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SUSTAINABLE NATURAL RESOURCE MANAGEMENT: GLOBAL PERSPECTIVES AND CONTEXTUALIZED ACTION



EDITORS

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ST. IGNATIUS COLLEGE OF EDUCATION (AUTONOMOUS)



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on
**SUSTAINABLE NATURAL RESOURCE MANAGEMENT:
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INTERNATIONAL CONFERENCE PROCEEDINGS

“Sustainable Natural Resource Management: Global Perspectives and Contextualized Action”

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From the Editor's Desk

Natural resources provide our basic needs: the air we breathe, the water we drink and the food we eat. They give us energy, prosperity and security: they protect us and make us healthier and our lives better. Globally, natural resources are becoming more strained each year as more people claim to consume and demand a higher standard of living. Over-exploitation ultimately threatens the livelihoods and well-being of people who depend on these resources and jeopardizes the health of ecosystems. Human actions threaten more species with global extinction now than ever before. At the same time, the extraction of many non-renewable resources is already reaching or nearing a peak. The world is heading for an ecological credit crunch far worse than the current financial or economic crises because humans are over-using the planet's natural resources. An international study warns that Natural resource depletion increases more than the Earth can replenish each year, leading to deforestation, degraded soils, polluted air and water, and dramatic declines in fish and other species. The problem is also worsening as populations and consumption keep growing faster than technology can find new ways of expanding what can be produced from the natural world. Many of the problems that threaten mankind's survival on the planet result from the increased consumption of energy, water, and raw materials, the increased production of waste and emissions, and the increased human use of land area. Climate change is the most important environmental problem linked to our natural resource use. Natural resource degradation increases susceptibility and exposure to climate shocks and further strains the adaptive capacity of resource-dependent communities. The rising population is taking its toll on scarce resources. We are in critical demand to manage our resources because everything we consume is obtained from resources existing on Earth; also, proper management ensures the availability of these resources for us today and future generations tomorrow. Sustainable utilization of natural resources is the appropriate management of natural resources for the benefit of the entire human community. The main aim of sustainable development is to provide resources for present generations without compromising the needs of future generations.

The Conference focused on these thought provoking thrust areas.

- Environmental Pollution and Public Health.
- Climate Change: Adaptation and Mitigation.
- Environmental Management.
- Environmental legislation and policy.

- Soil salinization, acidification, compaction (structural degradation), pollution – issues and management.
- E-remote sensing and its applications for managing soil degradation water resources conservation and management
- Conservation irrigation innovations for higher water productivity conjunctive use of poor quality waters sustainable farming systems vis-a-vis climate change
- Intensification of cropping systems for adaptation to climate change
- Integrated farming system for livelihood and natural resource security.
- Biodiversity conservation through the integrated farming system and coastal ecosystem Management
- Land use planning and management under changing soil and water scenario
- Carbon sequestration potential of soils under different land uses and in agro-climatic regions
- Biodiversity conservation for mitigating climate change
- Socio-economic and gender issues in natural resource management
- Women empowerment in natural resource management
- Role of women in environmental protection
- Policy interventions in soil and water management for global food security
- Bio-industrial approaches to the watershed for food and livelihood security
- Bio-industrial watershed management for enhancing income and employment generation.
- Use of bio-industrial waste for the development and management of degraded natural resources.

Having received good response from participants, we, the editorial board is glad to bring forth this International Conference Proceedings to disseminate the knowledge, values and skills to all ignited minds.

We are grateful to **The Rise Foundation** for their collaboration.

Rev.Dr. L. Vasanthi Medona ICM

Dr. M. Maria Saroja

Mrs. E. Michael Jeya Priya

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INTEGRATED FARMING SYSTEM - AN ECOFRIENDLY APPROACH FOR SUSTAINABLE AGRICULTURAL ENVIRONMENT – A REVIEW

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ABSTRACT

Integrated farming systems (IFS) is an ecofriendly approach in which waste of one enterprise becomes the input of another thus its make more efficient use of resources from the farm. Integrated Farming System (IFS): A component of FSR (Farming System research), introduces a change in the farming techniques for maximum production in the cropping pattern and takes care of optimal utilization of resources. IFS as a mixed animal crop system where the animal component is often raised on agricultural waste products while the animal is used to cultivate the soil and provide manure to be used as fertilizer and fuel. India, the growth rate of agriculture in the recent past is very slow in spite of the rapid economic growth. The country's population is expected to reach 1660 million in the year 2050 for which 349 million tonnes of food grains will be required. It is anticipated that the land area available in 2050 would be around 137 million hectares. Adoption of Integrated Farming System (IFS) leads to sustainability and stability in farm income through multiple enterprises that aim at maximum utilization of available natural resources to meet the family needs.

