-being of the resource are also enhanced. Regional and community based natural resource management is also based on the principle of subsidiarity. The United Nations advocates CBNRM in the Convention on Biodiversity and the Convention to Combat Desertification. Unless clearly defined, decentralised NRM can result in an

ambiguous socio-legal environment with local communities racing to exploit natural resources while they can, such as the forest communities in central Kalimantan

A problem of CBNRM is the difficulty of reconciling and harmonizing the objectives of socioeconomic development, biodiversity protection and sustainable resource utilization. [The concept and conflicting interests of CBNRM, show how the motives behind the participation are differentiated as either people-centred (active or participatory results that are truly empowering) or planner-centred (nominal and results in passive recipients). Understanding power relations is crucial to the success of community based NRM. Locals may be reluctant to challenge government recommendations for fear of losing promised benefits.

CBNRM is based particularly on advocacy by nongovernmental organizations working with local groups and communities, on the one hand, and national and transnational organizations, on the other, to build and extend new versions of environmental and social advocacy that link social justice and environmental management agendas with both direct and indirect benefits observed including a share of revenues, employment, diversification of livelihoods and increased pride and identity. Ecological and societal successes and failures of CBNRM projects have been documented. CBNRM has raised new challenges, as concepts of community, territory, conservation, and indigenous are worked into politically varied plans and programs in disparate sites. Warner and Jones address strategies for effectively managing conflict in CBNRM.

The capacity of Indigenous communities to conserve natural resources has been acknowledged by the Australian Government with the Caring for Country Program. Caring for our Country is an Australian Government initiative jointly administered by the Australian Government Department of Agriculture, Fisheries and Forestry and the Department of the Environment, Water, Heritage and the Arts. These Departments

share responsibility for delivery of the Australian Government's environment and sustainable agriculture programs, which have traditionally been broadly referred to under the banner of 'natural resource management'. These programs have been delivered regionally, through 56 State government bodies, successfully allowing regional communities to decide the natural resource priorities for their regions.

More broadly, a research study based in Tanzania and the Pacific researched what motivates communities to adopt CBNRM's and found that aspects of the specific CBNRM program, of the community that has adopted the program, and of the broader social-ecological context together shape the why CBNRM's are adopted. However, overall, program adoption seemed to mirror the relative advantage of CBNRM programs to local villagers and villager access to external technical assistance. There have been socioeconomic critiques of CBNRM in Africa, but ecological effectiveness of CBNRM measured by wildlife population densities has been shown repeatedly in Tanzania.

Governance is seen as a key consideration for delivering community-based or regional natural resource management. In the State of NSW, the 13 catchment management authorities (CMAs) are overseen by the Natural Resources Commission (NRC), responsible for undertaking audits of the effectiveness of regional natural resource management programs.

Gender-based natural resource management Edit.

Social capital and gender are factors that impact community-based natural resource management (CBNRM), including conservation strategies and collaborations between community members and staff. Through three months of participant observation in a fishing camp in San Evaristo, Mexico, Ben Siegelman learned that the fishermen build trust through jokes and fabrications. He emphasizes social capital as a process because it is built and

accumulated through practice of intricate social norms. Siegel man notes that playful joking is connected to masculinity and often excludes women. He stresses that both gender and social capital are performed. Furthermore, in San Everest, the gendered network of fishermen is simultaneously a social network. Nearly all fishermen in San Evaristo are men and most families have lived there for generations. Men form intimate relationships by spending 14 hour work days together, while women spend time with the family managing domestic caretaking. Siegel man observes three categories of lies amongst the fishermen: exaggerations, deceptions, and jokes. For example a fisherman may exaggerate his success fishing at a particular spot to mislead friends, place his hand on the scale to turn a larger profit, or make a sexual joke to earn respect. As Siegel man puts it, "lies build trust." Siegel man saw that this division of labor was reproduced, at least in part, to do with the fact that the culture of lying and trust was a masculine activity unique to the fisherman. Similar to the ways in which the culture of lying excluded women from the social sphere of fishing, conservationists were also excluded from this social arrangement and, thus, were not able to obtain the trust needed to do their work of regulating fishing practices. As outsiders, conservationists, even male conservationists, were not able to fit the ideal of masculinity that was considered "trustable" by the fishermen and could convince them to implement or participate in conservation practices. In one instance, the researcher replied jokingly "in the sea" when a fisherman asked where the others were fishing that day. This vague response earned him trust. Women are excluded from this form of social capital because many of the jokes center around "masculine exploits". Siegel man finishes by asking: how can female conservationists act when they are excluded through social capital? What role should men play in this situation?

Adaptive Management Edit.

The primary methodological approach adopted by catchment management authorities (CMAs) for regional natural resource management in Australia is adaptive management.

This approach includes recognition that adaptation occurs through a process of 'plan-do-review-act'. It also recognizes seven key components that should be considered for quality natural resource management practice:

Determination of scale

Collection and use of knowledge

Information management

Monitoring and evaluation

Risk management

Community engagement

Opportunities for collaboration

Integrated natural resource management Edit

Integrated natural resource management (INRM) is the process of managing natural resources in a systematic way, which includes multiple aspects of natural resource use (biophysical, socio-political, and economic) meet production goals of producers and other direct users (e.g., food security, profitability, risk aversion) as well as goals of the wider community (e.g., poverty alleviation, welfare of future generations, environmental conservation). It focuses on sustainability and at the same time tries to incorporate all possible stakeholders from the planning level itself, reducing possible future conflicts. The conceptual basis of INRM has evolved in recent years through the convergence of research in diverse areas such as sustainable land use, participatory planning, integrated watershed management, and adaptive management. INRM is being used extensively and been successful in regional and community based natural management.

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ENVIRONMENTAL IMPACT AND AWARENESS

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ABSTRACT

Man is a dominant organism of most ecosystems. He controls and modifies environments more extensively than any other organism. In fact, man is changing natural environment due to his intervention and attempt to become master of the planet earth. Several man-made activities such as, colonization, urbanization, industrialization, mechanized agriculture, mining, transportation and technology have seriously affected the natural environment. Deforestation provided land for agriculture and rural inhabitation. The rural land has been converted into urban settlements and open spaces are fast vanishing. The mass scale destruction of flora and fauna has become detrimental to ecological balance. Many environments throughout the world have been rendered barren and made unfit for survival of organisms. Under the name of economic development man has been altering the environment. Because of his numerous ecological resources like air, water space, minerals, vegetation, wild life etc. the modern civilization has to face many serious ecological problems. Man has already started facing problems such as energy crisis, pollution, land use, flooding, erosion, population growth urbanization etc. today, it is quite clear that these man-made activities have disturbed ecological balance of biosphere. There is, therefore, need to identify the areas and causes of the degradation of environment and their consequences that have occurred over the years, so as to take steps to preserve the heritage of mankind and live in harmony with the environment.

Keywords: Environment, ecosystem, Industrialization, Agriculture, Nature etc.

Introduction

The early human being was a nomad. He spent a major portion of his time in search of food. He was close to nature because his existence depended directly on plants and animals. He, then made the leap from hunting and food gathering to farming and creating conditions of living in small village communities. He tried to replace the natural biological communities to suit his requirements. He cut down a number of forest trees, shrubs and grasslands. These man made open places formed new biological communities. He developed agriculture in these places and in due course of time, these were turned into fields, road etc. in terms of human actions. Man is all the while replacing the various vegetations by new ones which he fields to be more suitable, useful and profitable, in the changing environments. He has also succeeded in changing the natural water relations and sources by way of irrigation and by building up huge dams like Bhakra Nangal, Kpyana etc. Along with the farming, man has domesticated a variety of animals

like cows, buffaloes, sheep, goat for his benefits. Because of these animals, the problem of overgrazing. has resulted in the destruction of forests, grasslands, disappearance of more palatable plants species etc.

Material and Method

Protection and proper use of environment is properly maintained by Ayurvedic science. Environmental factors like soil, atmosphere, humidity, temperature are precious and plants are equal to god as per Ayurveda. Living organisms should be protected, peaceful and cleanly leaving. It is desirable to have an idea of the possible impacts of any developmental plan it is going to have on our environment. Fortunately, adequate legislation could be brought into force to make proper assessment of all such environmental impacts.

Result and Discussion

Development, agricultural and industrial in particular lies at the nation. For a nation to progress socially, economically as well as politically development processes in

different fields are very necessary. This has been true and the super powers could do this at tremendous rates, the third world in the process of such developments. This is one side of the coin. Let us also have a look to another side of the coin. What are the costs of such development, not in terms of money but equally or rather more valuable in terms of its impact on our environment. The two ie. Development and environment are inseparably linked to each other. Any development process is bound to have its impact on the environment.

If we trace the history of human being, it should be clear that there had tremendous environmental impacts of industrialized societies. Agriculture, industry and meaning had very harmful impacts on our environment. Such impact lead to degradation of our land, forests, water, air and biological diversity by release of noxious chemicals and other factors.

Industrialization had been a mixed blessing. There was considerable economic growth and increase in GNP per capita and overall standard of living. However, all the development had been at a tremendous environmental cost. Man has virtually reached a stage when natural resources could not be exploited further and development will have to be achieved without destruction of environment.

In our country, in the post-independence period, our ideas were dominated by developmental growth and we did not have a culture of pollution control. Even late Pandit Jawaharlal Nehru wrote in 1957 "we have many large-scale river. Valli Valley projects which are carefully work out by our engineers. I wonder however, how much thoughts is given before the project is launched, to having an ecological survey of the area and to find out what the effect would be to the drainage system or to all flora and fauna of that area. I would be desirable to have such an ecological survey of these areas before the project is launched and thus avoid and imbalance of nature. The total insensitivity at the bureaucratic administrative level, which persists Still, has

given the nation a very heavy backlog of pollution and ecological degradation. They look immediate money in destruction of environment, and not in conserving it. We must reverse this picture .There is huge backlog of our 40 years of negative environmental impacts of developmental work. These are to be set right.

The objective of environmental impacts assessment (EIA) is to ensure that development is sustained with minimal environmental degradation. Adverse on environment is sought achieved by incorporating suitable measures in the project. The ministry of environment and forests, Govt.of India has been assigned the responsibility for appraisal of projects with regard to their environmental implications. Impact assessment of all developmental projects has to be made. The projects in various sectors, brought under the Purview of such so far are:

Major irrigation projects (covering 10,000 ha. and above)

River valley projects, Hydel power projects, Thermal Power projects, Meaning projects, Industries Ports and harbours, Human settlements, new towns and cantonments, Tourism projects, Coastal area projects, Projects in ecologically fragile areas, Communication projects

The ministry has an Environmental Impact Assessment wing, comprising three Divisions, each dealing with projects in specific areas. Impact Assessment Division-I (IA-I): River Valley projects, major irrigation projects and hydel power projects. Impact Assessment Division- II (IA-II): industrial projects, thermal power projects and meaning projects. Impact Assessment Division- III (IA-III): Ports and harbor projects, tourism projects, human settlement projects in ecologically fragile areas and communication projects. Environmental Appraisal Committee (EAC).In order to elicit multi-disciplinary inputs for appraisal of projects, the ministry has constituted the EAC for the following sectors.

River valley, multipurpose, irrigation and

hydel power projects, Industrial projects, Meaning projects, Thermal Power projects

The EAC has experts for water resources management, pollution control, forestry, ecology, landscape planning etc. The project authorities have to furnish the following documents for environmental appraisal of a development project: (i) Detailed project report (DRP), (ii) Filled in Questionnaire; and (iii). Environmental impact statement (EIS) along with Environmental management plan. EIS should provide the possible impact (positive and negative) of the project. Sum of the issues to be included are: (i) impact on soil, water (hydrologic regime, ground and surface water) and air quality, (ii) impact on land use, forests, agriculture, fisheries, tourism, recreation etc. (iii) socio-economic impacts including short and long term impact on population, (iv) impact on health (v) impact on flora and fauna (wild life) particularly endemic and endangered species and (vi) cost-benefit analysis including the measures for environmental protection.

The Environment Management Plan (EMP) covers the following aspects:

1) Safeguards and control measures propose to prevent or mitigate the adverse environmental impacts,,2) plans for rehabilitation of project oustees;3) contingency plans for dealing with accidents/disasters and,4) monitoring and feedback mechanisms on implementation of necessary safeguards.

There are a number of guidelines and questionnaires for environmental clearance of different projects. For instance, for river valley and hydel power projects, environmental impacts have been classified in three categories

- i) impacts within and around area covered by the dam and reservoir
- ii) downstream effects caused by alteration in hydraulic regime and.
- iii) regional effects in terms of overall aspects including resources use and socio-economic impacts.

The impacts caused by construction of dams and reservoirs include changes in microclimate, loss of vegetal cover, soil erosion, variation in water table and enhanced seismic activities due to pressure of water. In hilly area blasting operations for road construction may cause considerable damage to environment through loosening of hill sides and resultant landslides, sedimentation of reservoirs, drawing up of springs and flash floods. The creation of new settlements for the workmen and rehabilitation of project oustees in the watershed areas could aggravate the seriousness of advanced impacts. For cost benifitanalysis, the costs for environmental protection and mitigative measure should also be included in the overall estimates. These should include compensatory a forestation, restoration of land in construction areas, aquatic weed control of water and soil borne diseases and rehabilitation of oustees.

For industrial projects, the guidelines provide a list of areas which may be avoided for set up of industries. These include question areas (at least from the high tide line), National parks and sanctuaries, estuaries, wetland, archaeological monuments, flood plane of riverine system and major human settlements. For EIA, the guidelines outlines the factors that must be touched upon . These are: meteorology and air quality, hydrology and water quality, occupational safety and health effects and impact on sensitive targets. There are also indicated the aspects for EMP. These include: treatment and disposal of liquid effluents emissions and solid wastes; prevention and control of noise and vibration precautions for occupational safety and health; preventive maintenance of control systems; recovery and reuse of waste products; plantation and vegetal cover disaster planning; and environmental management plans for insuring implementation of necessary safeguards.

Similar guidelines have also been prepared for transportation, tourism and communications. Number of projects have

been appraised so far by the ministry and have been cleared and some rejected. For example, Narmada Sagar (MP) and Sardar Sarovar Project (Gujarat) where accorded environmental clearance in 1987. The work is in progress for identifying fragile ecosystems (the with unique properties; intrinsically low resilience; high species richness biological diversity, susceptible to species loss; linking two or more protected aquifers and water recharge areas of mountain springs; areas of active logical faults and and susceptible to seismic hazards).

There has also been developed Human Exposure Assessment Location, as a part of the Health Related Monitoring Program by WHO in cooperation with UNEP. The project has three components viz; air monitoring; water quality monitoring and food contamination monitoring on a global basis. In our country, Chembur and Central Bombay city have been identified for study of human exposure with reference to pollutants such as chlorinated pesticides (DDTHC); heavy metals (lead, cadmium) and air pollutants (nitrogen oxides). The following institutions are participating in this programme. National institute of occupational Health, Ahmedabad,

Maharashtra pollution control board, Bombay, Air Quality Monitoring and Research Laboratory, Bombay and municipal corporation, Bombay.

Conclusion

For the environmental conservation tremendous plantation, proper utility of water from river, dams. If it is uncontrolled then leads hazardous effects to environment. Global warming increases. We are towards cleaning of our India, plastic should be avoided which is not decomposing. For the packing we use paper bags but paper is manufactured from plants, for this we cut trees. Hence it is a time to manage our needs without harming environment. Medicinal plants with limited source and slow growth, destructive harvesting result in extinction of species. Therefore the sustainable use of medicinal plants should be considered and best harvesting practice must be applied.

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POLLUTION : SOURCES, EFFECTS & CONTROL

S.B.Patil

Nanded (MS)

Introduction

Human are concern as social animals. In society humans plays various role. Humans when live their life that time the whole surroundings also plays the crucial role i.e. nature. In nature all the aspects also plays the most important role in the progress of humans. But in today's perspectives the whole environments face the problem of pollution. If the natures face the problem of pollution the effects of pollution effected to the humans also. Present scenario known as global, in the process of globalization the development of the nation totally depending upon the industrialization. The one side of nation belonging to development and also another side consists destroying elements to the nature. When nature affected by the pollution and those affections also destroy all the human beings.

Pollution is the effect of undesirable changes in our surroundings that have harmful effects on plants, animals and human beings. This occurs when only short term economic gains are made at the cost of the long term ecological benefits for humanity. No natural phenomenon has led to greater ecological changes than have been made by mankind. During the last few decades we have contaminated our air, water and landon which life itself depends with a variety of waste products.

Pollution is the introduction of contaminants into the natural environment that causes adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants.¹

Environmental pollution is one of the most serious problems facing humanity and other life forms on our planet today. "Environmental pollution is defined as the contamination of the physical and biological components of the earth/ atmosphere system

to such an extent that normal environmental processes are adversely affected." Pollutants can be naturally occurring substances or energies, but they are considered contaminants when in excess of natural levels.

Any use of natural resources at a rate higher than nature's capacity to restore itself can result in pollution of air, water, and land. Environmental pollution is of different types namely air, water, soil, noise and light weight. These cause damage to the living system. How pollution interacts with public health, environmental medicine and the environment has undergone dramatic change.²

Pollutants include solid, liquid or gaseous substances present in greater than natural abundance produced due to human activity, which have a detrimental effect on our environment. The nature and concentration of a pollutant determines the severity of detrimental effects on human health. An average human requires about 12 kg of air each day, which is nearly 12 to 15 times greater than the amount of food we eat. Thus even a small concentration of pollutants in the air becomes more significant in comparison to the similar levels present in food. Pollutants that enter water have the ability to spread to distant places especially in the marine ecosystem.

From an ecological perspective pollutants can be classified as follows:

Degradable or non-persistent pollutants:

These can be rapidly broken down by natural promancesses. Eg: domestic sewage, discarded vegetables, etc.

Slowly degradable or persistent pollutants:

Pollutants that remain in the environment for many years in an unchanged condition and take decades or longer to degrade.i.e. DDT and most plastics.

Non-degradable pollutants:

These cannot be degraded by natural processes. Once they are released into the environment

they are difficult to eradicate and continue to accumulate. Eg: toxic elements like lead or mercury.³

Air pollution:

The origin of air pollution on the earth can be traced from the times when man started using firewood as a means of cooking and heating. Hippocrates has mentioned air pollution in 400 BC. With the discovery and increasing use of coal, air pollution became more pronounced especially in urban areas. It was recognized as a problem 700 years ago in London in the form of smoke pollution, which prompted King Edward I to make the first antipollution law to restrict people from using coal for domestic heating in the year 1273. In the year 1300 another Act banning the use of coal was passed. Defying the law led to imposition of capital punishment. In spite of this air pollution became a serious problem in London during the industrial revolution due to the use of coal in industries. The earliest recorded major disaster was the 'London Smog' that occurred in 1952 that resulted in more than 4000 deaths due to the accumulation of air pollutants over the city for five days.

Air pollution is a mixture of solid particles and gases in the air. Car emissions, chemicals from factories, dust, and pollen and mold spores may be suspended as particles. Ozone, a gas, is a major part of air pollution in cities. When ozone forms air pollution, it's also called smog. Some air pollutants are poisonous.

"Air pollution occurs when harmful or excessive quantities of substances are introduced into Earth's atmosphere. Sources of air pollution include gases, particulates, and biological molecules."

"Air pollution refers to the release of pollutants into the air that are detrimental to human health and the planet as a whole."⁴

Effects of Air Pollution:

The hazardous effects of air pollution on the environment include:

Diseases:

Air pollution has resulted in several respiratory disorders and heart diseases among humans. The cases of lung cancer have

increased in the last few decades. Children living near polluted areas are more prone to pneumonia and asthma.

Global Warming:

Due to the emission of greenhouse gases, there is an imbalance in the gaseous composition of the air. This has led to an increase in the temperature of the earth. This increase in earth's temperature is known as global warming.

Acid Rain:

The burning of fossil fuels releases harmful gases such as nitrogen oxides and sulfur oxides in the air. The water droplets combine with these pollutants, become acidic, and fall as acid rain which damages human, animal and plant life.

Ozone Layer Depletion:

The release of chlorofluorocarbons (CFC), halons, and hydro chlorofluorocarbons in the atmosphere is the major cause of depletion of the ozone layer. The depleting ozone layer does not prevent the harmful ultraviolet rays coming from the sun and causes skin diseases and eye problems among individuals.

Effect on Animals:

The air pollutants suspend on the water bodies and affect the aquatic life. Pollution also compels the animals to leave their habitat and shift to a new place.

Air Pollution Control:

Following are the measures one should adopt to control air pollution:

Avoid Using Vehicles:

People should avoid using vehicles for shorter distances. Rather they should prefer public modes of transport to travel from one place to another. This not only prevents pollution but also conserves energy.

Energy Conservation:

A large number of fossil fuels are burnt to generate electricity. Therefore, do not forget to switch off the electrical appliances when not in use. Thus, you can save the environment at the individual level. Use of energy efficient

devices such CFLs also controls pollution to a greater level.

Use of Energy efficient appliances:

Whether at the domestic level or at the industrial level, we must push for appliances that use energy efficiently, which result in complete combustion of fuel, as incomplete combustion causes air pollution.

Shifting industries:

Another possible solution to reduce the harmful effects of air pollution is to shift the manufacturing plants, factories and industries to remote areas with a low level of population.

Using Modern Techniques:

With technology making great advancements, there are now technologies available that can help reduce the release of pollutants in the air. Air filters, scrubbers, precipitators are just a few examples.

Shifting to Natural Gasses:

Instead of using and exhausting fossil fuels, shifting to greener options is a no-brainer. For example, using CNG (compressed natural gas) instead of petrol or diesel is a great option.⁵

Water pollution:

Water pollution is the contamination of water bodies, usually as a result of human activities. Water bodies include for example lakes, rivers, oceans, aquifers and groundwater. Water pollution results when contaminants are introduced into the natural environment.

“Water is essential to life. It need not be spelt out exactly how important it is. Yet water pollution is one of the most serious ecological threats we face today.” Water pollution happens when toxic substances enter water bodies such as lakes, rivers, oceans and so on, getting dissolved in them, lying suspended in the water or depositing on the bed. This degrades the quality of water. Not only does this spell disaster for aquatic ecosystems, the pollutants also seep through and reach the groundwater, which might end up in our households as contaminated water we use in our daily activities, including drinking.

Effects of water pollution:

The effects of water pollution are varied. They include poisonous drinking water, poisonous food animals (due to these organisms having bio accumulated toxins from the environment over their life spans), unbalanced river and lake ecosystems that can no longer support full biological diversity, deforestation from acid rain, and many other effects. These effects are, of course, specific to the various contaminants.

1. Water bodies in the vicinity of urban areas are extremely polluted. This is the result of dumping garbage and toxic chemicals by industrial and commercial establishments.

2. Water pollution drastically affects aquatic life. It affects their metabolism, behavior, causes illness and eventual death. Dioxin is a chemical that causes a lot of problems from reproduction to uncontrolled cell growth or cancer. This chemical is bio accumulated in fish, chicken and meat. Chemicals such as this travel up the food chain before entering the human body.

3. The effect of water pollution can have a huge impact on the food chain. It disrupts the food-chain. Cadmium and lead are some toxic substances, these pollutants upon entering the food chain through animals (fish when consumed by animals, humans) can continue to disrupt at higher levels.

4. Humans are affected by pollution and can contract diseases such as hepatitis through faecal matter in water sources. Poor drinking water treatment and unfit water can always cause an outbreak of infectious diseases such as cholera etc.

5. The ecosystem can be critically affected, modified and destructured because of water pollution.

Control of Water Pollution:

Water pollution, to a larger extent, can be controlled by a variety of methods. Rather than releasing sewage waste into water bodies, it is better to treat them before discharge. Practicing this can reduce the initial toxicity and the remaining substances can be degraded and rendered harmless by the water body

itself. If the secondary treatment of water has been carried out, then this can be reused in sanitary systems and agricultural fields.

A very special plant, the Water Hyacinth can absorb dissolved toxic chemicals such as cadmium and other such elements. Establishing these in regions prone to such kinds of pollutants will reduce the adverse effects to a large extent. Some chemical methods that help in the control of water pollution are precipitation, the ion exchange process, reverse, and coagulation. As an individual, reusing, reducing, and recycling wherever possible will advance a long way in overcoming the effects of water pollution.

Soil Pollution:

Soil contamination or soil pollution as part of land degradation is caused by the presence of xenon biotic chemicals or other alteration in the natural soil environment. It is typically caused by industrial activity, agricultural chemicals or improper disposal of waste.

Effects of Soil Pollution:

Soil pollution affects plants, animals and humans alike. While anyone is susceptible to soil pollution, soil pollution effects may vary based on age, general health status and other factors, such as the type of pollutant or contaminant inhaled or ingested. However,

children are usually more susceptible to exposure to contaminants, because they come in close contact with the soil by playing in the ground; combined with lower thresholds for disease, (headaches, nausea, and vomiting, coughing, pain in the chest, and wheezing) this triggers higher risks than for adults. Therefore, it is always important to test the soil before allowing your kids to play there, especially if you live in a highly industrialized area.

Control of Soil Pollution:

Several technologies have been developed to tackle soil remediation. Some important strategies followed for the decontamination of polluted soil are listed below.

1. Excavation and subsequent transportation of polluted soils to remote, uninhabited locations.
2. Extraction of pollutants via thermal remediation – the temperature is raised in order to force the contaminants into the vapor phase, after which they can be collected through vapors extraction.
3. Bioremediation or phytoremediation involves the use of microorganisms and plants for the decontamination of soil.
4. Mycoremediation involves the use of fungi for the accumulation of heavy metal contaminants.⁶

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SYNTHESIS, ANTIMICROBIAL STUDY OF MANGANESE (II) COMPLEX

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ABSTRACT

The synthesis of Manganese (II) metal complex has been synthesized by using novel (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl) prop-2-en-1-one ligand. The ligand was prepared by the Claisen-Schmidt condensation method of 2,6-dihydroxy acetophenone and 2-furaldehyde. The structure of the complex has been characterized by the analytical data, conductivity measurement, magnetic moment, UV-Vis spectra, and thermal studies. Analytical data shows 1:2 stoichiometry and the magnetic moment, TG-DTA suggests that Ni(II) complex having octahedral geometry.

Keywords: Antimicrobial activities, TG-DTA study, Magnetic Susceptibility and Conductivity.

Introduction

Chalcones and their metal complexes play an important role in modern coordination chemistry. These compounds possessing novel structural features, interesting spectral and magnetic properties, have been observed of intensive research due to their importance in medical, agriculture, analytical, biological and industrial fields. In recent years a number of β -dicarbonyl compounds in which the carbonyl function bonded to olefinic linkage have gained considerable importance mainly because of the fact that such compounds are structurally related to the active chemical constituents of several traditional medicinal plants [1-3].

Chalcones constitute an important group of natural products, which has two aromatic rings joined by α , β unsaturated carbonyl system and the name chalcone is given by the Kostanecki and Tambar [4]. The metal complexes possess interesting biochemical properties, such as antitumor, antioxidant, and antimalarial, anti-fungal and antimicrobial activities [5]. The magnetic moment, TG-DTA supports the octahedral geometry of the metal complex of chalcone.

Materials and Methods

Synthesis of (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one ligand:

The reagents used for preparation of (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl) prop-2-en-1-one are of A.R. grade. Mixture of 2,6-dihydroxy acetophenone (0.01 mol) and 2-furaldehyde (0.01 mol) are dissolved in ethanol

(20 mL) and then solution of potassium hydroxide 10 mL (15%) were added to it and the mixture was stirred for overnight. The progress of the reaction was being monitored by TLC. It was then poured on ice cold water and acidified with dilute HCl. The coffee brown solid was precipitates, filtered and washed with water and recrystallized from ethanol to give the chalcone [6].

Synthesis of Metal Complex:

The solution of 0.02 mole of (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one was taken in round bottom flask containing 30 ml of anhydrous methanolic solution and boiled for 10 minutes. Warm solution of 0.01 mole, of Manganese Acetate in 20 ml of methanol was added drop wise to the solution of the chalcone of 5-methylfurfural to this reaction mixture, 10% alcoholic ammonia was added up to slightly alkaline pH. The complex was precipitated at pH8. The 9-10 pH was definite for these complexes [7]. The content was stirred on magnetic stirrer for one hour. The solid metal complex separated out and washed with methanol for the 3 to 4 times. The melting point of the complex was determined by Thiele's melting apparatus. The reactions of formation of Mn (II) complex is shown in Figure-1.

Results and Discussion

Physical parameters:

Metal complex of Manganese (II) with (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one was brown in color. The complex was precipitated at 9 pH range, having Melting point 320°C . The complex is insoluble in water

and soluble in DMSO, DMF [8].

CHO analysis:

The calculated and measured values of Carbon, Hydrogen, Oxygen analysis are matching and are given in the Table 1.

Magnetic susceptibility, solution conductivity and electronic absorption spectral data Magnetic susceptibility:

The magnetic moment of Mn(II) complexes in the present investigation are in the range which is almost close to the spin only value of 5.92 B.M. These values are in good agreement with the moment reported for mononuclear high spin octahedral Mn(II) complexes by earlier workers[9].

Solution conductivity and electronic absorption spectral data:

The solution conductivities of 10^{-3} M solution of metal complex in DMSO were measured on EQUIPTRONICS digital conductivity meter EQ - 660 with $20 \mu\Omega$ to $200 \mu\Omega$ at 298K temperature. They are insoluble in water and soluble in DMSO, DMF. The low solution conductivity of 10^{-3} M solutions of Mn(II) complexes in DMSO indicates their non-electrolytic nature Figure-2.

The electronic absorption spectra of Mn(II) complexes were showed three bands at 19,121 to 25000 cm^{-1} , 25126 to 27700 cm^{-1} , and 28994 to 30582 cm^{-1} assignable to ${}^6A_{1g} \rightarrow {}^4T_{2g}(G)$, ${}^6A_{1g} \rightarrow {}^4E_{1g}$ or ${}^6A_{1g} \rightarrow {}^4T_{1g}(G)$ and charge transfer indicating octahedral geometry around the metal ion[10-11].

IR Spectrum:

The IR spectrum of α , β -unsaturated carbonyl group has bands of chalcone at between 1625 to 1650 per cm. The characteristic peaks in IR spectrum give the presence of particular functional group. The region at which other absorption bands appear depends on the type of aromatic / hetero-aromatic rings as well as the substituent present on these rings. The infrared spectrum of (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one was recorded on a Perkin- Elmer Spectrum RX-IFTIR Spectrophotometer in the range $4000\text{-}400 \text{ cm}^{-1}$ (Table-2) using potassium bromide pellet at CIL, Chandigarh, Punjab. The

stretching frequency of (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one is represented in table number (2) and the IR spectrum.

Thermal analysis Mn (II) complex of (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one:

The simultaneous thermo gravimetric, differential thermal analysis of Mn (II) complex (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one was performed in an inert nitrogen atmosphere on Perkin Elmer STA 6000 at SAIF, Cochin, Kerala. The heating rate was $10^\circ/\text{min}$ and flow rate of nitrogen 50 ml/min. The reference substance used was $\alpha \text{ Al}_2\text{O}_3$ in platinum crucible and sample weighed in the range of 4-12 mg. The thermogram of Mn (II) complex (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one is presented in figure-2. This curve reveals that there is presence of lattice as well as coordinated water in the complex.

The thermogram of Mn (II) complex of (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one shows first weight loss at 60°C indicating presence of lattice water. The second loss due to the coordinated water molecule liberated, from the complex. The anhydrous compound undergoes 4 steps decomposition. In the first two steps, decomposition occurs due to loss of non-coordinated part of ligand. The first step shows decomposition within a temperature of range from $240\text{-}330^\circ\text{C}$ with mass loss of 39.29%, which is supported by a sharp endothermic peak at 259°C in DTA curve. It may be due to half decomposition of non-coordinated part of ligand. In the second step, decomposition observed at about $350\text{-}400^\circ\text{C}$ with the weight loss of 33.78% in TG curve. This is supported by an endothermic peak at 380°C . This may be due to decomposition of remaining coordinated part of ligand. Beyond 600°C there is a formation of MnO as indicated by constant weight loss of in TG-DTA curve.

Thermodynamic and Kinetic Parameters

Akahira [12], first introduced that decomposition and kinetic studies of thermal reactions are useful in determining

thermodynamic and kinetic parameters like free energy, entropy change, activation energy, pre- exponential factor. The thermal decomposition study of materials are very useful in predicting thermal stability (Table-3).

The negative values of the entropy of activation (ΔS) indicate that the metal complex is thermally stable. ΔG is positive for the complexes revealing that the free energy of the final residue is higher than that of the initial complex, and all decomposition steps are non-spontaneous processes. Also, the value of free energy of activation, ΔG increases significantly for the subsequent decomposition stages of a given complex [13]

Antimicrobial activity:

Antimicrobial activity was assayed by cup plate agar diffusion method by measuring inhibition zones in mm. In vitro antimicrobial activity of all synthesized compounds and standard have been evaluated against strains of The fungal toxicity of Mn (II) complex was studied *in vitro* against *Aspergillusniger*ATCC 16404, *Saccharomyces cerevisiae*ATCC 9763,

*Candida albicans*ATCC10231 fungal pathogens at fixed 1% concentration.

The antibacterial activity of Mn (II) complex was studied, for evaluating antibacterial activity Gram positive and Gram negative bacterial pathogens were used. *Staphylococcus aureus*ATCC 6538, *Bacillus megaterium*ATCC 2326, *Bacillus subtilis*ATCC 6633 were Gram positive pathogens used in this study. *Escherichia coli* ATCC8739, *Salmonella typhi*ATCC9207, *Shigellaboydii*ATCC 12034, *Enterobacteraerogenes*ATCC13048, *Pseudomonas aerogenosa*ATCC9027, *Salmonella abony*NCTC6017 were the Gram-negative pathogens used in this study.

From the results of antimicrobial activity of ligands and complex it is clear that the complex shows enhanced activity than ligand. The increase in antimicrobial activity is due to faster diffusion of metal complexes as a whole through the cell membrane or due to the combined activity of the metal and ligands [14].

Table-1: Study CHO analysis synthesized Mn (II) complex

Metal complex	Chemical formula	Mol. Wt.	Elemental analysis: % found (calculated)						
			C	H	N	O	S	X(Br)	M
Mn (II) Complex	[C ₂₆ H ₂₂ O ₁₀ Mn]	549	56.83 (64.33)	4.05 (4.57)	-	29.14 (19.78)	-	-	9.97 (11.32)

Table-2: IR spectral data of (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one

Molecule	$\nu(\text{OH})$ Enolic	(-CO-CH=CH-) α,β -unsaturated carbonyl group	Carbonyl group (-C=O in pyron ring)	(C-O-C) Stretching Frequency	(C=C) Stretching Frequency	Aromatic Ring (C=C) Stretching Frequency	Ar-H Stretching Frequency	-NO ₂ stretching frequency
Ligand	3421	1653	-	1097	1577	1459	2922	-

Table-3: Thermodynamic and Kinetic Parameters of Mn (II) complex of (E)-3-(furan-2-yl)-1-(2,6- dihydroxyphenyl)prop-2-en-1-one:

Metal complex	Method	Step	Decomp. Temp.	Order of Reaction	Ea(KJ mol ⁻¹)	ΔS(KJ mol ⁻¹)	ΔG(KJ mol ⁻¹)	Z (S ⁻¹)	Correlation Coefficient (r)
Mn (II) complex	H-M C-R	I	300	0.5	26.84	-153.91	37.80	112973.9	0.907
					21.75	-97.64	28.70	98100737	0.988
	H-M C-R	II	450	0.5	6.73	-172.89	19.06	11545.4	0.999
					4.09	-83.66	9.96	527754555.2	0.998

Figure-1: Metal complex of Manganese (II) with (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one R= - H, M= Mn(II)

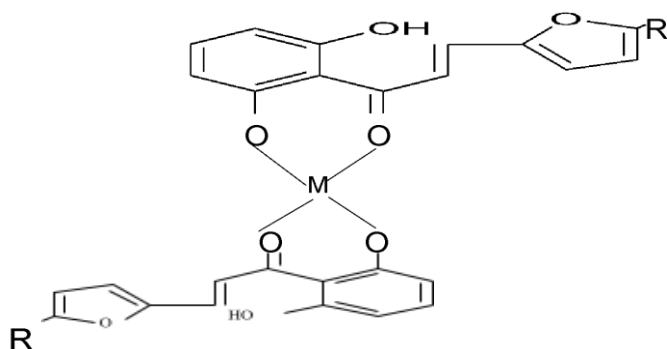


Figure-2: Electronic absorption spectrum.

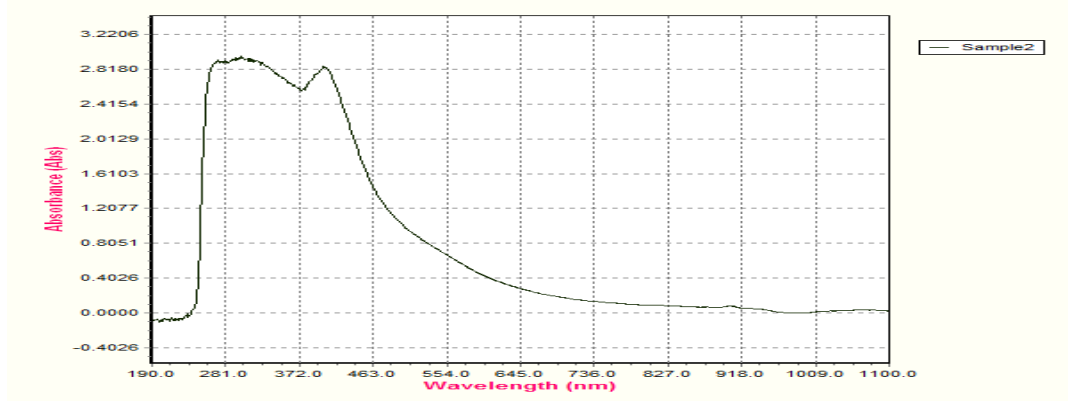
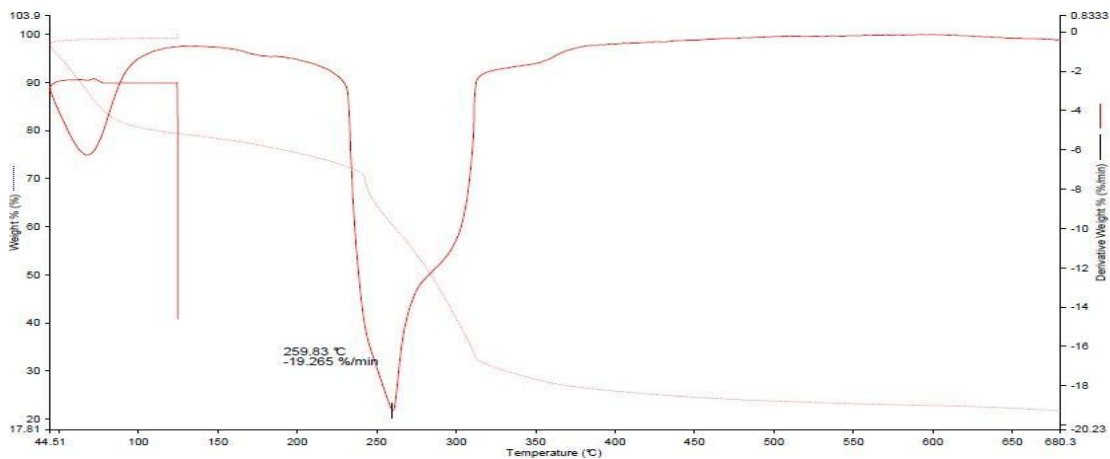


Figure-4: TG-DTA curve of Mn (II) complex of (E)-3-(furan-2-yl)-1-(2,6-dihydroxyphenyl)prop-2-en-1-one



Conclusion

The Mn (II) complex was colored, soluble in most of the organic solvent. The stoichiometry ratios of the metal complexes are obtained has been found to be 1:2. The electronic spectral data, magnetic moment, TG-DTA suggests that Mn (II) has Octahedral geometry. The CHO

analysis gives Carbon, Hydrogen, and Oxygen percentage in the metal complex. From the antimicrobial activity of ligand and complex it is clear that the complex shows enhanced antimicrobial activity than ligand.

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SYNTHESIS, CHARACTERIZATION AND ANTIMICROBIAL STUDY OF MANGANESE (II) COMPLEX

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ABSTRACT

The synthesis of Manganese (II) metal complex has been synthesized by using novel 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand. The ligand was prepared by the Claisen-Schmidt condensation method of 2,6-dihydroxy acetophenone and 5-methylfurfural. The structure of the complex has been characterized by the analytical data, conductivity measurement, magnetic moment, UV-Vis spectra, IR and XRD analysis. Analytical data shows 1:2 stoichiometry and the magnetic moment, suggests that Mn (II) complex has octahedral geometry. The Mn (II) complex shows moderate to good Antibacterial and Antifungal activity.

Keywords: IR, XRD study, Magnetic Susceptibility and Conductivity, Antimicrobial activities.

Introduction

Chalcone is a generic term given to compounds bearing the 1, 3-diphenyl-2-propen-1-one framework and belong to the flavonoid family [1-3]. Chalcones constitute an important group of natural products, which has two aromatic rings joined by α , β unsaturated carbonyl system and the name Chalcone is given by Kostanecki and Tambar [4]. The β -unsaturated carbonyl group in chalcone is found to be responsible for their antimicrobial activity [5]. The metal complexes possess interesting biochemical properties, such as antitumor, antioxidant, and antimalarial, antifungal and antimicrobial activities [6]. The computer program, used for indexing data was powder-X [7]. The X-ray powder diffractogram of the metal complex was used for the structural characterization and determination of lattice dimensions.

Material and Method

Synthesis of Chalcone:

The reagents used for preparation Chalcone are of A.R. grade. A mixture of 2,6-dihydroxy acetophenone (0.01 mol) and 2-furaldehyde (0.01 mol) dissolved in ethanol (20 mL) and then solution of potassium hydroxide of 10 mL (15%) were added to it. The mixture was stirred for overnight. The progress of the reaction was being monitored by TLC. It was then poured on ice cold water and acidified with dilute HCl. The coffee brown solid was precipitates, filtered and washed with water

and recrystallized from ethanol it gives chalcone [8].

Synthesis of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand:

Take the chalcone of (0.01 mol) and then it was dissolved in 20 ml DMSO, to this catalytic quantity of iodine was added. Contents were refluxed for one hour, the progress of the reaction was being monitored by TLC and the reaction mixture was left overnight. It was then poured on ice cold water, the separated solid was filtered washed with cold water followed by a dilute sodium-thiosulphate solution. The product was crystallized from ethanol it gives a flavones [9].

Synthesis of Metal Complex:

The solution of 0.02 mole of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand was taken in round bottom flask containing 30 ml of anhydrous methanolic solution and boiled for 10 minutes. A warm solution of 0.01 mole, of Mn Acetate, in 20 ml of methanol was added drop wise to the solution of the chalcone of 2-furfural to this reaction mixture, 10% alcoholic ammonia was added up to slightly alkaline pH. The complex was precipitated at pH 9. The pH 9-10 range was definite for these complexes [10]. The content was stirred on magnetic stirrer for one hour. The solid metal complex separated out and being washed with methanol for the three to four times. The melting point of the complex was determined by Thiele's melting apparatus. The reactions of formation of Mn (II) complex .

Table 1 study of CHO analysis synthesized Mn(II) complex

Metal complex	Chemical formula	Mol. Wt	Elemental analysis: % found						
			C	H	N	O	S	X(Br)	M
Mn (II) Complex	[C ₂₆ H ₁₈ O ₁₀ Mn]	545	57.30 (57.26)	3.32 (3.33)	-	29.30 (29.34)	-	-	10.09 (10.07)

Mn(II) Complexes	Molar Conductance Ohm ⁻¹ cm ² mol ⁻¹	μ_{eff} (B.M.)	Absorption Maxima cm ⁻¹ (nm)		
			⁶ A _{1g} ⁴ T _{2g} (G)	⁶ A _{1g} ⁴ A _{1g} (G), ⁴ E _g	Charge Transfer
Flavone	6.97	5.97	24154(414)	27624(362)	29673(337)

Table-2: IR spectral data Manganese (II) complex of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand:

Peak No	2 θ Observed	2 θ calculated	d observed	d calculated	Miller Indices of Planes			Relative Intensity (%)
					h	K	L	
1	16.415	16.347	5.39657	5.67847	0	0	1	100
2	18.225	18.326	4.86422	4.85440	0	-1	0	62.62
3	18.240	18.250	4.86032	4.54791	-1	0	0	14.80
4	23.905	23.896	3.72000	3.45874	-2	-1	0	19.14
5	23.934	23.434	3.71526	3.56741	-1	0	1	13.75
6	23.967	23.121	3.71021	3.54895	1	-1	0	5.9
7	24.085	24.347	3.69229	3.76595	1	-1	1	8.36
8	25.147	25.440	3.53828	3.86737	0	1	1	4.5
9	33.325	33.661	2.68664	2.56785	1	1	1	7.76
10	36.931	36.549	2.43231	2.47634	0	-2	0	23.75
11	46.137	46.434	1.96599	1.94676	-1	-2	1	13.16
12	48.161	48.323	1.88016	1.45682	1	2	1	4.9
13	49.059	49.492	1.85550	1.85407	-2	2	0	2.34

Table-3:

Ligand/Metal complexes	ν (OH) cm ⁻¹	ν (H ₂ O) cm ⁻¹	ν (-CO-CH=C H-) cm ⁻¹	ν (-C=O in pyron ring) cm ⁻¹	ν (C-O-C) cm ⁻¹	ν (C=C) cm ⁻¹	Aromatic Ring (C=C) cm ⁻¹	ν (M-O) cm ⁻¹
[Mn(B1)2]	-	3363	-	1574	1019	1431	1234	661

Unit cell data and crystal lattice parameters for Mn (II):

Unit cell data and crystal lattice parameters

a (Å) = 7.9163 Volume (V) = 1546.5 Å³

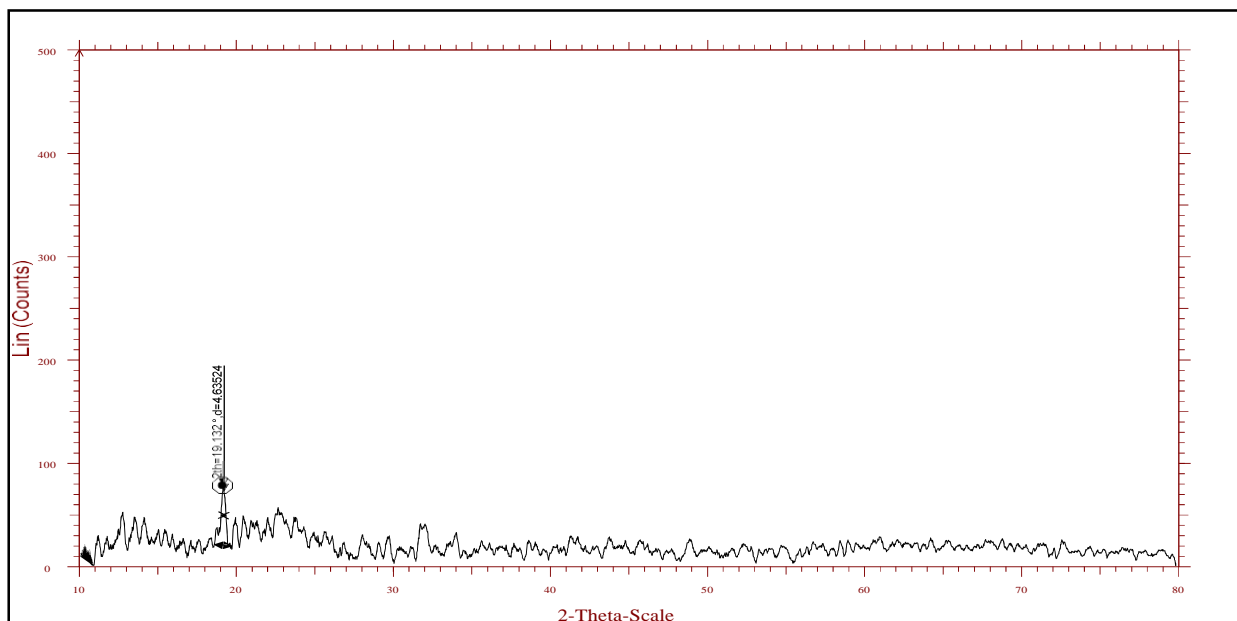
b (Å) = 4.9165 Density (obs.) = 0.8615 g cm⁻³

c (Å) = 8.4089 Density (cal.) = 0.8609 g cm⁻³

$\alpha=90^\circ$ Z = 1

$\beta=102^\circ$ Crystal system= Monoclinic $\gamma=90^\circ$ Space group = P2/m

Standard deviation (%) = 0.042

Figure-3: X-ray diffractogram of Mn (II) complex of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand

Results and Discussion

Physical parameters:

Metal complex of Manganese (II) with 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand was Blackishbrown in color. The complex was precipitated at 8 pH, having Melting point 320°C. The complex is insoluble in water and soluble in DMSO, DMF [11].

CHO analysis:

The calculated and measured values of CHO analysis are matching and are given in the Table-1.

Magnetic susceptibility, solution conductivity and electronic absorption spectral data

Magnetic susceptibility:

The magnetic moment of Mn(II) complexes in the present investigation are in the range which is almost close to the spin only value of 5.92 B.M. These values are in good agreement with the moment reported for mononuclear high spin octahedral Mn(II) complexes by earlier workers

Solution conductivity and electronic absorption spectral data:

The solution conductivities of 10⁻³ M solution of metal complex in DMSO were measured on

EQUIPTRONICS digital conductivity meter EQ -600 with 20 μΩ to 200 μΩ at 298K temperature. They are insoluble in water and soluble in DMSO, DMF. The low solution conductivity of 10⁻³ M solutions of Mn(II) complexes in DMSO indicates their non-electrolytic nature.

The electronic absorption spectra of Mn(II) complexes were showed three bands at 19,120 to 25000 cm⁻¹, 25125 to 27700 cm⁻¹, and 28993 to 30581 cm⁻¹ assignable to 6A_{1g} 4T_{2g}(G), 6A_{1g} 4E_{1g} or 6A_{1g} 4T_{1g}(G) and charge transfer indicating octahedral geometry around the metal ion [12-13].

IR Spectrum:

The IR spectrum of α, β unsaturated carbonyl group has characteristic bands of chalcone between 1625 to 1650 per cm. The characteristic peaks in IR spectrum give the presence of specific functional group. The region at which other absorption bands appear depends on the type of aromatic / heteroaromatic rings as well as the substituent present on these rings. The infrared spectrum of metal complex of Manganese (II) with 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand was recorded on a Perkin- Elmer Spectrum RX-IFTIR Spectrophotometer in the range 4000-400 cm⁻¹ (Table-2) using potassium bromide pellet at CIL, Chandigarh,

Punjab. The stretching frequency of metal complex of Manganese (II) with 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand is represented in table number (2) and the IR spectrum in Figure-2.

X-ray diffraction spectral studies of metal complex of Mn (II) complex of 2-(furan-2-yl)-5-hydroxy-4H chromen-4-one ligand:

The XRD spectral study has been done at SAIF, Cochin Kerala. The standard deviation observed for Mn(II) is 0.042 which is within the permissible limit of 2%. The observed and calculated densities are 0.8615 gcm⁻³ and 0.8609 gcm⁻³ respectively. The volume is found to be 1546.5 Å³ and complex crystallizes in the monoclinic system with 1 atom per unit cell. The lattice parameters are a= 7.9163 Å, b= 4.9165 Å, c=8.4089 Å, α= 90°, β=102°, γ=90°.

Indexed X-ray Diffraction Data of Mn(II) Complex of 2-(furan-2-yl)-5-hydroxy-4H-chromen-4-one ligand.

Antimicrobial activity:

Antimicrobial activity was assayed by cup plate agar diffusion method by measuring inhibition zones in mm. In

vitro antimicrobial activity of all synthesized compounds and standard have been evaluated against strains of The fungal toxicity of Mn (II) complex was studied in vitro against *Aspergillus Niger* ATCC 16404 *Saccharomyces* ATCC 9763, *Candida albicans*

ATCC10231 fungal pathogens at fixed 1% concentration. The antibacterial activity of Mn (II) complex was studied, for evaluating antibacterial activity Gram positive and Gram negative bacterial pathogens were used. *Staphylococcus aureus* ATCC 653, *Bacillus magaterium* ATCC 2326, *Bacillus subtilis* ATCC 6633 were Gram positive pathogens used in this study. *Escherichia Coli* ATCC87, *Shigellaboydii* ATCC 12034, *Pseudomonas aerogenosa* ATCC9027, *Salmonella abony* NCTC6017 were the Gram-negative pathogens used in this study. From the results of antimicrobial activity of ligands and complex it is clear that the complex shows enhanced activity than ligand. The increase in antimicrobial activity is due to faster diffusion of metal complexes as a whole through the cell membrane or due to the combined activity of the metal and ligands [14].

Conclusion

The Mn (II) complex was colored, soluble in most of the organic solvent. The stoichiometry ratios of the metal complexes are obtained has been found to be 1:2. The electronic spectral data, magnetic moment, TG-DTA suggests that Mn (II) has Octahedral geometry. The CHO analysis gives Carbon, Hydrogen, and Oxygen percentage in the metal complex. The XRD parameters shows that the structure of Mn (II) is Monoclinic and has space group = P2/m. From the antimicrobial activity of ligand and complex it is clear that the complex shows enhanced antimicrobial activity than ligand.

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ENVIRONMENT SUSTAINABILITY IN THE DIRECTION OF SOCIO-ECONOMIC DEVELOPMENT

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ABSTRACT

This paper deals with the core issues of environment sustainability that affect the socioeconomic structure and growth that hampers all round sustainable development is looked at. This study basically looks at the ideas and theories behind the political, social, economic, spiritual, environmental, scientific, technical, and information stability of the state and the growth of the socioeconomic system. The idea of "sustainable state and development" was defined, and a structural model of the stability of the socioeconomic system was made. The different types of sustainable state and development were broken down into their parts. Conditions were made for the theoretical foundations of the socioeconomic system's sustainable development to be built on further.

Keywords: Socio-economics, Sustainability, go-green, eco-friendly, imbalance.

Introduction

Since the end of the 20th century and up to the present day, people have talked a lot about the ideas of a sustainable state and the development of the socio-economic system. However, putting these ideas into practice is still a difficult problem. This is because of problems with the sustainability of the social environment. The "Gordian nodes" of these problems are: the idea of a stable state; its main properties, patterns, and features; interactions between social systems at the regional and global levels; the evolution of the social system, etc. Humanity grows in a society where each person is affected at the same time. But the person has an effect on society and affects both the size and quality of changes. If the social and economic system is stable, both society and humanity as a whole can grow in a healthy way. So, an imbalance in relationships in society could lead to bad things, such as a rise in the number of fights and a change in the stability of the social environment. It's important to remember that social life is always trying to calm down both outside and inside disturbances, and it also tries to get everyone to agree on things. All of these issues are important to society, so we used theoretical methods like abstraction, hypothetical (hypothetical-deductive) method, formalised, and axiomatic, as well as logical methods like analysis, synthesis, analogy, and so on. With their help, we were able to figure out what the real issues were, how they were linked, and whether or not the results were

right. The system method helped researchers study the sustainability of a society's development by looking at its socio-economic parts, how they interact with each other, processes, frameworks, and other features. This gave researchers a better understanding of modern society, its sustainability, and its likely future. In the scientific fields that study natural profiles, there are many definitions of the term "stability," but we think that A. Poincare's [1] definition is the most accurate. He thinks that stability is the desire of a system that has been thrown out of balance to return to this state, getting closer and closer to it. In sociology, a system is said to be stable if it can go back to its original state when the thing that changed it stops having an effect on it. So, the stability of the system shows that it is unchangeable and can adapt to changes. This shows that the stable state of the system is a complex object of study that reflects the internal structure of social relationships and phenomena, as well as its development and changes over time and space as a result of external factors.

In our work, we look at the structure of the system's stable state by making a formal model with its most important parts. Figure 1 shows the different kinds of structure of this model that were chosen based on the system approach. The model's integrity depends on how well its parts work together, interact, and depend on each other. This model doesn't take into account how different things affect this system depending on how

far along a society is in its development.

Green practice is a movement that encompasses including the printing industry that involves reducing, recycling, and reusing materials to ease the strain on resources used for printing, copying, and advertising. This method uses low-VCO (Volatile Organic Chemical) inks, recycled paper, computers and other equipment that use less energy, remanufactured laser toner cartridges and ink cartridges for printers, paperless or electronic information distribution, and attempts to teach and inform people about green printing. Friendly to the environment Green printing is when paper products are printed in a way that is good for the environment. It uses a number of methods that are better for the environment than usual printing methods. Some tips for printing in an environmentally friendly way are to use digital formats instead of print formats whenever possible, Using recycled paper, recycling printer cartridges, Buying soy-based ink that doesn't contain chemicals and printing on both sides of the paper Green Printing The amount of paper used every year has reached almost 400 million tonnes, and the rate of growth is very fast.

Even though modern technologies for transferring information and storing it in data centres are getting better and better quickly, they can't stop people from using more and more paper. Without printed documents in every library and information centre, digital and electronic archives, e-mail, and the Internet can't compete. Libraries of all sizes and types are making environmental sustainability and the preservation of natural resources a priority and an effective initiative. Saving money on printing costs is one of the benefits of green printing. When everything is done in a library or even at home, costs can be cut by up to 70% or more, depending on how eco-friendly strategies are used. When it comes to concerns about the environment, green printing can help protect and keep natural resources.

Both making publications and making paper

use a lot of water, trees, energy, and other natural resources that could be dangerous. Inks, solvents, acids, lacquers, dyes, dryers, varnishes, shellacs, and many other solutions used in the printing process can be harmful to people and the environment. When paper is bleached with chlorine, chemicals and other pollutants can get into the water. Bindings, glues, foils, and other things used to make printed items can also make it hard to recycle them. And libraries and information centres don't always need or want to go completely digital. But there are many ways to use less paper, ink, and other resources. So, paper is something that almost every library uses in large amounts. We all know that libraries are where books and other printed materials are kept. And people are so used to using paper that they don't usually question it. In the same way, using paper has negative effects on the environment that are hard to see. Paper can be made from new wood, pre-consumer waste, which is waste from paper mills and manufacturing plants, or post-consumer waste, which is paper that has been collected during recycling programmes or is waste from printing processes, etc. All of the steps that go into making paper, like getting the wood, processing it, making the paper, transporting it, using it, and throwing it away, pose big problems for the environment.

We can stop using so much paper by recycling it. Paper recycling is the process of making used paper usable again. We all know that paper is one of the easiest things to recycle. Recycled paper is made from old paper and paper products that have been used and then reclaimed. Recycling paper is the greenest choice because it uses less energy, water, and carbon than making paper from raw materials. Using recycled paper is important for the environment because of this. It has many positive effects on the environment.

So, everyone needs to know that recycling paper is important, but there is still a long way to go before the same behaviour about recycling printer cartridges becomes

common. With the development and popularity of smartphones and e-readers, the need for printing has gone down a lot. However, there is still a huge need for printing at home and in the office. Printing is still a big part of our daily lives, so more people need to know about it so that environmental damage can be kept to a minimum in the future.

The carbon footprint is a way to figure out how much pollution a person and their lifestyle cause. The total amount of greenhouse gases (GHG) that an organisation, event, or product releases can be called its "carbon footprint." It is often said in terms of how much carbon dioxide or other greenhouse gases (GHGs) were released. Greenhouse gases are made out of water vapour, carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons. They are all different types of natural gases, but humans can make more greenhouse gases by polluting. To lower our Carbon Footprint, we should use materials that are good for the environment or are recycled. We should find ways to save energy and use more renewable energy. We should also reduce waste and make plans for waste separation. In the same way, we should stop using plastic bags and cups and recycle them.

This conversation could help a lot with understanding the social responsibility of libraries, which are the most important source of information for society. As we know, most people want to keep the parts of the environment that produce resources that can be used over and over again, like water, air, forests, and solar energy. We all need to take care of the environment right now. Sustainability is the ability to keep doing something the same way forever. Environmental sustainability is the ability to maintain the level of living that is valued in the physical environment without making any sacrifices. Libraries can play a big part in making the world as sustainable as possible by doing well at all green practises. Everyone, from students to employees to publishers, who is directly or indirectly

involved in print-related tasks needs to be aware of and take responsibility for how much paper they use every day. We don't have to do it just to save money; we also have to know that we're helping to save the planet. By making some changes right now to bring more environmental sustainability. Green practice is all about being aware of how our performing tasks affect the environment. As experts in information, librarians should know what environmental labeling really means and be able to give this information to their user communities.

It is important that the social environment always tends toward balance. This can be seen in the desire to stop disturbances and adjust to new situations. The important directions for its growth are toward harmony, order, consensus, and solidarity, among other things. The stability of such a system comes from the fact that people in the society want peace, unity, and stability. This is made possible by the spread of traditional values and the dominance of positive feedback, both of which affect how people interact with each other. In this case, P. Sorokin [6] says that the system has a constant tendency to stabilise itself. The social system brings together all the ways that relationships can be linear or not. The social environment always tries to find this kind of balance so that it can get rid of all kinds of problems and adjust to new situations. So, the social aspect of the sustainability of the system and its growth is tied to maintaining social stability through adaptation, self-regulation, order, and reducing conflict by using all available stabilising mechanisms, i.e., the processes of self-organization of the society.

But if we look at the situation from the other side, we can see that conflict, when internal and external conditions change, can become a way to bring the system together and help it grow, as well as a way to change and keep the social structure intact. A steady state economy is one that has two main parts that are pretty stable: the number of people living there and how they use their limited natural resources. In this view, the economic sustainability of the system should be based

mostly on its own resources, which is a self-sustaining and strategic factor that shows the key condition for any long-term growth. The long-term balance between the use of natural resources and the growth of society is important to the economic sustainability of the system.

From the point of view of the evolutionary way of economic development, we can see the life cycle of changes in the system, which depends on its environment and is made up of processes that are always changing [7]. The main point of this kind of cycle is that a stable state is reached either after a period of growth or after a period of no growth (reduction). It turns out that when the economy moves from a stable state to an unstable one, something new happens. So, the stability of the economic system at a certain time is a state in which its main features (such as financial, production, organisational, etc.) are within certain limits of stability and can grow even if the outside environment changes. In the "Concept of Sustainable Development"[8], which was signed in Rio de Janeiro in 1987, "sustainable development" is defined as development that not only helps improve the quality of life for people now and in the future, but also helps keep the environment safe for living things.

This idea is based on two main ideas that are linked: needs and constraints. Constraints is a term for how well the environment can meet the needs of people now and in the future. So, the third parameter, which was the environment, was used to look at how stable and balanced the system in the economy was. Now that the effects of humans on the environment are as big as geological and geochemical processes, the question of how humans will survive is very important. Increased consumption leads to the depletion of natural resources, the degradation of the environment, and the worsening of many environmental problems that are directly linked to socioeconomic development. We think that the spiritual part is meant to give people a sense of inner stability.

Culture, as the source of norms and values, keeps society stable and alive. It is the main way that human history becomes more human, and it keeps the value base of the socioeconomic system as a whole. For culture to stay alive, it's important for two cultures to talk to each other, especially when the new culture ("receiving") takes over from the old one ("transmitting"). Yu. M. Lotman [8] says that one culture passes on texts, and the other culture accepts and adopts them, learns the "Varangian" language, and makes new texts that follow the same rules. So, gradually, new cultural codes and traditions are passed on to the "receiving" party, where they are spread out and changed. So, this culture gets used to them and makes them part of itself. This is a natural way for different cultures to come together and influence each other, and it has its own life cycle.

Conclusion

For the socioeconomic system to grow, it needs to be stable, changeable, and able to adapt to changes in the environment. The model being looked at doesn't take into account how complicated the world is right now, with countries splitting up because of where they are geographically and traditions being lost. Forms of social contacts, moves toward the creation of a global community in the form of a global network structure. If the above-mentioned aspects of the sustainable state and development of the socioeconomic system can be looked at at the level of society, then we think the spiritual aspect should be looked at through the internal structure of a person that determines his behaviour and activities.

Taking into account how globalisation affects societies and how states want to keep their political, geographical, economic, etc. borders, there are trends towards the formation of macro-societies, as the current stage of human evolution is a more complex social model that is actively promoted by modern technologies and global network structures. But such a model is still a socioeconomic system, and it aims for sustainability, which is provided by the

social, economic, spiritual, political, and other parts of the social system, which are again influenced by the person himself. The paper talks about how important it is for socioeconomic and sociopolitical subsystems of sustainable development to work together in a way that is aware and based on spiritual

and humanistic principles. The authors pay special attention to the spiritual dimension through cultural and moral values and traits. This is based on their understanding of human nature as their owner and as a subject of the socio-economic system.

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HEALTH RELATED PHYSICAL FITNESS COMPONENTS OF PLAYERS

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ABSTRACT

The present study was conducted to investigate the health-related physical fitness components of individual and team game players. To conduct the study, 180 players from each group i.e. team game (90) and individual (90) game. respectively were selected as sample. In all 180-team game as basketball, handball, volleyball and badminton, tennis, table tennis 30 from each game players were selected. The criterion for selection of football players for the present study was participation in any intercollegiate tournaments during their sporting career. To measure health related physical fitness, AAPHERED standardizes test was administered to each subject. Results were obtained by t-test technique and revealed that health related components statistically significant among players.

Keywords: Health, Cardio respiratory fitness, Physical Fitness

Introduction

Today sports and physical fitness become inseparable of our life. The acquisition of new knowledge for betterment of performance of human organism in relation to physical fitness and psychological parameter which do influence sports performance and health. Physical fitness is one's ability to execute daily activities with optimal performance, endurance, and strength with the management of disease, fatigue, and stress and reduced sedentary behavior. Physical fitness components are associated with disease prevention and health promotion. Health related physical fitness component maintain the balance between physical activities and motor skill ability. Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

Methodology

To conduct the study, 180 players from each group i.e. team game (90) and individual (90) game. respectively were selected as sample. In all 180-team game as basketball, handball, volleyball and badminton, tennis, table tennis 30 from each game players were selected. The criterion for selection of football players for the present study was participation in any intercollegiate tournaments during their sporting career. To measure health related physical fitness, AAPHERED standardizes test was administered to each subject. After scoring,

obtained data was tabulated. To find out and compare the cardiovascular endurance, flexibility, muscular strength and body composition of individual and team game players, t-test was adopted.

Results and Discussion

It is evident from table 1 that there was no significant of difference obtained in Cardiorespiratory Endurance $t = -1.299$ $p > .05$, Flexibility (Low Back Hamstring) $t = .243$ $p > .05$, Abdominal Muscle Strength/Endurance $t = -.932$ $p > .05$, whereas Body Composition (Triceps & Subscapular Skinfolds) shows significant of difference $t = -5.936$ $p < .05$ of health-related physical fitness components between individual and team game players. The result further indicates that means scores of cardiorespiratory endurance component were better in team game players ($M = 1643.9556 \pm 200.80506$) than individual game players ($M = 1607.3889 \pm 175.95363$). The scores of Flexibility (Low Back Hamstring) component also indicates that the individual game players ($M = 28.1778 \pm 6.09767$) scored better than team game ($M = 27.9444 \pm 6.77630$). The mean scores of Abdominal Muscle Strength/Endurance component indicates that team game players ($M = 38.9111 \pm 6.56796$) scored better than individual game ($M = 37.9778 \pm 6.86299$). The scores of individual game Body Composition (Triceps & Subscapular Skinfolds) ($M = 24.9000 \pm 5.40297$) better than

team game ($M=20.0000\pm 5.66876$). Further results indicates that there was no significant of difference obtained in Cardiorespiratory Endurance, Flexibility (Low Back Hamstring), Abdominal Muscle Strength/Endurance, whereas Body Composition (Triceps & Subscapular Skinfolds) shows significant of difference of health-related physical fitness components between individual and team game players where the individual game players scored significantly higher than team game players in Flexibility

(Low Back Hamstring) and Body Composition (Triceps & Subscapular Skinfolds) whereas the team game players scored significantly higher than individual game players in cardiorespiratory endurance, Abdominal Muscle Strength/Endurance on health related physical fitness components.

Conclusions

The health-related physical fitness components of individual and team game players were observed and found significant.

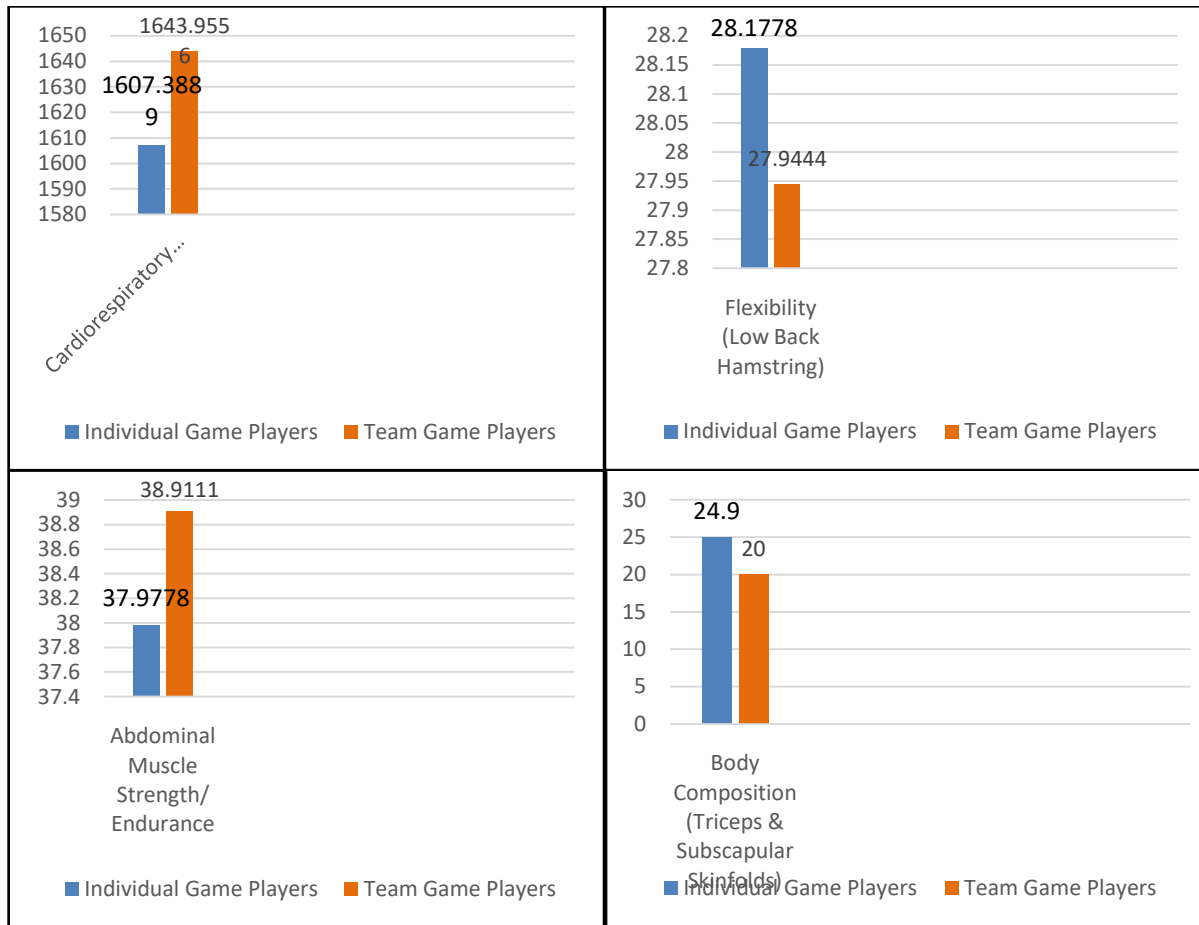
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Table 1: Comparison of Health-Related Physical Fitness Components Sub scales between Individual Game and Team Game players.

Health-Related Physical Fitness Components	Game Type	Mean	Std. Deviation	Std. Error Mean	t	N
Cardiorespiratory Endurance	Team Game	1643.9556	200.80506	21.16671	1.299	90
	Individual Game	1607.3889	175.95363	18.54714		90
Flexibility (Low Back Hamstring)	Team Game	27.9444	6.77630	.71428	-.243	90
	Individual Game	28.1778	6.09767	.64275		90
Abdominal Muscle Strength/Endurance	Team Game	38.9111	6.56796	.69232	.932	90
	Individual Game	37.9778	6.86299	.72342		90
Body Composition (Triceps and Subscapular Skinfolds)	Team Game	20.0000	5.66876	.59754	-5.936	90
	Individual Game	24.9000	5.40297	.56952		90

Figure: Graphical representation of health-related physical fitness components of individual and team game players.



**A NEW MARATHWADIAN GRASS GALL-MIDGE
(DIPTERA: CECIDOMYIIDAE) FROM AUNDHA (NA.)**

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ABSTRACT

This paper is a comparative study of air pollutants present in ambient air in and around Chandrapur city during January 2015 to December 2017. It was observed that RSPM level in winter season were higher but during Covid-19 pandemic lockdown period during 24 March 2020 to 30 May 2020 it has been observed that pollution level decreases. The pollution level of RSPM mass concentration was significantly increased near the area under industrial impact.

Keywords: Covid-19, RSPM, Industrial Pollution, Seasonal Variation, Chandrapur.

Introduction

This contribution reports of the description of a new species, *Lasioptera Wagarwadensis*, reared from the earheads of *Bothriochloa Pertusa* (L.) (Willd.) A. Camus, in Campus, of Wagarwadi, Aundha (Na.), Hingoli. The new Midge can be distinguished in the number of antennal segments, absence of vein M_{1+2} subdorsal plates being entire

***Lasioptera Wagarwadensis* ♂ sp. Nov**

(Figs. 1-8)

Male : body 1.00mm long including genitalia, PALRUS (fig. 7): Palpus quadric articulate, sparsely setose; first segment short, indistinct in the preparation; length 1.20 x its maximum thickness (11:3), second segment cylindrical, third segment cylindrical, 2.00 x its Maximum thickness (12:2); fourth segment cylindrical, longest of all length 4.10 x its maximum thickness (18:0). ANTENNA: less than half the length of the body, with 2 + 10 sessile, cylindrical segments with two whorls of long setae, low circumfila; SCAPE (fig. 5), cup-shaped (15:11); pedicel: globose (10:11); third segment (fig. 4) (16) confluent with and longer than fourth, enlargement with a very small basal prolongation (3:2) Length 1.66 X its maximum thickness (10:7) ;WING 9 (fig.1): are hyaline, 2.20 x as long as broad (40:18); costa scaled, R5 meeting costa beyond the middle of the wing and interrupting at its union: MM_{1+2} absent, Cu forked; legs thickly hairy, metatoesus short (5), second tarsal segment longest of all (46), terminal tarsal segment longer than metatarsus (8); CLAW:

(fig:8), (3:7); dentate on all legs empodium 0.50 the length of the claw. GENITALIA (fig.6): basal clasp segment cylindrical 3.00 x as long as broad (45:10), with finely setose rounded basal lobe; terminal clasp segment slender gradually tapering towards the tip, ending in a tooth, length 3.33 x its maximum thickness (22:2); dorsal plate broadly and deeply incised, lobes triangular subdorsal plate shoetec and narrower than dorsal, entire; aedeagus slender, rounded apically, length 5.25 x its maximum thickness (22:2), surrounded by paramere lobes, tips of the latter bifid.

Male:- 1. Wing: 2. Penultimate antennal segment. 3. Terminal antennal segment. 4. Third and fourth antennal segments. 5. Scape and pedicel. 6. Genitalia. 7. Palpus. 8. Claw.

Material

Holotype : One male dissected and mounted on slide labeled as reared from earheads of *Bothriochloa Pertusa* (L.) (Willd.) A. Camus, Wagarwadi, Aundha (Na.), Hingoli, Marathwada, 15.1 x 2019 Coll. A.R.Chavan & S.S.Bhalerao. Type slides and other material are retained, for the present, in authors collection at Wagarwadi, Aundha (Na.), Hingoli, Marathwada.

Paratype : Two males are dissected and mounted on slides, many males and females in alcohol, data same as in holotype.

Allotype : Two males dissected and mounted on slide, labelled as in holotype.

Etymology: The specific epithet *wagarwadensis* refers to Wagarwadi,

Aundha(Na.), Hinoli, Marathwada, India

Acknowledgement

Remarks

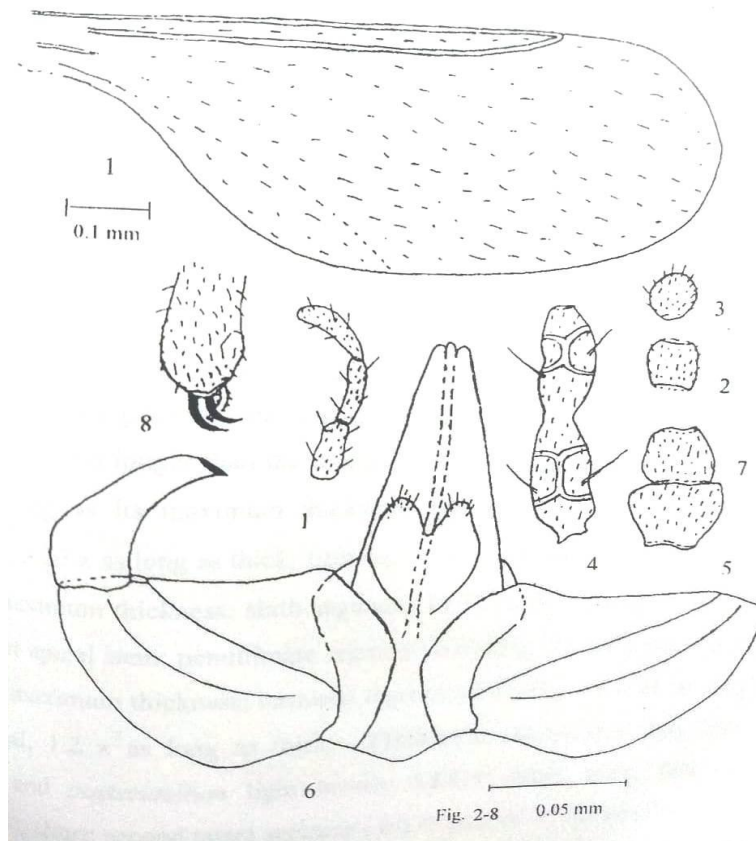
This species very closely resembles, *L. tomentosae* (Grover, 1967) but differs in the (i) different proportion of palpal segments, (ii) number of antennal segments, (iii) absence of vein M_{1+2} , (iv) subdorsal plate being entire.

Thanks are due to the Principle, B. S. Mahavidyalaya, Basmathnagar, Hingoli, Maharashtra for permission to collection at Aundha Na., Wagarwadi, with junior author and ShivrayMultiservices& Printers, Basmathnagar.

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Figs. 1-8 :LasiopteraWagarwadensis ♂ spnov..



GREEN COMPUTING: RECENT PRACTICES AND TECHNOLOGIES FOR ICT ENVIRONMENT SUSTAINABILITY

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ABSTRACT

In terms of growing awareness about environmental impact of computing, green technology is gaining increasing importance. With rising energy consumption, global warming and e-waste, the idea of green computing is widely taken into serious consideration by both the government agencies and private companies, as their contribution in good practices for sustainable development. Green computing refers to the practice of environmentally responsible and efficient use of computing resources while maintaining economic viability and improving its performance in eco-friendly way. This paper aims to present main approaches and assumptions of green IT by showing the latest solutions and energy efficient practices in computing industry. In the article author has made a systematic study on several strategies and developments in context to the ICT sustainability as a future asset of growth for modern society. The article focuses on the practices like use, disposal, design and manufacturing as well as on technology based-solutions like electronic products and services e.g. green cloud. The outlook for greener ICT should include using the Internet as a powerful agenda for promotion and education for environmentally aware behaviour and as a useful tool for creating eco-friendly technology.

Keywords: green computing, power management, sustainability, eco-friendly technology, green cloud

Introduction

Green computing, the reading and training of effective and environmental computing properties, is currently below the care of not simply ecological officialdoms, however also industries after additional businesses. In current years, firms in the computer production have arise to recognize that successful green is in their greatest attention, together in standings of open dealings and cheap costs. In 1992, the U.S. Environmental Protection Agency launched Energy Star, a volunteer labeling program that is planned to help and identify energy-efficiency in screens, weather controller apparatus, and further machineries. This resulted in the well-known approval of sleep type amongst user electronics. Green Computing is well-defined as the education of planning, business, by means of too organizing of computing procedures in a grouping that decreases their eco-friendly impact. Many IT creators and retailers are constantly investing in designing energy efficient computing devices, falling the use of dangerous materials and inspiring the recyclability of digital devices and paper.

Why Green Computing?

These days almost all streams weather its IT, medicine, transportation, agriculture uses machines which indirectly needs large amount

of power and money for its effective running. We have great machines and equipments to achieve our tasks, great appliances with royal looks and features make our lives more striking and smooth. Green computing whose goals are to decrease the use of risky things, maximize energy proficiency during the product's lifetime, and promote the recyclability or biodegradability of defunct products and factory waste. Therefore we use Green Computing for following benefits

- 1) The Climate Savers Computing Initiative (CSCI) catalog can be used for choosing green products.
- 2) Organic light-emitting diodes should be used in its place of the regular monitors.
- 3) Surge guards offer the use of green computing by cutting off the power supply to peripheral devices when the computer is turned off.
- 4) Contributing your old computers and other peripherals can shrink the rate of e-waste creation.
- 5) Moreover, those who cannot afford to buy a computer can benefit from such contributions. Through proper removal of computers and its accessories, it is possible to decrease environmental pollution.
- 6) It was likely that computers would help

reduce paper wastage. However, even today wastage of paper is a severe issue in industries. The easy accessibility of photocopiers and printers is too one of the felons behind unrestricted paper wastage. Think twice before using printers.

Approaches to words the Green Computing

Data centers, which have been appraised for their amazingly high energy demand, are a primary focus for supporters of green computing. Data centers can actually improve their energy and space proficiency through techniques such as storage association and virtualization. Many organizations are opening to eliminate underutilized servers, which results in lower energy usage. The U.S. federal government has set a minimum 10% reduction target for data center energy usage by 2011. Computer virtualization refers to the generalization of computer resources, such as the process of running two or more logical computer systems on one set of physical hardware. The concept initiated with the IBM mainframe operating systems of the 1960s, but was commercialized for x86-compatible computers only in the 1990s. With virtualization, a system administrator could combine several physical systems into virtual machines on one single, powerful system, thereby releasing the original hardware and dropping power and cooling consumption. Several commercial companies and open-source projects now offer software packages to enable a conversion to virtual computing. Intel Corporation and AMD have also built registered virtualization improvements to the x86 instruction set into each of their CPU product lines, in order to enable virtualized computing. Virtual machine can be more easily measured and examined from outside than a physical one, its configuration is also more elastic. This is very useful in kernel development and for teaching operating system courses. Virtual machine can be easily re-located from one physical machine to another as required. For example, a sales person going to a customer can copy a virtual machine with the demonstration software to its laptop, without the necessity to transport the physical computer. At the same time and fault inside a

virtual machine does not harm a host system, so there is no risk of breaking down the OS in said laptop.

Recent implementations of Green Computing

A. Blackle: Blackle is a search-engine site powered by Google Search. Blackle came into being based on the concept that when a computer screen is white, presenting an empty word or the Google home , your computer consumes 74W. When the screen is black it consumes only 59W. Based on this theory if everyone switched from Google to Blackle, mother earth would save 750MW each year. This was a really good implementation of Green Computing.

B. Sunray thin client: Sun Microsystems is reporting increased customer interest in its Sun Ray, a thin desktop client, as electricity prices climb, according to Subodh Bapat, vice president and chief engineer in the Eco Responsibility office at Sun. Thin clients like the Sun Ray consume far less electricity than conventional desktops, he said. A Sun Ray on a desktop consumes 4 to 8 watts of power, because most of the heavy computation is performed by a server. Sun says Sunrays are particularly well suited for cost-sensitive environments such as call centers, education, healthcare, service providers, and finance. PCs have more powerful processors as well as hard drives, something thin clients don't have.

C. The Asus Eee PC and other ultra portables: The "ultra-portable" class of personal computers is characterized by a small size, fairly low power CPU, compact screen, low cost and innovations such as using flash memory for storage rather than hard drives with spinning platters. These factors combine to enable them to run more efficiently and use less power than a standard form factor laptop.

Advantages and Disadvantages of Green Computing

As with other things, green computing also has advantages and disadvantages. Let's see its advantages first.

Advantages :

- As green computing emphasizes low energy consumption, it helps reduce fossil fuel utilization and greenhouse gas emissions.
- It aims to lower heat generation from computers and electronic devices to protect the environment.
- It promotes the effective usage of natural resources and their preservation.
- This approach emphasizes the usage of non-toxic substances reduces health hazards.
- Green computing encourages recycling and reusability of materials to reduced electronic waste, hence, lower land pollution.
- It is cost-effective as it involves less energy and cooling needs.
- Implementing green computing makes us responsible for the environment and towards leading a sustainable future.

Challenges

Every concept comes with inherent challenges that people need to overcome. Though green computing seems like a breakthrough, there are problems that companies face while implementing it. Some of the challenges of green computing are:

- Due to a lack of concern and huge market competition, companies resist this change. Consequently, everyone has to suffer the impact. Thought leadership and educating people about the dangers can increase awareness and adapt to eco-friendly ways.
- Frequent technology changes can confuse them to decide on how to proceed.
- The initial cost for implementing green computing is high.
- Less information is available on green computing, and there's a great level of difference in understanding across end-users, professionals, and companies.
- Companies find it difficult to make decisions due to fragmented data. They must put more effort into collecting and analyzing

data and conclude that the method they use is environment-friendly yet profitable for their business.

Conclusion

While the presentation along with the wideness of appliance of computer is growing, so as well as our knowledge of the price and insufficiency of the power necessary to command them, since the equipment required to build them in the initial position. on the other hand, as computing development can permit persons and business to accept greener lifestyle and effort style, in the conditions of the ecological contest computing is absolutely common component of the trouble and element of the explanation. throughout extra environmental alert practice (such as more effective power management and shut-down during periods of inactivity), and by adopt active minor control technology, computers can by now be made much more liveliness professionalism. without a doubt, now as we seem reverse and surprise why automobile a decade or two previously used to knock back so much petrol, in a decade's time we will no hesitation be spread out that a usual desktop PC used to gladly assemble roughly sketch 100-200W of power each hour day and night, and at what time accomplish no additional than display a screensaver. The computing production is ready and faraway more capable than approximately any other production when it comes to in front of and respond to express transformation. Environmentally it is not a good quality that generally PCs -- mainly in companies -- have naturally enters a landfill behind just a little years in package. though, this actuality does at least suggest that a well-known state of mind previously exist for equally adapt to and paying funds for fresh computer hardware on a standard starting point. thus, while it take decades to find further force professional cars on the roads, it will confidently single obtain a subject of years to achieve a situation of dealings where most computers are using far-off fewer control than they unnecessarily garbage these days.

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ANATOMICAL STUDY OF PROP ROOT FOUND IN SOME SPECIES OF FICUS

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ABSTRACT

The presence of prop root or aerial root is one of the identifying character of family Moraceae. Current investigation was made on anatomy of prop root of *Ficuskrishnae* C. DC. and *Ficusvirens*Ait from Moraceae family. Many mythological stories are seen regarding the *Ficuskrishnae* C. DC. The aim was to contribute with more information concerning the knowledge of anatomy. In this paper included study of microscopic (anatomical) characters of prop root. *Ficuskrishnae* C. DC. and *Ficusvirens*Ait. belongs to the family Moraceae, less reports were available on prop root anatomical studies, hence present efforts were undertaken to investigate the microscopic studies.

Keywords: *Ficuskrishnae* C. DC, *Ficusvirens*Ait. Anatomy, Crystals, tannin cells etc.

Introduction

Moraceae is one of the largest family in dicotyledones, distributed all over India and various part of the world mostly in tropical region (Dhore 2002). The genus *Ficus* is remarkable for the large variation in the habits of its species. Some species of *Ficus* shows remarkable development of aerial roots and they may grow as epiphytes. *Ficuskrishnae*C.DC is a very uncommon species. It shows presence of cup-shaped leaves. It is in large extent found in India, Sri Lanka and tropical Africa. It is large, fast growing, evergreen tree grows up to 30 m tall, with spreading branches and aerial roots (Joshi et al., 2012) *Ficuskrishnae*C.is worshiped in India. Many mythological stories are seen regarding the formation of cone-shaped leaves are associated with this species. In spite of having several morphological differences, *F. krishnae*C.DC is considered by some authors as a synonym of *F. benghalensis*L. which does not seem to be considerable. (Anand et al. 2016). *Ficuskrishnae*C. DC is a perennial plant, it is used in number of folklore medicine, to treat various diseases like ulcer, vomiting, fever, diabetes, dysentery, inflammation, leprosy and cancer etc. (Kanjikar and Londonkar 2017). *Ficuskrishnae* have an anti-diabetic effect in alloxan induced diabetic rats and their effect was equivalent to that of reference drug glibenclamide. (Mohanalakshmi et al., 2010).the leaves are also known as 'MakkhanKatori' (butter cup). God Krishna used to steal makkhan, once when his mother caught him stealing makkhan, he folded the leaves in the form of cone to hide makkhan,

Then produces cone shaped leaves. This is mythology behind cone shaped leaves (Tiwari et al., 2015).

Materials and Methods

The plant material of *Ficuskrishnae* C.DC Were Collected from Nagarjun garden, Akola (dist.), Maharashtra, India. It was not easily available like other species of *Ficus*. *Ficusvirens*Ait.was collected from the forest area of Digras. The required specimen samples stem and leaves were cut and preserved in formalin water solution at room temperature. Hand cut sections had been taken and permanent slides were prepared. Slides were studied under different magnifications of light microscope, and anatomical feature were noted. Photomicrography of slides was taken in Department Of Botany of Govt. Vidarbha Institute of Science And Humanities, Amravati, Maharashtra. using trinocular microscope and A.S.A. 200 film..

Result and Discussion

Morphology and Macroscopic Characters

*Ficuskrishnae*C. DC

Medium size tree, solid, much branched, glabrous, dull whitish colour, leaf simple form pouch at base cupuliform (peculiar leaves), alternate, 10-20cm long and 5-10cm broad, leaflet like appendages on the petiole. Petiole 3-10 cm long, ovate lanceolate, entire, acute or bluntly acuminate, glabrous, reticulate unicastate venation, inflorescence hypanthodium.

*Ficusvirens*Ait

Medium or large deciduous tree, often epiphytic when young, aerial, smooth, grey, leaf simple alternate, 7-15 cm long, 4-9 cm long broad, petiole 4-6 cm long stout, oblong ovate, ovate lanceolate, shortly acuminate, base rounded succordate, reticulate venation, inflorescence hypanthodium.

Microscopic study

Ficus krishnae C. DC.

Transverse section of root showed circular outline. The development of periderm observed. Cork 3-4 layered, cells squarish, rectangular, radially arranged and suberized. Recorded average $6.51 \pm 0.66 \times 14.1 \pm 0.66$ μm and range $5.75-6.9 \times 13.8-14.95$ μm . Phellogen single layered, cells rectangular and tangentially elongated. Recorded average $6.51 \pm 1.75 \times 20.7 \pm 2.3$ μm and range $4.6-8.05 \times 18.4-23$ μm . Phellogen single layered, cells squarish, rectangular to oval shaped. Recorded average $9.96 \pm 3.51 \times 22.2 \pm 3.51$ μm and range $6.9-13.8 \times 18.4-25$ μm . Rhomboidal crystals formed complete sheath in phellogen. Cortex very small, 1-2 layered, composed of parenchyma cells. Cells oval to tangentially elongated in shape. Recorded average $8.05 \pm 1.15 \times 21.4 \pm 3.54$ μm and range $6.9-9.2 \times 18.4-25.3$ μm . Laticifers, tannin cells and rhomboidal crystals present in cortex. Endodermis not prominently observed. Pericycle composed of sclerenchyma fibres, cells with narrow lumen, triangular, polygonal and hexagonal in shape. Recorded average $10.73 \pm 2.65 \times 12.26 \pm 3.51$ μm and range $9.5-13.8 \times 9.2-16.1$ μm . Phloem present below the pericycle, it was 10-12 layered and consists of sieve tubes, companion cells and parenchyma cells. Recorded average $3.83 \pm 1.32 \times 4.21 \pm 1.75$ μm and range $2.3-4.6 \times 2.3-5.75$ μm . Laticifers observed in phloem region. Below the phloem observed a complete ring of 5-6 layered cambium, cells tangentially elongated, flattened, compressed and arranged in rows. Recorded average $5.36 \pm 1.32 \times 5.75 \pm 1.12$ μm and range $4.6-6.9 \times 4.6-6.9$ μm . Below the cambium complete cylinder of secondary xylem observed, it composed of vessels, tracheids, fibres and parenchyma cells. Recorded average

$26.06 \pm 18.5 \times 31.4 \pm 24.3$ μm and range $9.2-46 \times 9.2-57.5$ μm .

In the secondary xylem region patches of sclerenchyma fibres arranged alternate to parenchyma and it was interrupted by vessels and tracheids. In primary xylem metaxylem present towards the centre. Recorded average $14.1 \pm 0.66 \times 15.3 \pm 7.02$ μm and range $13.8-14.95 \times 9.2-23$ μm . Protoxylem present towards the periphery. Recorded average $5.36 \pm 1.32 \times 4.98 \pm 0.66$ μm and range $4.6-6.9 \times 4.6-5.75$ μm . Vessels oval to circular in shape. Medullary rays parenchymatous multicellular, biseriate and multiseriate. They composed of elongated to oval shaped cells, arranged in rows. Rays travels through xylem towards the phloem and get more dilated in cortex region. Root polyarch type. Presence of more than six numbers of primary xylem groups observed. Centre occupied by parenchymatous large pith; cells circular to oval in shape with smooth margin and intercellular spaces. Recorded average $15.71 \pm 4.64 \times 16.4 \pm 5.90$ μm and range $11.5-20.7 \times 11.5-23$ μm . Starch grains observed in parenchyma all the tissues. Tannin cells and solitary crystals present abundantly in peripheral region and scattered in all the tissues.

Ficus virens Ait. Hort. Beng.

Transverse section of root showed circular outline. The development of periderm observed. Cork 4-5 layered, cells squarish, rectangular, radially arranged and suberized. Recorded average $4.44 \pm 0.53 \times 16.1 \pm 2.3$ μm and range $4.14-5.06 \times 13.8-18.4$ μm . Phellogen 1-2 layered, cells rectangular and tangentially elongated. Recorded average $5.36 \pm 1.32 \times 22.2 \pm 1.3$ μm and range $4.6-6.9 \times 20.7-23$ μm . Phellogen 1-2 layered, cells squarish, rectangular to oval shaped. Recorded average $7.28 \pm 0.6 \times 22.2 \pm 1.3$ μm and range $6.9-8.05 \times 20.7-23$ μm . Rhomboidal crystals formed complete sheath in phellogen. Cortex very small, 1-2 layered, composed of parenchyma cells. Cells oval to tangentially elongated in shape. Recorded average $6.13 \pm 1.32 \times 21.4 \pm 2.65$ μm and range $4.6-6.9 \times 18.4-23$ μm . Laticifers, tannin cells and rhomboidal crystals present in

cortex. Endodermis not prominently observed.

Pericycle composed of sclerenchyma fibres, cells with narrow lumen, triangular, polygonal and hexagonal in shape. Recorded average $12.2 \pm 2.65 \times 9.89 \pm 1.19 \mu\text{m}$ and range $9.2-13.8 \times 9.2-11.27 \mu\text{m}$. Phloem present below the pericycle, it was 8-10 layered and consists of sieve tubes, companion cells and parenchyma cells. Recorded average $4.216 \pm 0.66 \times 4.6 \pm 1.15 \mu\text{m}$ and range $3.45-4.6 \times 3.45-5.75 \mu\text{m}$. Laticifers observed in phloem region. Below the phloem observed a complete ring of 4-5 layered cambium, cells tangentially elongated, flattened, compressed and arranged in rows. Recorded average $5.06 \pm 1.21 \times 5.29 \pm 1.61 \mu\text{m}$ and range $4.14-6.44 \times 4.14-7.16 \mu\text{m}$. Below the cambium complete cylinder of secondary xylem observed, it composed of vessels, tracheids, fibres and parenchyma cells. Recorded average $40.63 \pm 26.8 \times 39.86 \pm 28.1 \mu\text{m}$ and range $11.5-64.4 \times 9.2-64.4 \mu\text{m}$.

In the secondary xylem region patches of sclerenchyma fibres arranged alternate to parenchyma and it was interrupted by vessels and tracheids. In primary xylem metaxylem present towards the centre. Recorded average $18.4 \pm 4.6 \times 15.3 \pm 2.65 \mu\text{m}$ and range $13.8-23 \times 13.8-18.4 \mu\text{m}$. Protoxylem present towards the periphery. Recorded average

$7.28 \pm 0.6 \times 9.96 \pm 1.32 \mu\text{m}$ and range $6.9-8.05 \times 9.2-11.5 \mu\text{m}$. Vessels oval to circular in shape. Medullary rays parenchymatous multicellular, biseriate and multiseriate. They composed of elongated to oval shaped cells, arranged in rows. Rays travels through xylem towards the phloem and get more dilated in cortex region. Root polyarch type. Presence of more than six numbers of primary xylem groups observed. Centre occupied by parenchymatous large pith; cells circular to oval in shape with smooth margin and intercellular spaces. Recorded average $9.96 \pm 3.51 \times 12.26 \pm 3.51 \mu\text{m}$ and range $6.9-13.8 \times 9.2-16.1 \mu\text{m}$. Starch grains observed in parenchyma all the tissues. Tannin cells and solitary crystals present abundantly in peripheral region and scattered in all the tissues

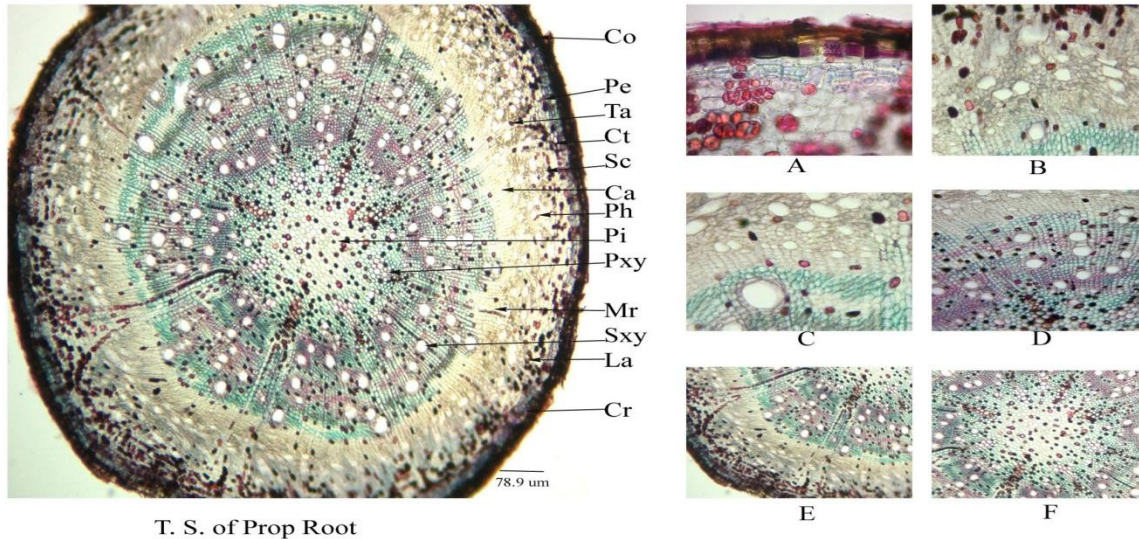
Conclusion

Anatomical information of prop root of two species of Ficus is given, which will be very useful for researchers and students of Botany. Laticifers, tannin cells and rhomboidal crystals present in cortex. Endodermis not prominently observed. Laticifers observed in phloem region. Starch grains observed in parenchyma all the tissues. Tannin cells and solitary crystals present abundantly in peripheral region and scattered in all the tissues.

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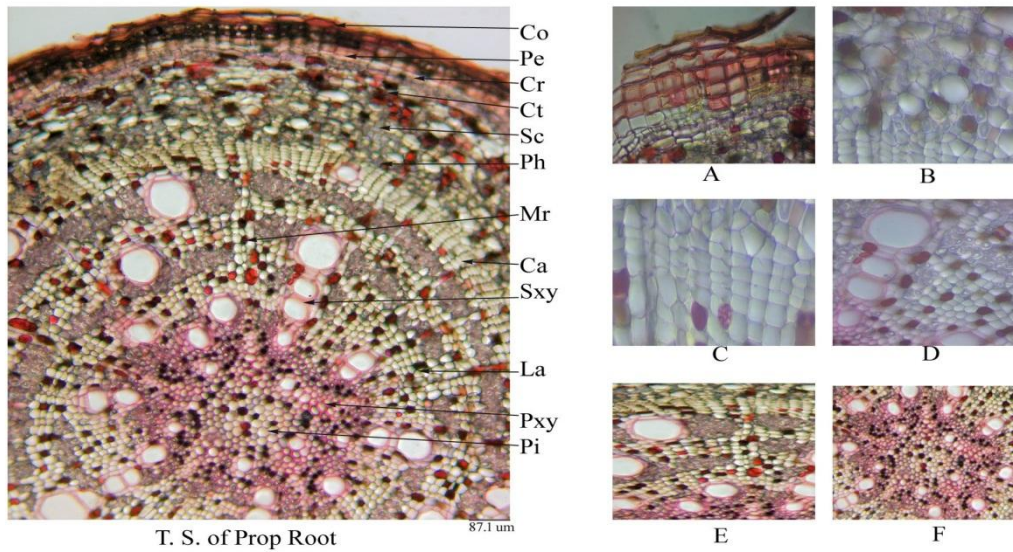
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T. S. of Prop Root

T. S. of Prop Root: (M-4X) Co- Cork, Pe- Periderm, Ct- Cortex, Sc- Sclerenchyma fibres, Ph-Phloem, Ca- Cambium, Sxy- Secondary xylem, Mr- Medullary ray, Pxy- Primary xylem, Pi- Pith, La- Laticifers, Cr- crystals, Ta- Tannin cells

A- Periderm with crystal sheath, B-Phloem with laticifers, C- Cambium, D- Secondary xylem, E- Medullary rays, F- Primary xylem and large pith.



T. S. of Prop Root

T. S. of Prop Root: (M-4X) Co- Cork, Pe- Periderm, Ct- Cortex, Sc- Sclerenchyma fibres, Ph-Phloem, Ca- Cambium, Sxy- Secondary xylem, Mr- Medullary ray, Pxy- Primary xylem, Pi- Pith, La- Laticifers, Cr- Crystals

A- Periderm with crystal sheath, B-Phloem region, C- Cambium, D- Secondary xylem, E- Medullary rays, F- Primary xylem and large pith

ENVIRONMENTAL POLLUTION IS A SOCIAL DEGRADATION ON THE SYSTEM

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Save the Tree, save the Environment

Save Ozone, save Environment

Save the Water, save the Forest

Protect Wildlife

Introduction

Environment and human life are closely related. In the age of science and technology, even if we are moving forward in the name of development and progress, we cannot ignore the environment. If we compare about the environment and its side effects, the environmental awareness is still lacking. Environmental pollution is happening on a large scale. If awareness is to be created between the environment and the society, the legislature intends to enact appropriate laws and implement them non-discriminatory and strictly at the government level. Society should not harm the environment for the sake of happiness and to meet its own needs. Protecting the environment is the need of the hour to live a healthy and prosperous life in the future. The responsibility of stopping the degradation of environmental pollution should be fulfilled by the state, legislature, executive body, administrative bodies, government, society and people.

Hypothesis

Factors causing increase in environmental pollution – population growth, human migration from rural areas to cities due to various reasons (urbanization), industrialization, use of chemical fertilizers and pesticides, political pollution, religious pollution, atmospheric heat, soil erosion, pollution (sound, air, water), Deforestation, fire, disease, seasonal imbalances, chemical spills, avalanches, cloudbursts, hailstorms, hurricanes, nuclear installations, increased use of chemical substances and natural hazards contribute to disrupting the balance of the environment.

There are two types of environmental pollution -

1. Natural pollution
2. Man-made pollution

Objective of the research paper –

A general tracing of the environmental political policy of the 1990s shows that along with the liberalization policy, political elections are acknowledged to bring about fundamental changes not only in the Indian economy but also in the society. In the name of urbanization and industrialization, there is still a lack of knowledge about deep politics while the focus of politics is shifting towards urban areas, neglecting the rural areas. 80% of the population in rural areas lack safe drinking water and one-third of urban waste is never collected by municipalities. The situation in urban slums is particularly deplorable. which houses at least 20% of India's urban population. Nearly 25% of urban areas lack sanitation. Therefore, the environmental condition of India is very bad. A survey by the researcher claimed that 60% of agricultural land has been degraded due to excessive use of pesticides and chemical fertilizers. The above statistics show that the failure of environmental policy at the political level is explained by the lack of implementation of environmental laws, environmental initiatives and expected work on governmental and semi-governmental reporting. Therefore, to maintain the balance of the political environment, the main objective of the research paper is to reduce the gap between politics and environment.

Environment and Disaster Management

Natural and man-made disasters cause physical and environmental damage. Floods, droughts, tidal waves, earthquakes, traffic, accidents, population and political disturbances are more destructive than the capacity of social resources to maintain ecological balance. A disaster is a crisis in property and infrastructure along with loss of life and environment.

There is an atmosphere of concern about environmental problems in developed societies and developing countries. In spite of many environmental protection laws in a country like India, the environmental problem is getting worse day by day for two decades. Despite the appalling nature of the Bhopal gas leak, the remedial measures taken accordingly are very disappointing. The current environmental strategy and the various reforms that follow it do not seem to have been very successful. While studying environmental politics in India, it is important to take a conscious and comprehensive view of environmental amenities, natural resources and man-made environment in rural and urban areas. At present, politics often tries to involve the environment in questions of citizenship. For that, it is necessary to bring natural resources, environmental facilities and services to common citizens. It is important to look at the structure of institutional mechanisms for responding to natural disasters. The high level of socio-economic insecurity in the country contributes to disaster management.

Disaster means - obstacle, disruption, problem and loss.



Characteristics of emerging environmental policy –

Poor people bear the brunt of environmental degradation. Large-scale social, economic and political changes have environmental dimensions. Economic inflation and excessive consumption of manufactured goods affect the environment of daily life and the ecological processes underlying them. Exa. Increasing

vehicular traffic as well as increasing difficulty in finding space for solid waste management. In the name of improving the environment, the poor citizens of the metropolis are finding their right to occupy space in the city seriously diminished. Illegal workers coming to urban areas for livelihood from rural villages depleted by rural unemployment are being demonized as environmental criminals. The symbiosis of human species on the surface is threatened by environmental degradation. Due to such a challenge created in front of the environment, the economic development has also come into play. Social support and the politics of reconciliation in Indian society may seem hopeless, but it should be emphasized that this is a feature of emerging environmental policy around the world. Despite the Pollution Prevention and Control Act of 1974, till date the government has not been successful enough to address the widespread pollution of rivers.

Government Policy and Individual Responsibility of the People

1. Forests and wildlife must be protected to protect and improve the state environment.
2. It shall be the duty of every citizen of India to preserve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.
3. An international agreement is needed to phase out ozone depleting substances.
4. Complexity of technical problems hindered the flourishing of cottage and small scale industries.
5. Central and State Governments failed to create awareness of key policy issues for afforestation and soil conservation.

The reasons for the obstacles to effective implementation of environmental regulations are as follows -

1. Obstruction of enforcement of Pollution Prevention Act pending court case
2. Conflicting Interests of Central and State Authorities.

3. Internal competition between central and state government departments.
4. Politicization of bureaucratic structures.

Environment and Politics in India

Lack of will in the bureaucracy for legal channels and cooperation when implementing environmental policy and loyalty to the party cadre is considered more important than adherence to policies from the political level. In such a case, it is found that many petitions are filed regarding the environmental protection program, expecting from the judiciary system. In such cases, the court has also assumed the role of activists in some cases and ordered the relevant system to take appropriate action. It is common for environmental politics to begin with symbolic

measures. There is a lack of awareness among the Indian public about the environmental threat sensibility. Of course, the actual action of the government is also evidently disappointing. As a result, government inaction leads to social protests and the creation of grassroots opposition movements e.g. The Chipko movement and the campaigns against the Narmada Dam project are the most prominent examples of environmental politics. Environmental pollution is a socially degrading stain on the system.

The general public is more concerned about climate change than ever before. Yet environmental problems and the complexity of those problems remain a major obstacle to political action.

The complexity of environmental problems and the problems of the general public

Environmental Problems	The range of people who care about these "big things" (~1989 to ~2019)	Average percentage	People worrying about these "big things" in 2019
Pollution of drinking water	48% ते 72%	57.50%	56%
Pollution of rivers, lakes and reservoirs	46% ते 72%	53%	53%
Toxic wastes contaminate soil and water	44% ते 69%	52%	-----
Ocean and beach pollution	43% ते 60%	52%	-----
Loss of natural habitat of wildlife	44% ते 58%	51%	-----
Air pollution	36% ते 63%	45%	43%
Damage to the Earth's ozone layer Loss of tropical rain forests	33% ते 51%	43%	-----
Extinction of plant and animal species	33% ते 51%	40%	39%
Global warming or climate change	31% ते 46%	37%	43%
Global warming or climate change	24% ते 45%	34%	44%
Urban pollution and loss of open spaces	26% ते 42%	33%	-----
Acid rain	20% ते 41%	26.50%	-----



Interrelationship of Environment with Global Poverty

Wealth -How does it address issues of inequality?

Can carbon-trading provide solutions to manage climate change?

Access to water -How does the dynamics of wealth and poverty intersect?

Wildlife conservation - is it involved in social injustice?

Environmental movement -What role can they play in development?

Is there a connection between environmental change and violent conflict?

What is the political environment of the forest?

International Environmental Politics

Environmental degradation has increasingly become a legitimate concern of states. Humans should be seen as problem-solving resources rather than sources of environmental degradation. The international community must respond to environmental degradation and achieve environmental sustainability. They add to greenhouse gas emissions that threaten the ice sheet, resulting in submergence of coastal communities and posing a problem of rehabilitation. The massive import and export of computer waste in international trade releases carcinogenic fumes and metals into rivers and groundwater on which the poor

depend. Topics such as international environmental politics include the United Nations, the World Bank, national, state and local governments as well as government policy, technology, business, citizen and consumer social movements. Of course this includes the non-human world, plants, animals, soil and water that are related to the above complex processes and on which humans depend. International environmental politics is therefore a subject made up of values, ideas and philosophies which motivates and discourages human actions. In the early 1950s, the United States faced an epidemic of polio, but within a short period of time, the development of the polio vaccine resulted in the end of the epidemic of polio victims. Recognizing that climate change is a complex and scientific issue may require a renewed focus on scientific literacy. The rapid rate of deforestation in tropical regions destroys the planet's biodiversity built up by millions of years of evolution. Naturally, the climate change that this causes harms the agricultural industry. Understanding the nature of such phenomena is a major goal of the study of international environmental politics.

Conclusion

It is painful for the general public to imagine the destruction of environmental problems. This makes it difficult to understand the links between jurisdiction and responsibility and their causality. The question arises among the

public that what measures should be taken in time to avoid the above problems.

1. Man-made environmental degradation is inimical to human rights.
2. The natural environment is affected by natural phenomena and changes in it.
3. When humans do scientific research, does it have an adverse effect on life? Due to the lack of attention to this, the natural environment has become a threat.
4. Man-made environment and human rights are interconnected

5. Due to the industrial progress made by man, the environment of land, water and air has been greatly affected and the life of man is in danger.

You are the key to cleaner and pollution-free air.

Save the Earth, Save Yourself.

Eradicate pollution, save the environment.

Stop polluting and start living.

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A STUDY ON ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT

While acknowledging the need for “sustainability,” this paper summarizes the problems that have been encountered in our understanding and use of this concept. It explores the efforts of others to define the concept within the context of specific disciplinary areas and sets forth a proposal for a basic understanding of the term “environmental sustainability” as an expansion of our common perception of the nature of human activity.

Keywords: Environmental Sustainability, Principles of Environmental Sustainability.

Introduction

In the middle of the 20th century, we saw our planet from space for the first time... From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery, and soils. Humanity's inability to fit its activities into that pattern is changing planetary systems, fundamentally. Many such changes are accompanied by life-threatening hazards. This new reality, from which there is no escape, must be recognized - and managed (From One Earth).

The need for sustainability There is no question regarding the need for sustainability. In “The Concept of Environmental Sustainability,” Robert Goodland substantiates a history documenting this need, presenting proponents ranging from Mill and Malthus to Meadows and Brundtland et al., and puts forth a definition of “environmental sustainability as the maintenance of natural capital” and as a concept apart from, but connected to, both social sustainability and economic sustainability. These arguments are not repeated here but rather accepted as valid, supported, and used as a basis from which to proceed to further develop this concept

A Definition of Environmental Sustainability:

Understanding and use of the word “environmental” quite often tends to be associated with some kind of human impact on natural systems. This context distinguishes it from the word “ecological,” which can be characterized as a concept of interdependence of elements within a system. As discussed above in the essay, “Ecological Sustainability

as a Conservation Concept,” the authors suggest that an ecological definition of sustainability be advanced that is in better accord with biological conservation. Their suggestion was that ecological sustainability is “meeting human needs without compromising the health of ecosystems.” This seems inappropriate in that the general perception of the word “ecological” is that it implies a broader context than just the human experience. The word “environmental,” however, is almost always used in reference to human interaction with the ecosystem. To increase precision, it thus seems reasonable to view “environmental” as a subset of the broader concept of “ecological,” i.e., the intersection of human activities and ecological systems. Understanding and use of the word “sustainable” or “sustainability” endured a period of accelerated evolution commencing in 1987 with the publication of Our Common Future, which was then followed by a more recent decline in coherency to become an often-abused term simply meaning “good” and sometimes used even without a connection to the natural environment or ecological health (Kiss). As discussed above, meanings for this concept of sustainability have been evolving as individual professions have attempted to develop definitions that make sense in the context of their respective areas of expertise and contribution. The basic understanding of the term “environmental sustainability” set forth in this paper essentially expands our common perception of human activity so as to more clearly connect it with the ecological concept of interdependence, thus delineating the boundaries of this use of “sustainability” to correspond to the overlay of human activity upon the functioning of the supporting

ecosystem. Environmental sustainability, then, is limited to and, in fact, becomes a subset of ecological sustainability. Broadly speaking, this concept of “environmental sustainability” might be seen as adding depth to a portion of the meaning of the most common definition of sustainable development, i.e., “meeting the needs of the current generation without compromising the ability of future generations to meet their needs,” by taking on the general definition “meeting the resource and services needs of current and future generations without compromising the health of the ecosystems that provide them,” (“Our Common Future”). More specifically, environmental sustainability could be defined as a condition of balance, resilience, and interconnectedness that allows human society to satisfy its needs while neither exceeding the capacity of its supporting ecosystems to continue to regenerate the services necessary to meet those needs nor by our actions diminishing biological diversity

Supporting Principles of Environmental Sustainability:

The primary purpose for this effort to develop a definition of environmental sustainability was to help environmental professionals and others operationalize a portion of the concept sustainable development as set forth in Our Common Future. The general understanding and conditions proposed in the preceding section do provide more clarity of purpose and direction but do not include instructions for serving that purpose or following that direction. The list below contains 15 guiding principles, collected from a variety source by the author and his students and colleagues. They are sorted into five imperfect but helpful categories. They are included to stimulate thought as well as provide advice. Readers are encouraged to visit the original sources for greater depth and perspective.

Societal Needs

- Produce nothing that will require future generations to maintain vigilance (“Sustainability Report”).
- Design and deliver products and services that contribute to a more sustainable economy (“Moffat”).
- Support local employment

(Southampton City Council)

- Support fair trade (Williams).
- Review the environmental attributes of raw materials and make environmental sustainability a key requirement in the selection of ingredients for new products and services (“Global Sustainability Principles”).

Preservation of Biodiversity

- Select raw materials that maintain biodiversity of natural resources (“Global Sustainability Principles”).
- Use environmentally responsible and sustainable energy sources and invest in improving energy efficiency (“Global Sustainability Principles”).

Regenerative Capacity

- Keep harvest rates of renewable resource inputs within regenerative capacities of the natural system that generates them (Goodland).
- Keep depletion rates of non-renewable resource inputs below the rate at which renewable substitutes are developed (Goodland).

Reuse and Recycle

- Design for re-usability and recyclability (“Sustainable Living 101”).
- Design (or redesign, as appropriate) manufacturing and business processes as closed-loop systems, reducing emissions and waste to zero (Robinson).

Constraints of Non-renewable Resources and Waste Generation

- The scale (population x consumption per capita x technology) of the human economic subsystem should be limited to a level that, if not optimal, is at least within the carrying capacity and therefore sustainable (Goodland).
- Keep waste emissions within the assimilative capacity of receiving ecosystems without unacceptable degradation of its future waste absorptive capacity or other important ecological services (Goodland).
- Develop transportation criteria that prioritize low-impact transportation modes (Moffat).

- Approach all product development and product management decisions with full consideration of the environmental impacts of the product throughout its life cycle (Moffat).

Conclusion

This paper defines environmental sustainability: as meeting the resource and services needs of current and future generations without compromising the health of the ecosystems that provide them, ...and more specifically, as a condition of balance,

resilience, and interconnectedness that allows human society to satisfy its needs while neither exceeding the capacity of its supporting ecosystems to continue to regenerate the services necessary to meet those needs nor by our actions diminishing biological diversity. It is intended to help operationalize the concept of sustainability by providing more clarity of purpose and direction, particularly regarding the importance of valuing ecological services and recognizing our interconnectedness.

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A REVIEW ON STUDIES OF ZOOPLANKTONS IN VARIOUS WATER RESERVOIRS OF THE INDIA

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ABSTRACT

Plankton occupies the first link in the food chain of the aquatic ecosystem and considers as an important source of food for fish and other aquatic organisms in which zooplankton is the secondary producer of the aquatic ecosystem. It always survives near the surface area of the fresh water and sea because; it requires a food nutrient which is near sea and river banks. Zooplanktons are minor components of undisturbed lotic ecosystem. Zooplanktons provide the main food item to fishes and are also used as indicators of the trophic phase. They play an important role in transferring energy form the producers to the micro consumers. They occupy the second 5 trophic level in an aquatic ecosystem. The common zooplanktons present in freshwater are Rotifers, Cladocera and Copepod. Planktons are highly sensitive to environmental variations, as a result change in their abundance, species diversity or community composition can provide important indication of environmental change or disturbance. Planktonic communities often respond quickly to environmental change and these communities respond to wide variety of disturbances including input of nutrient load. These are sensitive to climatic conditions and plays vital role in indicating the presence or absence of fish species. Zooplanktons are bio-indicators of pollution.

Keywords: Zooplanktons, aquatic ecosystem, environmental variation, bioindicator.

Introduction

Zooplanktons are cosmopolitan in nature and they are found to inhabit all freshwater tropical wetlands. Zooplanktons are a diverse group of heterotrophic organisms that consume phytoplankton, regenerate nutrients via their metabolism, and transfer energy to higher trophic levels (Steinberg and Robert, 2009). It plays an important role in recycling nutrients as well as cycling energy within their respective environment. These are the main sources of natural food for fish which is directly related to their survival and growth and are base of food chains and food webs in all aquatic ecosystem (Miah et al., 2013). They are the essential food item of omnivorous and planktivorous fishes and the most essential for fish larvae culture (Alam et al., 1987). Zooplankton vary from site to site within the same location with similar ecological conditions and as such both qualitative and quantitative studies of zooplankton in a water body are of great importance in managing successful aquaculture operation (Boyd, 1982). Zooplanktons are often an important link in the transfer of energy from producers to aquatic carnivores (Thayer et al., 1974). Zooplankton is a good indicator of changes in water quality because it is

strongly affected by environmental conditions and responds quickly to changes in physical and chemical conditions as well as environmental conditions. Zooplankton communities respond to a wide variety of disturbances including nutrient loading, acidification, sediment input etc. It is a well-suited tool for understanding water pollution status (Contreras et al., 2009).

Planktons: Many minute, microscopic plants and animals which are able to spend their life in the floating manner in the water and these suspended organisms form planktons. They are unable to move rapidly, their movements occur due to physical factors of their environment. (Jhingran, 1991). The planktons consisting plant part is called as phytoplankton and animal part is called as zooplankton.

Zooplanktons: The zooplanktons are the microscopic, free-swimming animalcule components of an aquatic ecosystem, which are primary consumers of phytoplanktons. Zooplanktons provide the main food item of fishes and can be used as indicators of the trophic status of water body (Varma & Munshi, 1987). Zooplanktons play an integral role in transferring energy to the consumers, hence they form the next higher trophic level in the

energy flow after phytoplanktons. The density and diversity of zooplanktons are controlled by several physico-chemical factors of water. The pattern of algal distribution and its density is the main biological factor affecting the density and diversity of zooplanktons. Temperature, dissolved oxygen and organic matter are the important factors, which control the zooplankton growth. (Hanazato&yasuno, 1989 and Bhati&Rana, 1987).

The zooplankton community is composed of both primary consumers (which eat phytoplankton) and secondary consumers (which feed on the other zooplankton). They provide a direct link between primary producers and higher trophic levels such as fish. Nearly all fish depend on zooplankton for food during their larval phases, and some fish continue to eat zooplankton for their entire lives (Madin et al., 2001). Zooplankton forms a major link in the energy transfer at secondary level in aquatic food webs between autotrophs and heterotrophs (Deivanai et al., 2004). The distribution and diversity of zooplankton in aquatic ecosystem depends mainly on the physico-chemical properties of water (Harikrishnan and Abdul Azis, 1989). Moreover, zooplankton communities are sensitive to anthropogenic impacts and their study may be useful in the prediction of long-term changes in lake ecosystems, as these communities are highly sensitive to environment fluctuations (Ferrara et al., 2002; Jeppesen et al., 2011; Kehayias et al., 2014; Preston and Rusak, 2010). It has been reported by several studies that zooplankton can serve as an indicator of changes in trophic dynamics and ecological state of lakes related to changes in nutrient loading and climate (Caroni and Irvine, 2010; Kehayias et al., 2014).

The zooplanktons consists of groups of rotifera, copepods, cladocera, ostracoda and protozoa. The rotifers are microscopic metazoans (100 to 1000 μm) belongs to subphylum Nematohelmenthies. (Kodarkaret.al., 2006). These are commonly called as “wheel animalculae”. These are most important soft-bodied metazoans. (Jacob, 2002). The Copepoda is a major planktonic group of crustacean. These are oftenly called as

“Water fleas”. These are filter feeders that feed on living and detrital particles. The ostracoda are the small crustaceans with bivalve carapace and large antennae. These are also called “Seed shrimps”. These are rarely caught in plankton collecting net because most of them are bottom swimmers and occasionally swim at surface of water. The protozoa include ciliates and flagellates like Paramecium, Euglena, Arcella, etc.

In India some studies on macroinvertebrates are done by Gupta (1976) on Ioni reservoir benthic fauna, studies on lower lake of Bhopal by Nagbhushnam and Vaidya (1979) and Das and Dutta (1983) made comparative study on pulmonates (Gastropods). Sharma and Sharma (2011) conducted a study on Zooplankton diversity of Loktak Lake, Manipur, India. He concluded that plankton showed their annual abundance peak during winter and significant inverse correlation with water hardness and chloride, and abundance inversely correlated with nitrate. Pawaret., al. (2003) recorded fish diversity in Sirur dam near Mukhed in Nanded district of Maharashtra. Several physicochemical and biological characteristics can be reason for stress and adversely affect the fish growth and their population.

Senapati et al. (2011) studied the variation of phytoplankton diversity and its relationship with the physicochemical parameters of semi lentic water body Golapbag, West Bengal India. Factors like nitrate, phosphate concentration support huge growth of Cyanophycean members and sometimes produces algal bloom. Plankton density reached its maximum level in monsoon time. All the physico-chemical parameters of the water were within the permissible limits and can be used for domestic, irrigation and pisciculture (Thirupathaiah et al. 2012).

A change in the physico-chemical conditions in aquatic systems brings a corresponding change in the relative composition and abundance of organisms thriving in the water; therefore, they can be used as a tool in monitoring aquatic ecosystems; zooplankton have been considered as ecological importance organisms (Jose *et al.*, 2015;).

The utmost important ecological parameter of zooplankton in water quality assessment is they help in clearance of sewage and act as natural cleansers of water. Zooplanktons play an important role in recycling nutrients as well as cycling energy within their respective environment. These are the main sources of natural food for fish which is directly related to their survival and growth and are base of food chains and food webs in all aquatic ecosystem (Miah et.al. 2013). Zooplankton mediate the transfer of energy from lower to higher trophic level thus zooplankton represent an important link in aquatic food chain and contribute significantly to secondary production in fresh water ecosystem (Sharma, 1998). Aquatic diversity of lentic water bodies consist many organisms but out of all zooplankton play an important role. The diversity and abundance of zooplankton fluctuates with seasonal variations (Singh et al., 2021).

Zooplankton diversity and their ecology greatly contribute to as understanding of the basic nature and general economy of aquatic habitats. In present days, the biodiversity is in danger due to pollution and human activities. Conservation of biodiversity is essential so it is compulsory to keep update knowledge of every aquatic species diversity. The density of planktons in water body determines stocking rate of fishes because they are the chief sources of the food of commercially important fishes as well as development in production of inland fishery sector. The presence and dominance of zooplankton species played a very significant role in the functioning of freshwater ecosystem. (Panpatil P. and Deshmukh, S.V.)2021.

The survival of effective zooplankton grazer populations preventing algal blooms is important. The zooplanktons play fundamental role in aquatic food chain and food web helping to establish aquatic ecosystem. Zooplanktons are vital components of fresh water food web. The smallest zooplanktons are eaten by larger zooplanktons which, in turn, are eaten by small fish, aquatic insects and so on. Herbivorous zooplanktons graze on phytoplanktons or algae and help in maintaining natural balance of algae.

(MominHeena andMominShakir) 2021.

The zooplankton occupy a central position in aquatic food web as they are the key biotic elements that influence all functional aspects of aquatic ecosystems including food chains and trophic networks, energy flow and circulation of matter. The diversity, distribution and occurrence of zooplankton fauna depend on a number of factors, such as, the physicochemical properties, climate change, habitat; as well as, the biotic factors, like vegetation cover, ichthyofauna presence and other microorganisms (Rajagopal et al., 2010; Ahmad et al., 2011; Alexander, 2012). Many studies also focused that availability of nutrients can also significantly determine the productivity, distribution and diversity of zooplankton taxa in an aquatic ecosystem (Gonzalez et al., 2011).

Komala et al., (2013) studied plankton diversity and abundance of Arkavathi River before and after pollution. Plankton diversity and abundance varied during different seasons, both at non-polluted and polluted sites. A total of 27 species of Zooplanktons were recorded belonging to Protozoa 6 species, Rotifera 8 species, Crustacea 8 species and Insecta 5 species. Nutrient enrichment of the river due to silk industries effluents has altered the structure of plankton community.

Singh, (2013) studied biodiversity of river Gomti is heavily affected by pollution. Planktons are important biological parameters to access the pollution level. This study shows biological productivity as ecological indicator to identify the ecological quality of river Gomti. The zooplankton community comprised Protozoa 5 species, Rotifera 3 species, Cladocera 2 species and Copepoda 1 species. The zooplankton population was observed maximum during monsoon season but it was low in summer season.

Avinash B. Gholap (2014) has studied Species diversity indices of zooplankton from Sadatpur reservoir, Ahmednagar, Maharashtra and found total of 25 species of zooplankton belonging to different taxonomic groups. Among these 6 species belonging to protozoa, 10 species to rotifer, 5 species of cladocera, 3 species to

copepoda and 1 species from decapoda. The numerical superiority of zooplankton revealed that 81.8% frequency occurrence of some protozoa and rotifer. The maximum value of relative density (4.36) was recorded in *Sinantherina* species (rotifer). The maximum value of relative frequency (15.35) was recorded in *Rotaria* species (rotifer). The maximum value of relative abundance (7.6) was recorded in *Rotaria* and *Asplanchna* species (rotifer). These are pollution indicator species used for monitoring the aquatic body.

The study was carried out to assess the planktonic diversity and seasonal variations in the physico-chemical characteristics of Pohra, Wadali and Chhatri surface water reservoirs around Amravati during June 2014 to May 2015. During the course of study the zooplankton in the reservoir under investigation were represented by five major groups i.e. Ostracoda, Rotifera, Cladocera, Protozoa and Copepoda. Among phytoplankton a total of 28 algal species were recorded from all the reservoirs under study with 14 taxa from Chlorophyceae, 9 taxa from Bacillariophyceae and 8 from Cyanophyceae. The Chhatri reservoir was found to contain most of the pollution indicator species. Wadali reservoir also exhibited few pollution tolerant species. The water in all the reservoirs was found to be eutrophic in the order of Pohra>Wadali>Chhatri. (Sangve K.B., 2020).

The presence of zooplankton is directly or indirectly influenced by seasonal variation with complex limnological factors and due to richness and reduction in several nutrients with a suitable environment to maintain diversity and population of zooplankton. Where class belonging to Rotifera is dominant followed by Cladocera>Copepoda> Protozoa and the class of Ostracoda has lower the quantity throughout the study period. We also found that the class

of Copepoda and Ostracoda sp. has monsoon season is highest suitable for growth followed by summer and winter season. Especially class of Rotifera has summer season highest suitable followed by monsoon and winter season and class of Cladocera has highest in winter season then monsoon and summer season and class of Protozoa has monsoon season suitable followed by winter and summer season. Records of various species of zooplankton in this reservoir are some pollution indicators. (S. Yannawar, V. Yannawar, R. Akkewar, S. Pedewad., 2022)

Conclusion

Above review of the literature on zooplankton showed that Zooplankton has been a subject of great interest for foreign as well as Indian researchers. Zooplankton plays very important role in energy transfer within trophic levels, Zooplankton serves as primary and secondary consumers as well as an important link in the transfer of energy from producers to aquatic carnivores. Also, they act as an indicator to the change in quality of water. Zooplankton are very sensitive to any kind of disturbances occurs in water body and this feature makes them extremely suitable to analyze water pollution status. This review about zooplankton may create more interest in their studies and many more possibilities to save water reservoirs.

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BIO WASTE BASED ACTIVATED CARBON FOR CHROMIUM ABETMENT FROM CONTAMINATED WATER

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ABSTRACT

Diverse elements; which are located in the periodic table have been. Chromium is one of such elements. Out of 104 naturally occurring elements some are essential for human life, while a few others inclusive of chromium are toxic and dangerous. Due to its long half life Chromium is much hazardous and it can be toxic effects on the human. The chromium intake is depends on its concentration in natural sources such as air, land and water and should not go above 20 mg per day. If Chromium intake is increases then a wide variety of symptoms observed such as low grade of bone mineralization, high rate of fractures, and intense bone associated pain. In the current project, attempt has been made to study the applicability of activated carbon generated from *Hibiscus cannabinus* fruit shell (HCAC), an bio waste product as a potential metal adsorbent to remove chromium from aqueous solution from contaminated water. A proportionality involving the percentage of divalent chromium removal and adsorbent doses was noted. Highest removal of Cr (II) was achieved at pH ranges of 7- 8 for this adsorbent. The optimum temperature of 250 K for efficient removal of Cr (II) was observed. The effect of anions like SO_4^{2-} , Cl^- , NO_3^- and ClO_4^- on divalent Chromium adsorption has also been investigated. Thus, the agricultural waste based activated carbon under the present investigation is found to be successful for the removal of toxic chromium from aqueous solution (polluted water).

Keywords: Activated carbon, chromium toxicity, adsorption, water contamination, *Hibiscus cannabinus* fruit shell.

Introduction

For the last few decades contamination of water bodies due to the disposal of heavy metals has been causing worldwide alarming effect. Some metals can have toxic or harmful effects on many forms of the life (Yrabulut, 2000). Metals such as chromium, copper, lead, mercury, chromium, nickel and iron etc have a significantly toxic to human beings, aquatic animals and biological environments (Bowen, 1979). In recent years this type of problem has considerable attention. Even in comparatively low concentration of heavy metals are toxic to aquatic flora and fauna. Some of these are capable of being assimilated, stored and concentrated by organisms (Yu, 2000 and Murley, 1992). Destruction, nausea, salivation, diarrhea, muscular cramps, renal degradation, chronic pulmonary problems and skeleton deformity have been observed in the human body by chromium is accumulation (Kadrvelu, 2003; Low, 1998 and Krishnan, 2003). According to the World Health Organization guidelines, the permissible concentration of chromium in drinking water is less than $1.3 \mu\text{g/lit}$. Various treatment technologies have been developed for the purification of water and wastewater contaminated by heavy metals. Out of these

methods for the removal of metal ions from industrial effluents includes: chemical precipitation, solvents extraction, oxidation, reduction, dialysis/electro dialysis, electrolytic extraction, reverse osmosis, ion-exchange, adsorption etc. Amongst all the purification methods adsorption is highly effective and economical. The use of activated carbon is a well-known adsorbent for the removal of heavy metals from the water and wastewater, the high cost of activated carbon limits its use as an adsorbent in developing countries. Hence, it is a emergent need to get the activated carbon from cheaper and locally available bio waste materials. Several research workers used different low cost adsorbents obtained from agriculture wastes such as coconut coir pith, sawdust, rice husk, banana pith, cottonseed hulls, apple wastes, sugarcane bagasse pith, peanut hull, etc. for the removal of chromium from water and wastewater (Marshall, 1996). In spite of several researchers adopted various low cost adsorbents, there is still a need to develop suitable adsorbents for the removal of chromium from aqueous solution. In the present investigation, studies have been carried out for the removal of chromium from

contaminated water using activated carbon derived from *Hibiscus cannabinus* fruit shell which is an agricultural waste locally available in large quantity.

Materials and Methods

The entire chemicals used were procured from Merck, Mumbai, India and were of analytical or chemically pure grade. Deionized/distilled water was used throughout the investigation. A pH meter (Systronic made) was used for the pH measurements.

Atomic absorption spectrophotometer (AAS) with chromium hollow cathode lamp and air acetylene Agro waste based activated carbon for chromium abatement from contaminated water 235 flame was used for determining chromium concentration.

Generation and activation of carbon from *Hibiscus cannabinus* fruit shell (HCAC)

The fruit shell of *Hibiscus cannabinus* species was collected from the local area. The fruit shell was cut into small pieces. It was washed with tap water to remove the sand particles and then treated with formaldehyde to avoid release any colour of fruit shell into aqueous solution. It was again washed several times with deionized water. Then it was allowed to sun dried for 6 days. After drying, the material was subjected to pyrolysis process for carbonization using muffle furnace at 800-900 °C for about 7 to 8 hr so that volatile products were removed and residue was converted into a char. The char was then subjected to microwave activation in microwave oven. The input power of microwave equipment was set at 360 W for 30 min. The resulting activated carbon particles were grounded and sieved in 120-200 mm size. This activated carbon was then washed with double distilled water and dried at 105°C for 3 hr.

Adsorption studies

Stock solution of chromium salt was prepared by progressive dilution as working standards. AR grade HCl, NaOH and buffer solution was used to adjust pH of the solutions. Removal of Cr(II) using *Hibiscus cannabinus* fruit shell activated carbon (HCAC) was carried out

by batch equilibration method. The influence of various parameters such as effect of pH, contact (agitation) time, adsorbent dose and initial metal ion concentration etc. were studied. For each experimental run, 100 ml of contaminated water of known concentration of metal ion was taken in 250 ml stoppered polyethylene reagent bottles. pH was adjusted to the desired value and a known amount of the activated carbon was introduced into the solutions. The bottles were agitated at temp. (250 ± 1K) using a mechanical shaker for a prescribed time to attain equilibrium. At the end of the predetermined time intervals, the samples were taken out, solutions were separated from the activated carbon by filtration using Whatman filter paper No. 41 and the final concentration of metal ions were determined in the filtrate by atomic absorption spectrophotometer. Blank solution was treated similarly and the concentration was taken as initial concentration. The batch adsorption study was replicated twice to confirm the reproducible results.

The experimental conditions are tabulated in Table 1.

Results and Discussion

Characterization of the adsorbent material

FTIR (Fig. 3) analysis was performed to examine the functional groups present on adsorbent material. FTIR spectrum of HCAC displays number of absorption peaks. The broad peak around 3300-3200 cm⁻¹ is due to existence of hydroxyl group. The absorption peak around 1760 cm⁻¹ represents the stretching band of carbon oxygen double bond of the carboxyl functional group. The peak around 1610 cm⁻¹ may be assigned due to stretching of C=O bond. The scanning electron microscopy of HCAC shows that the surface of the material was rough, uneven and with numerous gaps. The porous surface is indicative of high surface area (Fig. 4).

Effect of pH

The effect of pH on removal of Cr(II) by adsorbent was carried out in the pH range 3.0-10.0 ± 0.2. It can be noted that the

removal of Cr (II) ions increased with increasing pH of aqueous solution and reached maximum value at pH 9. It is evident that the HCAC is effective for maximum removal of chromium over the pH range 7-8. Studies were carried out up to pH 8. At the pH beyond 8 the tendency of metal ions to precipitate as metal hydroxide was predominant and hence further studies beyond pH 8 were not conducted.

Effect of contact time on the removal of chromium by HCAC

Equilibrium time is considered as one of the important parameters for economical waste water treatment plant application. The initial concentration of Cr⁺² ions taken was 80 mg dm⁻³. Equilibrium was established within 30 min for Cr (II). It could be seen that the removal was found to 95% for Cr (II) at optimum pH conditions. According to these results, the agitation time was fixed at 60 minutes for the rest of batch experiments to make sure that the equilibrium was reached in every experiment.

Effect of anions

The effect of anions like sulphate, nitrate, chloride, perchlorate, etc. on the adsorption of Chromium (II) was studied. The inhibition on adsorption by monovalent Cl⁻ is less than that of divalent SO₄⁻². As can be expected, a similar conclusion can be drawn for the effect of perchlorate and nitrate anions. The ionic or electrostatic attraction between sorbent and sorbate is the ordinate mechanism, but other mechanism at low and high pH would also be responsible for adsorption.

Conclusion

Removal of toxic chromium from aqueous solution is possible using activated carbon obtained from Hibiscus cannabinus fruit shell (HCAC), which effectively removes more than 95% of Cr(II) at 250 K. Adsorption of Cr(II) was highly pH-dependent and shown the optimum at pH 8 for the removal of chromium at which Cr(II) exists in the most easily absorbable form. Increase in the dose of adsorbent, initial concentration of Cr (II) and contact time up to 1h, results in the increased percentage of removal of Cr(II). Thus, the newly generated activated carbon derived from Hibiscus cannabinus fruit shell (HCAC), has been proved to be an excellent adsorbent which can be employed for removal of Cr (II) from polluted water. Thus, it proves the practical applicability of the sorbent under investigation for control of chromium pollutant in contaminated water.

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Table 1 : Experimental condition for batch adsorption studies

S.N.	Optimization study	Constants	Variables
1.	Agitation time	i) Metal ion conc.=70 mg dm ⁻³ ii) Adsorbent weight=500mg per 0.1 mg dm ⁻³ iii) pH = 8 ± 0.2	Time (min) 10,20,30,40 50 & 60 min.
2.	pH	i) Metal ion conc. = 70 mg dm ⁻³ ii) Adsorbent weight=500mg per 0.1 mg dm ⁻³ iii) Agitation t time = 60 min.	pH ranges from 3-10 ± 0.2
3.	Initial metal ion concentration	i) Adsorbent weight=500mg per 0.1 mg dm ⁻³ ii) pH=8 ± 0.2 iii) Agitation time = 60 min.	Concentration of metal ions 60,50,40,30,20 mg dm ⁻³
4.	Adsorbent weight	i) Metal ion conc. = 70 mg dm ⁻³ ii) pH=8 ± 0.2 iii) Agitation t time = 60 min.	Adsorbent weight 0.1,0.25,0.5,0.75,1.0, 1.25 & 1.50 g per 0.1 dm ⁻³

Fig. 1 : *Hibiscuscannabinus* fruit shell. **Fig. 2:** Activated carbon of *Hibiscuscannabinus* fruit shell.

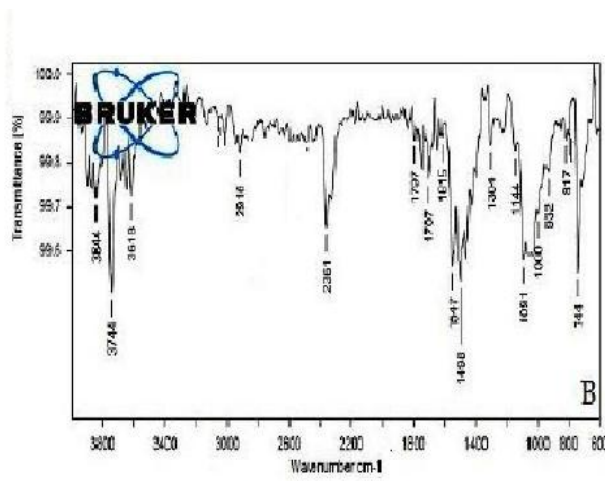


Fig.3 FTIR of HCAC

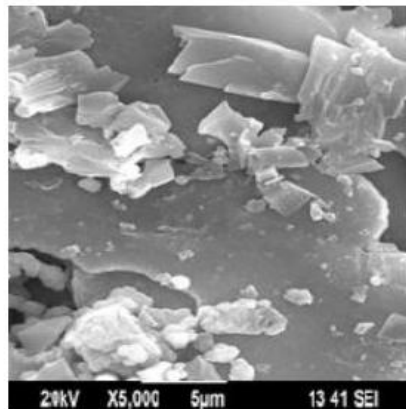


Fig.4. SEM of HCAC

SUSTAINABLE DEVELOPMENT OF ENERGY RESOURCES

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ABSTRACT

The aim of study has to Sustainable development without affecting energy resource by writing this research paper for awareness. Now days we are facing a acute problem of energy scarcity and energy crisis. This research study is within the context of Sustainable development of energy resources. Research focuses on the investigation of the energy conservation. In this context, present government has rightly focused its attention on harnessing the huge Renewable Energy potential that Mother Nature has gifted us naturally in the form Sunlight, Wind, Hydro, tidal and biomass.

Keywords: Energy, Sustainable Development, Growth, Challenges.

Introduction

Human beings are dependent upon a continuous flow of energy. Infact this applies to all living organisms .Without energy life could not exist. It is the duty of any nation to ensure that its citizen s have ready to access to the energy they need. This energy may take the form of food, heat for homes, power to drive machinery, or electricity to run appliances and petrol to fuel automobiles. But man is interfering in nature for his own need and greed he exploit these energy resource and he misuses and overuses of this energy sources . Due to increasing in industrialization more and more energy is utilized which results we are facing a problem like scarsicty of energy resources , load shading problems we are facing in day to today life. We are progressing by utilizing new technologies and sustainable development is more important but that development should not affect the energy resources, they do not cause harmful to energy resource for present and future generation.

Sustainable Development

World Commission on Environment and development published a report in 1987 which defined “Sustainable Development “as “The development that meets the needs of the present without compromising the ability of future generation to meet their own needs”.

Accordingly, this definition is also applicable to the energy resources. If we want the future generations also be benefited by modernization, they should also get the regular

supply of energy. The present rate of exploitation of certain resources like oil and natural gas has to be controlled. The new inventions are necessary and use of non-conventional energy sources is to be made more frequently. There are attempts to use wind power by developing “Wind Mills” in certain area. Solar heat is being used to generate electricity, solar cooker, solar heater etc. Use of biomass and geothermal energy also possible in specific area.

India's development priority

Despite efforts to improve the quality of life of the masses and ensure an equitable allocation of resources with benefits accruing to every ection of society, India’s development challenges continues to remain pretty formidable. The Human Development Index (HDI) for India has increased from 0.52 in 1990 to 0.62 in 2005 (UNDP, 2007). The number of absolute poor in India has been declining, albeit at a much slower than desirable rate, and around 27.8 percent of India’s population was still estimated to be below the poverty line in 2004-05. Obviously, 72 percent of the country’s population continues to reside in rural areas that often lack access to basic infrastructural requirements such as clean drinking water or adequate health and education facilities. The Eleventh Plan Approach Paper states that a key element of the strategy for inclusive growth must be “to provide the mass of our people access to basic facilities such as health education , clean drinking water and so on and governments at different levels have to ensure the provision of

these services. “

However around 44 percent of the population did not have to access to electricity as per Census of India, 2001. Further, shortages in the electricity supply remain significant with around 11 percent energy shortages and 12 percent peak shortages in 2008-09

Though, improving social and physical infrastructure and providing adequate levels and quality of energy to its people remains an over-riding priority for India.

Growth in Energy Demand

There is a strong positive link between human development, economic growth and increase in energy and infrastructure. No country has substantially reduced poverty without massively increasing its use of energy and electricity plays a crucial role in improving level of human development and quality of modern life. The integrated Energy Policy Report of the Planning Commission estimates that in an 8 percent GDP growth scenario.

Now TERI estimates indicate that in an 8 percent GDP growth scenario, associated with higher energy aspirations, improved lifestyles and access energy and services, commercial energy requirements would increase to about 2150 Mtoe in 2031.

However, Petroleum consumption is also expected to increase by around eight times over the period 2001-2031, mainly on account of the transport sector. Consequently, the country's reliance on coal and oil could increase dramatically, resulting in non-coking coal imports of around 1300 MT and crude oil import levels of around 660 MT by 2031.

The Sustainability Challenge

The challenge for an economy like India is huge given that the prime status is to first significantly enhance energy needs by fulfilling the "unmet or latent" demands of the economy and society at large and then to provide for these needs in a manner that is sustainable.

There is no doubt that a major transition is required in order that the country moves away from its current energy path towards one that includes energy saving options both on the

energy demand and supply sides, diversifies the energy. To reduce over-dependence on fossil fuels, makes greater use of indigenous resources and reduces the environmental footprint of the energy mix in future.

Key options for India

Recent analysis has in fact indicated that directionally pursuing energy security and low carbon path goals similarly may lead to the most optimal choice for the country in the long run (TERI, 2009).

Energy savings

Energy efficiency can play a key role in reducing the demand for energy across the consuming sectors. It is estimated that a saving of about 30 per cent is possible in the short term by increasing energy efficiencies along the entire value chain. The challenge of promoting energy efficiency gets further compounded by distortions in the existing pricing system that leads to perverse incentives to either promote wasteful use of energy or resort to theft.

The fiscal measures should ensure that pricing of fuels reflects their true scarcity value and prices of appliances and equipment provide correct information to consumers. The higher purchase price of an efficient technology fails to be appreciated in light of the pay-offs offered by reduced electricity bills and more efficient appliances.

Renewable Energy

Renewable energy technology (RETs) can promote energy security by displacing use of conventional fossil fuels and providing the country with more secure and clean long – term energy options, and providing increased opportunities for local employment, especially the rural poor.

There is a need to focus efforts on product development, achieve continuous improvements in efficiency and reliability, and thereby reduce cost. The significant infrastructure has already emerged for the manufacture of solar PV cells and modules, solar collectors and solar water heating systems in India.

There is now a need to design suitable measures to expand the indigenous manufacturing base of solar energy system and components to help in servicing the domestic Markets with standard equipment and devices and also position the country as a solar hub for catering to the growing export markets.

Sustainability in transportation

Moreover, The National Urban Transport Policy (NUTP) seeks to discourage the use of personal vehicles and increase the share of public transport, and the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) has also made funding for transport projects in cities conditional on the proposals being in conformity with NUTP. Again, it is observed that funds have been sought for more transport-related infrastructure such as widening of roads and building flyovers, rather than for funding the provisions of buses and other transportation.

There is an urgent need to identify areas for collaboration in key sectors and discuss challenges and opportunities for the development, financing, and commercialization of clean energy technologies. Apart from investment in appropriate R and D activities, training of manpower to create the appropriate skill that would be required for maintenance and operations with new technologies needs to be considered seriously taking a long-term and holistic view.

To sum up, The National Action Plan on Climate Change has already set the stage for movement in directions that synergies the multiple objectives of development, energy security, and environmental sustainability. There is a need to carefully evaluate the entire range of options available at each stages. Thus,

the customized solutions and models that can trigger innovation that would be required for maintenance and operations with new technologies needs to be considered seriously taking a long-term and holistic view. To sum up, The National Action Plan on Climate Change has already set the stage for movement in directions that synergies the multiple objectives of development, energy security, and environmental sustainability. There is a need to carefully evaluate the entire range of options available at each stages. Thus, the customized solutions and models that can trigger innovation.

Conclusion

The renewable source become more significant for sustainable supply of energy. Hydel Power, Wind, Sun and Tides are such sources. Accordingly the appropriate technology has to be developed for commercial exploitation of these resources.

Sustainable Development of energy resources, thus implies the i) Present need, ii) growing need and iii) need for future generations. This development should not alter the present natural system that supports that support the life of the earth. It should promote the values encouraging consumption standards within the ecological limits. It should aspire to achieve full growth potential and meeting all essential needs. Sustainable development is possible if the population size I in harmony with the changing productive potential and the ecosystem. To keep in mind the requirements of energy resource that much energy we have to use in our day-to-day life and conserve energy without misusing and overusing for present and future generation is important.

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GREEN LIBRARIES: WELL-GROUNDED DEVELOPMENT IN THE INSIGNIFICANT LIFE OF THE LIBRARY

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ABSTRACT

The role of library in this worldwide phenomenon is enormous. Green image is a good image for the libraries and should use their way of going green to promote a powerful green image towards library users. A Green Library also known as a sustainable library, is a library build with environmental concerns in mind, Green libraries are a part of the larger green building movement. A study of Green libraries revealed that not only has energy conservation become important, but that spaces designed for users. The paper summarizes green or sustainable libraries buildings that are inspiring, functional, and successful and to analyze the importance of green libraries; to identify the standards for green libraries in India, challenges to libraries and library professionals who seek to be positive agents of learning for the communities. It also suggests possible issues, trends, challenges to be faced by future library.

Keywords: Green Library, Sustainable Library, Environments, Green Building, LEED.GRIHA.

Introduction

Most of the famous libraries are transforming their library buildings into green environment. Everyone is talking about “Being Green”. It seems the right things to do, especially if we want our great great-children to live well on this planet. After initial research and thinking about the concept of this paper, we realized that there are many resources for designing green buildings and living a green life. But we found no practical how-to guide for both evaluating facilities and operations and providing a range of solutions towards greening a library. The world keeps on changing and switching from one phase to another, traditional to Industrial to electronic. Libraries have not fully technologically been transformed. This might have been a reason for not being interested in green library movement. Green library management emphasizes a new mindset of taking responsibility for the stability of nature, health of library users and staff and catering for the needs and interest of future generations of users. Libraries as non-commercial and service oriented public buildings are particularly suited to give examples to illustrate the idea of sustainability, to distribute and to disseminate this idea to the people. We need to develop sustainable environment so that coming generation could survive well and green libraries are one of the salutations.

Definitions:

A Green library, also known as a sustainable library, is a library built with environmental concerns in mind. Green libraries are a part of the larger green building movement. There is no univocal definition of a green library.

The online Dictionary of Library and Information Science defines Green Libraries as: A Library designed to minimize negative impact on the natural environment and maximize indoor environment quality by means of careful site selection, use of natural construction materials and biodegradable products, conservation of resources (water, energy, paper, responsible waste, disposal, Recycling etc). In new constructing and library Renovation, sustainability is increasingly achieved through leadership in energy and environment Design certification a Rating system developed and administered by the U.S. Green building council.

What is Green Building:

LEED uses five different categories to Judge a building sustainability.

- **Site location:**

The library should be located in a densely populated area, near a number of other services related buildings. People should be able to reach the building by public transportation and the parking lots should give priority parking to those driving energy efficient vehicle.

- **Water conservation:**

Use of roof water harvesting, green toilets, water recycling, etc. can save lot of water for proper landscaping and greenery in and outside the library building.

- **Energy efficiency:**

In the LEED rating system it is the heaviest weighted of all the categories. On site renewable energy systems, including solar, wind, and geothermal, provide an independent supply of energy. Use of wind and sun can manage temperature and light in place of electricity. It saves lot of natural resources like coal and emission of harmful gases like Co₂ which will be helpful in reducing global warming.

- **Building Materials:**

Major responsibility for selecting materials for the library that can be produced without causing too much damage to the natural environment. Less use of wood will save many trees. Use of locally available material will save transport cost and fuel. It also includes use of biodegradable materials, non use of plastics and other such products.

- **Indoor air quality:**

Green buildings need to be designed in a way in which the air gets recycled, and does not stay stagnant. Least use of air conditioners will reduce emission of harmful gases responsible for holes in ozone layer and intern global warming. Indoor plants significantly improve a whole range of aspects of our indoor environment.

Designing Green Library Building:

First, a sustainable building makes a statement that the library is investing in the future of the community. The systems that support the physical building and operations as well as the supplies and services offered or used by the library. Indian Green Building Council defines "A green building is one which uses less water, optimizes energy efficiency, conserves natural resources, generates less waste and provides healthier spaces for occupants, as compared to a conventional building." As more people take environmentalism seriously, a green image can

improve an institution's image. Brown identified the following green designing elements, which can be incorporated into libraries.

- Community collaborating- makes sure that community assets are efficiently used and helps to maintain public support.
- Daylight- pair daylight with artificial lighting and reduce energy costs.
- Green materials- use renewable materials like wood, bamboo.
- Green roofs
- Raised floor systems
- Energy efficiency
- Natural Ventilation
- Green power and renewable energy
- Indoor environment quality.

Green Libraries in India:

Now many countries all over the world have been enjoying the benefits of green libraries but in India a very few attempts have been made to develop sustainable library buildings. A survey made of four university libraries (Calcutta University Library, Mumbai University Library, Madras University Library, Delhi University Library) by Chakraborty (2013) reveals that although measures were taken care off a long time ago at their establishment time but some suggestions also need to be adopted to solve the problems in current Environment.

India has taken initiative in green movement in the world to save the earth. Before the UN Framework Convention on climate change (UNFCCC) to be held in Paris in Dec.2015. India intend to submit Intended Nationally Determined Contributions (INDC) which will have, apart from technology and capacity building, adoption and mitigation, US, China, European Union and other 50 countries have already submitted INDC (15). Let us hope a green future in the world in India.

Standards for Green Libraries:

- **Indian Green building Council (IGBC):**

Create the possibility for Green Library Building construction which otherwise would have been a utopian fantasy. Indian Green Buildings Council (IGBC) established in the year 2001 to promote and rate Green buildings in India. There are about 2190 registered buildings, 398 rated buildings and also 1082 IGBC aggregated professionals.

• **Leadership in Energy and Environmental Design (LEED-India):**

Leadership in Energy and Environmental Design (LEED- India) green building rating system

is a nationally and internationally accepted benchmark for the design, construction and operation of high performance green buildings.

• **GRIHA (Green Rating for Integrated Habitat Assessment).**

GRIHA for Existing Day the developed as a framework to evaluate and rate the environmental performance of existing schools across India. The rating intends to develop a proactive attitude amongst the students and teachers to reduce their environmental footprint and adopt a greener lifestyle. The rating intends to imbibe the concept of resource conservation by means of learning through play activities thereby converging towards the national targets.

Green Library Challenges:

- Libraries have specific needs that raise some extra challenges. Challenges are:
- cost of constructing green building has become affordable to other entities, libraries will face issues in meeting green goals as they are subject to stringent budget cuts especially when reengineering, or reconstructing library structures one cannot forget the cost associated with it.
- Possibilities to convince the administration who would otherwise object the idea executing green library practices due to their unawareness.
- It is likely to expect lack of awareness in green technology and among the employees

who have been recruited with traditional knowledge and skills.

- To expose the professionals to the latest development which directly or indirectly affect them.
- Attitudinal barriers play significant role in slowing down the sustainable practices in libraries. There is a well laid plan for green library building will remove resistance to change.
- For the preservation, books must be kept away from sunlight as well as moisture and temperature changes.
- A common strategy in green design is to raise the floors to increase circulation, but the weight of the stacks can be an impediment to this strategy.

Conclusion

Green Buildings has very important role in the environmental protection. Obviously a common and very prominent feature of the sustainable design and construction of green library buildings is the special emphasis given to the concept of protection. Protection in this sense covers natural resources (earth, air and water). Depending on the site chosen it will cover nature and landscape; it will encompass the use of material-related and energy resources and finally, it covers the protection of the climate and thus the health of each individual. Environmental protection has become one of the social and cultural values of citizens when stating the necessity of taking responsible action and finds expression within the design and Library building process. Institutions increasingly choose to implement Environmental Sustainability strategic plans. Libraries are discovering that their green building gives them a great opportunity to educate the citizenry. Government should encourage the green library and guide to the all the libraries for making green libraries.

Suggestions

Following suggestions are made for Going Green Libraries:-

- Library buildings should be properly planned using Green Building Standards.

- Implanting the convention of eco- friendly libraries among its users by inviting them to participate in “Go Green Drive”.
- “Economy and Ecology” are the notions for making libraries flourishing, prosperous and carbon neutral.
- Advantage of cloud computing services should be perfectly reaped out hence evading

the print materials.

- Roof water harvesting and roof top gardens, etc. should be encouraged, Use of solar energy should be promoted at roof tops.

Proper reader spaces should be made available with the use of natural resources.

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READING OF WORDSWORTH AND GIEVE PATEL'S POETRY FROM ECOCRITICAL AND ECOLOGICAL PERSPECTIVE

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ABSTRACT

Literature being the reflection of society deals with every aspect of human life and generates theories and criticism relating to the needs and necessities. It has been witnessing the various phenomena happening around the world. One such phenomenon is the environment and nature and man's progressive attack on nature in the name of development. The British poet, William Wordsworth and the Indian poet Gieve Patel are the litterateurs who called for ecocritical studies and show ecological concerns in their poetry. The interdependence and interconnected relationship between man and nature becomes incongruous in the modern world against which the poets record their disapproval. The paper tries to explain the eco critical perspective in their poetry and analyze the theory in view of the literary works created by them.

Keywords: Nature, Literature, Environmental Concern, Ecocriticism.

Introduction

Environment as necessary phenomena for life on earth has got severe blow with the introduction of the industrial era in human history. It was for the first time in history that such a pivotal and vital issue sought recognition at the world's earth summit held at Rio de Janeiro, Brazil in 1992. The retrospection of the causes of earth being defile and polluted emerged as the area of multidisciplinary concern. Beginning from the social studies to the scientific and technological discipline, every field of knowledge begin study to save earth. Every nation of the world has participated in the drive to save this mother earth after exploiting it ruthlessly for centuries in the name of development and material prosperity. At present, major countries of the world has initiated programs as a remedy to environmental threat through scientific experiments, through experiences, emotional calls, drives, literature, education, social activities etc.

Literature being the reflection of society deals with every aspect of human life and generates theories and criticism relating to the needs and necessities. It has been witnessing the various phenomena happening around the world such as wars, threats, ethnicity, problem of races and communities, etc. The quality of tracing all the aspects related to human being has made

literature close to the heart and mind of every intelligent man. Another aspect that deals in literature is the concern of nature and the call for its preservation. From earlier times, nature with its different shades and colours found place in literary forms such as poetry, fiction and short stories, however it was not totally devoted to the environment and studied separately as a branch of literature till 20th century when it was initiated by American scholars Charlyl Glotfelty and after that, it has made a distinguished place in the field of literary criticism. ecocriticism as a theory 'studies literature and the environment from an interdisciplinary point of view, where literature scholars analyze texts that illustrate environmental concerns and examine the various ways literature treats the subject of nature.'

The theory analyses literary works from environmental perspective. It focuses on the things that have been at the margin and been neglected earlier. Ecocriticism investigates the relation between humans and the natural world in literature. It deals with how environmental issues, cultural issues concerning the environment and attitudes towards nature are presented and analyzed. One of the main goals in ecocriticism is to study how individuals in society behave and react in relation to nature and ecological aspects. Due to its broad approach it is known by a number of other designations,

such as 'green (cultural) studies', 'ecopoetics', and 'environmental literary criticism'.

Estok argues that ecocriticism is more than "simply the study of Nature or natural things in literature; rather, it is any theory that is committed to effecting change by analyzing the function—thematic, artistic, social, historical, ideological, theoretical, or otherwise—of the not serious tural environment, or aspects of it, represented in documents (literary or other) that contribute to material practices in material worlds".(Estok, 2001).

At present ecocriticism has been perceived as a theory of a literary movement to restructure the condition of the environment on the planet earth through literary consciousness. The natural environment has been degraded by the exploitative activities of man with attendant fatal consequences of earth warming, air, sea pollution and destruction of aquatic lives, deforestation. These problems in contrast to the beauty of the natural environment like sea, hills, mountains, and forests which remain a source of literary creativity deserve a critical attention. So, the theory of Ecocriticism was introduced to trace environmental representation in a literary work as a primary object.

The study deals with the poetry as a form of literature that specifically concerned with nature and exhibit environment from ecocritical perspective in the works of williamwordsworth, a British romantic poet, (1770- 1850) and Gieve Patel,(1940-) a prominent Indian English poet. Both the poets belong to different societies and cultures. They all lived in a different period and a different region, but their poetry makes much more similarities regarding their poetic style, technique, thematic concern, and ecoconsciousness. For them the role of literature was to restructure the universal concerns from the materialistic to the natural.

William Wordsworth, born in 1770, is a famous English Romantic poet and the forerunner of Romanticism in England.

Romantic poetry has created an ecological perspective to understand the interconnectedness and interdependent of human being and nature. William Wordsworth is considered as the pioneers of ecological conscious writer whose views towards nature and man's treatment of nature is highly appreciable in ecocriticism. Jonarthan Bate Argues that: 'The romantic ecology reverence the green earth because it recognize that we live neither physically nor psychologically can we live without green things.' (Bate, 1991) With the initiation of the ecocriticism as a theory, William Wordsworth has become the exponent of the theory.

Historically, romanticism began as a reaction against the industrial revolution and was an artistic and intellectual movement to reconnect the human feeling to nature. Therefore Under Wordsworth hand the exquisite nature with all its forms, the sky, the clouds, the sea, the forests, the open land, the meadows, the cliffs and the rocks, the grass and the greens, the flowers and the streams seemed alive and bestowed its miraculous power upon man. In the poem "The World is Too Much With Us" Wordsworth is disappointed with modern man's neglectful treatment of nature and shows that the materialistic attitude of man would bring the punishment of detaching the spirit from the body. To quote:

'The world is too much with us; late and soon,

Getting and spending, we lay waste our power:

Little we see in Nature that is ours;

We have given our hearts away, a sordid boon!'(Wordsworth, 1958)

His great poem, "The Table's turn' is a strong aversion of human being's engaging in monotonous activities for educating self. Instead for him the best education can be provided only by nature because it has the quality to in enhance human's capacity to sustain in life. He said:

"Up! Up! My friend, and quit your books;

Or surely you will grow double:
Up! Up! My friend, and clear, your look;
Why all this toil and trouble?
...
Books! 'Tis a dull and endless strife:
Come, hear the woodland linnet,
How sweet his music! On my life
There's more of wisdom in it.
...
Enough of Science and of Art;
Close up those barren leaves;
Come forth, and bring with you a heart
That watches and receives" (Wordsworth,
2006, p 1335)

William Wordsworth found nature as a teacher who taught him right from his childhood. Wordsworth's poetic uniqueness lies in the fact that he has given the most impressive and emotional account of man's relation to nature. In all Wordsworth's poem, an urge is found for man to be united with nature in this vast eco system. Wordsworth's prime aim in celebrating nature is a call to remind humans that a fragmented identity and too much involvement in physical powers would lame the true spiritual powers assigned by nature to man. In the words of S. Campbell, "The conviction that humans are neither better nor worse than other creatures...but simply equal to everything else in the natural world" (Campbell,S.1898)

While surveying Indian English Literature for marking its links with nature, what strikes at first instance is that in poetry, the concern with nature is at its utmost which is justified, considering that poetry is the first genre that enchanted humanity at the dawn of civilization. Toru Dutt, A.K.Ramanujan, Nissim Ezekiel Kamla Das, Gieve Patel are prominent Indian English poets who show their concern to nature and environment and depict the necessities to be in accordance in nature as against the prevalent mentality of human being as controller of the nature and this world.

Gievepatel, a poet and a playwright is staunch supporter of a 'green movement' a group of writers who work for supporting environment. His poems act as a mouthpiece of his love for nature and his animosity at man's destructive and cruel attitude to nature. His famous poem, 'On Killing a Tree' is a graphic picture of a demolition of tree by the hands of man. The interdependence and existence of man on nature has become a faint reality for the modern human. The grid to consume everything that is offered by nature is a devastating mentality of the world around. Gieve Patel describes the ruthless act of killing tree in a picturesque manner. Tree is a symbol of nature, so it is not only killing a tree but killing the nature. In the words of Roy, "modern man out of his grid and selfishness roots out Nature and its very spirit. The murderous rage involved in killing a tree is a symbolic of the extensive deforestation going on throughout the world thereby destroying world and ecology.(Roy, 2014) The poem stated:

'It takes much time to kill a tree,
Not a simple job of knife
Will do it.' (1-3)

Killing a tree is not an easy act for man as the tree has grown slowly underground consuming the earth, absorbing water, air and sun for years and so a sheer act of chopping and hacking will not do the job of killing it forever.

'The bleeding bark will heal
And from close to the ground
Will rise curled green twigs...
The root is to be pulled out-
Out of the anchoring earth...
Or pulled out entirely,' (13-24)

Nature's patience to the unlawful act of human is so much that the tree once again comes to life after the bleeding bark heals all the time. The tender green twigs appear again to resume life even after the onslaught. Knowing this rejuvenating power in tree,

man decides to pull it from the ground cutting all its roots like slaughter, then only his act will be satiated. The earth which has nurtured the tree like a mother will lose it for the lust of a man. 'And then it is done'. The poet sarcastically comments upon the tedious job of cutting down the tree by chopping and browning and hardening. Poet's call for saving trees and the entire environment is but a warning that if the man keeps attacking nature, the whole universe will suffer. The poet describes man's cruelty to nature with irony and sarcasm. While talking on the qualities of Gieve Patel as a poet, an eminent critic C.V. Venugopal says that "The poet's total social commitment, his concerned for the oppressed, his ire at discrimination, above all his love for anything living make his poetry stand apart." (Venugopal, 1984) The poem is a commentary on one of the major environment issue. It brings in forth how a modern, in the name of development become insensitive and ruthless and meddles with the ecosystem as if it is belonged to him and him only.

Many poems written in India during different periods, from diverse perspective and tone at the end advocate the same urgency and need for the harmonious relationship between man and nature. Isolated life is not possible for anyone living on this earth. The interdependence and interconnectedness of human and environment is a truth that makes ecological balance, If this cycle of ecology gets disturbed by the greed of man, then the entire universe would stand at stake.

Conclusion: Environment and human being is interdependent and interconnected like umbilical cord. A man for his existence

needs to understand and realize this relationship can only save him and his future generation. The efforts on the part of nations and the world collectively through UNO have taken some steps to safeguard the environment along with promotion of industrial and economical development. The UN's Earth Summit in 1992, sustainable development was a key word which refers to the equitable distribution of natural resources between present and future generations. Since then preservation and conservation of environment of nature becomes the mission for not only environmental scientists but the political leaders, non government organisations, writers of all the countries, educationist, social workers and researchers. The need of today's hour is not the competition with others but it is the cooperation and the promise to ensure safe, healthy and happy life with longevity and strength. The dreadful situation of today's world in terms of materialistic attitude and actions, selfish desires, rakeless actions, devour mentality, etc ought to be controlled if man wants to dream for the life of future generation as he desires for himself. 'While the earth is poisoned, everything it supports is poisonous. While the earth is enslaved, none of us is free, while it is treated like dirt, so are we.'

Literature in the form of poetry since ancient times reflect the concerns for the growth and development of man attuned with environment and show their disregard and dissatisfaction through their literary styles and works of arts in order to awake the humans from the delirium of money and material.

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THE INFORMATION ENVIRONMENT AND ITS EFFECTS ON INDIVIDUALS AND GROUPS

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ABSTRACT

Over the past two decades, digital technologies have fundamentally altered how people are exposed to and engage with information. The internet has enabled content to be created and shared with large audiences at marginal cost, social media have blurred the lines between personal and mass communication and search engines have made vast amounts of information widely, instantly and freely accessible. More recently, the optimism about the positive transformative potential of digital technologies has given way to an acute sense of its risks: a risk, for instance, of filter bubbles and echo chambers, polarising society along ideological lines and fragmenting the political discourse; or a risk of nefarious actors spreading misinformation online, wielding undue influence and undermining democratic processes. However, researchers can now learn how people interact with their information environment at an unprecedented scale and level of detail by analysing massive amounts of data about who sees, reads or writes what, when and where. This allows them to evaluate the benefits and risks of digital transformations. It also enables them to reassess more fundamental cognitive mechanisms of engaging with information and to develop new hypotheses about the operation of these mechanisms in the digital age. Going forward, good research will have to understand these transformations and how they recontextualise a long history of literature in the field. This makes a review both timely and necessary. This literature review aggregates research on today's information environment and its effects on individuals and groups, with a particular emphasis on the digital sphere but without a narrow focus on the impact of digital technologies.

Keywords: *This is an inherently interdisciplinary task. In our view, emerging fields of research in the computational social and communication sciences do not replace but complement established streams of literature from the cognitive and behavioural sciences. Just like smaller-scale, more controlled experimental studies, the now popular big data approaches come with their own set of strengths and limitations. A comprehensive understanding of today's information environment and its effects on individuals and groups needs to incorporate both perspectives. Review Structure The relationship between individuals and their information environment can be examined along two key dimensions: exposure and engagement. We use this distinction to structure our review as follows: (I) Exposure characterises the encounters between individuals and information content. (II) Engagement refers to the interaction between the individual and the information they are exposed to. (III) Digital technologies have blurred the lines between these concepts and dramatically changed the information environment by enabling individuals to generate, seek out or share information content with unprecedented ease. Accordingly, our review is divided into three main sections, which follow this introduction.*

Introduction

In the wider literature, the term information environment is often used without prior definition and imbued with different meanings depending on the context it is used in. Since this review is concerned with the information environment and its effects on individuals and groups, a precise definition of the term as well as its components is necessary. The term information by itself has eluded a unifying definition. Claude Shannon, who founded the field of information theory, acknowledged that "the word information has been given many

different meanings by various writers in the general field of information theory. It is likely that at least a number of these will prove sufficiently useful in certain applications to deserve further study and permanent recognition. It is hardly to be expected that a single concept of information would satisfactorily account for the numerous possible applications of this general field." (Shannon, 1953, p. 105). A full discussion of the manifold concepts of information is well beyond the scope of this review (see instead Machlup, 1983; McCreadie and Rice, 1999; Madden, 2000; Nauta, 2019). One relevant conceptualisation

for our review comes from the field of semiotics, which is concerned with signs and signalling across a broad range of biological, engineered, and social systems (Morris, 1938). Semioticians understand information as the unexpected, novel content of a sign (Machlup, 1983; Nauta, 2019). This implies that there are two sides to the concept of information, as it refers both to an object serving as a sign, and a cognitive process of recognizing novelty in that sign (Raber and Budd, 2003). In this review, we recognise the importance of both sides by separating our discussion of exposure to and engagement with information

Exposure: The Information Environment in 2020

Before individuals engage with information content, they must encounter it, that is, be exposed to it. Figuratively speaking, this section is concerned with describing the stage for these encounters.

Geographic Divides in the Information

Environment Deep economic and social divides between the Global North and South are reflected in clear differences in how people are exposed to information across the globe. Internet access, for instance, which drastically changed the information environment by offering access to online news sites and social media, is expanding globally but has not yet fully covered the Global South. For 2018, the United Nations' International Telecommunication Union (2019b) reported that internet use in the Global North was nearing saturation levels, with 80.1% and 74.6% of individuals online in Europe and the Americas. In Africa, on the other hand, only 26.3% of individuals were using the internet, while in the Arab states and the Asia & Pacific region 49.5% and 46.2% of individuals, respectively, were online

Social Dynamics and the Diffusion of Information

Online social networks like Facebook or Twitter were devised with the express purpose of facilitating information to be

spread via likes, shares, comments or retweets. Such social media create new dynamics of interaction between individuals, the communities they belong to and the information environment they are embedded in. Most of this review so far has focused on individual exposure to and interaction with information. In the following, we outline evidence regarding the collective dynamics of information diffusion in online social networks

Conclusion and Outlook

This review brought together interdisciplinary perspectives on the contemporary information environment and its effects on individuals and groups. Over the past two decades, digital technologies have redefined modes and dynamics of interaction between individuals and the information they are exposed to, which has motivated new fields of literature in the computational social sciences and media studies but also revived interest in research on human cognition and its biases from the cognitive sciences.

Even though the literature is wide, diverse and continues to grow, much work remains to be done. Directions for future research naturally emerge from the key messages of current literature synthesised in this review. The information environment is not a universal concept, but rather it is characterised by clear geographic and demographic divides. Media consumption habits significantly differ between the Global North and South as well as between individual countries. Older generations across the world generally rely more on non-digital media sources. The young, wealthy and educated are overrepresented on social media across platforms and countries. The information environment is also not a static concept, but rather it changes with the emergence and adoption of new technologies as well as social and political circumstances. A growing proportion of mobile-first internet users as well as a decline in the editorial power of traditional media will increasingly blur personal and mass communication in terms of both information

content and delivery. On the one hand, these factors make much empirical research on the information environment inherently contemporary and context-dependent. High public trust in newspapers in Germany does not imply the same holds in India, Angola, or even the UK. Discourse dynamics on social media that exist today might be reversed in a few years' time.

Today's research is still valuable, but the limits to its generalisability need to be acknowledged. On the other hand, these factors encourage future research, which evaluates the information environment in light of technological changes, such as the emergence of new media. Such research should also devote more attention to countries outside the Global North in order to provide a more comprehensive perspective on the information environment and its effects on individuals and groups across the world. As it stands, both small-scale experimental and big data research concerning the Global South remains woefully underrepresented. Beyond exposure, as characterised by the composition of the information environment, engagement with information is the mechanism through which the information environment affects individuals and groups. Psychological research on dual process theory and motivated reasoning forms a comprehensive account of human cognition and its biases, which in turn provides a framework for evaluating individual engagement with the information environment in different contexts. Confirmation bias in particular, three types of which 28 were discussed in this review, is highly relevant for understanding individual behaviour, beliefs and opinions when faced with new information.

People tend to give greater weight to congenial information in information-rich settings, as shown by research on the myside bias. Even factual content is often interpreted in a partisan manner, as demonstrated by evidence for motivated perception. Both phenomena occur in an information environment that tends to already be biased

towards prior opinions and beliefs, as supported by the literature on selective exposure. The credibility of information content provides another important dimension for understanding how individuals engage with their information environment. Credibility is highly context-dependent, but it can be evaluated in terms of the influence exerted on it by each component of the information transmission channel. The attributes of information sources and social signals about them as well as familiarity and semantic quality in message content can imbue credibility. Different channels are perceived as differently trustworthy, with online social media being among the least trusted. Lastly, individual attributes of the recipient, in particular ideological congeniality, can increase credibility.

This long history of literature on human cognition and engagement with new information in particular has recently gained added momentum due to its relevance for understanding contemporary social challenges, such as political polarisation or online misinformation. Future research will have to continue connecting established results from experimental settings with findings from big data analyses. Conversely, new experimental research is needed to isolate causal effects in otherwise correlational big data research and thus inform targeted policy measures. Digital technologies have fundamentally transformed the way individuals and groups are exposed to and engage with information. The internet and social networks in particular have facilitated collective dynamics of social information diffusion at an unprecedented scale. Network context, including local network topologies as well as influential nodes in the larger network, and information content determine the degree of social influence. However, homophily of connected users as well as external influences, such as other media sources, have to be considered as alternative explanations for perceived behavioural contagion in social networks. While the risks of these digital transformation will have to be evaluated further, current evidence suggests they might

be overstated. Concerns over echo chambers, driven by cognitive biases, and filter bubbles, driven by algorithmic design, fracturing digital information environments and thus increasing social and political polarisation have only limited support in the literature.

On individual platforms, echo chambers appear to exist for political issues, but their relevance fades in light of generally diverse media diets. The same applies for filter bubbles, although algorithmic opacity limits the quality of evidence. Similarly, the prevalence of online misinformation appears a deep but narrow issue, whereby a small and politically polarised subset of the population is most exposed to and engages the most with misinformation content. Its effectiveness in achieving social or political influence, however, has not been demonstrated.

Future research will need to validate these results for more diverse contexts. An overwhelming majority of the empirical literature uses Twitter data, as it is most freely accessible, and much of it focuses on US politics, both of which severely limits the generalisability of its findings. In order to obtain stronger results on the existence of filter bubbles or the causal influence of

online misinformation, researchers will also need to collaborate with platforms to obtain privileged data access, although this in part limited by public policy and political constraints. Initiatives such as Social Science One, which seeks to build industry-academic partnerships for computational social science research, present a strong step in this direction. A better understanding of the extent of the risks thus posed by digital transformations is essential to inform policy responses and countermeasures. At the time of writing, the COVID-19 pandemic is further highlighting the social and political relevance of many of the issues discussed in this review at a global scale. Digital technologies and social media in particular stand to provide a valuable tool for educating the public and disseminating health advice, leveraging the dynamics of social information diffusion on the internet. At the same time, the prevalence of online misinformation around the virus and the underlying cognitive biases that lead people to find it credible pose a very concrete threat to human lives. While the pandemic presents a uniquely disruptive challenge to society as a whole, it is also an opportunity for the academic community to step up and provide research with very real and immediate impact.

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