Keywords: *Integrated farming systems, Sustainable development, Integrated Bio systems*

Introduction

An integrated farming system(IFS) is an eco-friendly approach that turns waste from one enterprise into nutrients for another, thereby maximizing the use of resources from the farm. The essence of IFS is that it works like an ecosystem where all the elements are in equilibrium and interdependent. The waste of one element works as a nutrient for another. (Gupta,A.K.et al.2020).The emergence of Integrated Farming Systems (IFS) has enabled us to develop a framework for an alternative development model to improve the feasibility of small sized farming operations in relation to larger ones. Integrated farming system (or integrated agriculture) is a commonly and broadly used word to explain a more integrated approach to farming as compared to monoculture

approaches. It refers to agricultural systems that integrate livestock and crop production or integrate fish and livestock and may sometimes be known as Integrated Biosystems (Sharma,P.K et al. 2019). In this system an inter-related set of enterprises used so that the “waste” from one component becomes an input for another part of the system, which reduces cost and improves production and/or income. IFS works as a system of systems. IFS ensure that wastes from one form of agriculture become a resource for another form. Since it utilizes wastes as resources, we not only eliminate wastes but we also ensure overall increase in productivity for the whole agricultural systems. (Dadabhau,A.S., & Kisan,W.S.2013). Farming systems and thinking about farming change continuously. These processes can be called the evolution of farming systems and system philosophy, if change is called evolution and if thinking about systems is called philosophy. Rapid change took place in the last two decades in both temperate and tropical regions in terms of yield per animal or plot, and in terms of input use. All over the world the grain yields went up at spectacular rates during the green revolution and individual levels of production in animals followed a similar trend.It aims at generating a threshold level of farm income required for the farm family to maintain sustained interest in farming thus preventing migration of people from the farming sector. Integrated Farming System which combines activities of food-crop farming with horticulture, animal husbandry, fisheries, forestry and other science related to farming on the same field at the same or almost the same time needs to be developed as a solution to food security problem resulting from decreasing food productivity and climate change. IFS itself is important for sustainable development of farmer by improving yield, economic return, employment generation, nutritional security and livelihood (Soni,R.P., Katoch,M &Ladohia,R.2014).

Sustainability of IFS

Sustainable development in agriculture must include integrated farming system (IFS) with efficient soil, water crop and pest management practices, which are environmentally friendly, and cost effective (Walia and Kaur 2013) Nutrient recycling within the system advocates the self-sustainability of the system and which will not only reduce the dependency on the external inputs viz, seed/ fertilizers etc. but also provide the balanced and rich nutrition to the farm family with reduced cost of cultivation and increased profit margin on the same piece of land which is key factor for taking care of sustainability On any farm, four natural ecosystem processes like energy flow, water cycle, mineral cycle and ecosystem dynamics work (Sullivan 2003). These four ecosystems processes function together, complementing each other as sustainable agriculture requires system

approach (Singh et al. 2009) and system implies a set of agricultural activities organized while preserving land productivity and environmental quality and maintaining a desired level of biological diversity and ecological stability.

Scope for IFS

An IFS consists of a range of resource-saving practices that aim to achieve acceptable profits and high and sustained production levels, while minimizing the negative effects of intensive farming and preserving the environment (Lal and Miller 1990, Gupta et al. 2012). IFS give greater importance for sound management of farm resources to enhance the farm productivity and reduce the environmental degradation, year (Kumar et al. 2015) improve the living standard of resource poor farmers and maintain sustainability (Kumar et al. 2013) Integrated farming is a system which tries to imitate the nature's principle, where not only crops but, varied types of plants, animals, birds, fish and other aquatic flora and fauna are utilized for production throughout the Integration of livestock with crops on watershed and individual holding basis has been reported to improve the traditional farming system on sustainable and eco-friendly basis (Dhiman et al. 2003).

Empowerment of women through IFS

Women play a very important role in household management including agricultural operations. This is especially true for hilly and tribal areas. There is a vast scope to improve the household profitability by judiciously utilizing family labour using innovative practices and ensuring multiple uses of various household resources. This is possible through women's empowerment through location specific trainings and critical need based support. With the improvement in educational status in the years to come, the role of women in agriculture and management of household resources will be increasingly important. As such, feminization of agriculture in the long run is expected and developing women-centric farming system models will be a real challenge as men are migrating to rural non-farm sectors (Soni, R.P., Katoch, M., & Rajesh Ladohia, R. 2014).

Need of Integrated farming systems

In the changing scenario, major issues such as poverty, climate change and livelihood and nutritional security, land needs holistic approaches to enhance the farm income mostly in rural agricultural belt of India. Some of the most factors needed to adopt and use the Integrated Farming Systems:

- ❖ Enhancing natural resource quality
- ❖ Enhanced productivity and reduced production cost
- ❖ Increased income and standard of living
- ❖ Enhanced resource use efficiency
- ❖ Recycling of resources
- ❖ Reduced effect of climate change on agriculture
- ❖ Improving biodiversity
- ❖ Reduced risk through diversity of integrated farming systems

Over all Advantages of Integrated Farming System

Farming system models at different situations could enhance the productivity of the farm as whole, improve the profitability in terms of additional net return and continuous flow of income to the farmer and sustain the soil health through residue addition and improve the major and micro nutrient supply. In integrated crop livestock farming system, crop residues can be used for animal feed, while manure from livestock can enhance agricultural productivity by intensifying nutrients that improve soil fertility as well as reducing the use of chemical fertilizers (Gupta et al. 2012). The enterprise linkage provides good opportunity for regular and gainful on-farm employment for farm employment for farm family members with equi-temporal distribution. This also helps for nutrition security through optimised carbohydrate, protein, fat and energy supply by integrating allied enterprises (Jayanthi and Vennila,2008) Animal excreta contain several nutrients (including nitrogen, phosphorus and potassium) and organic matter, which are important for maintaining the soil structure and fertility.

- ❖ **Productivity:** IFS provides an opportunity to increase economic yield per unit area per unit time by virtue of intensification of crop and allied enterprises especially for small and marginal farmers.
- ❖ **Profitability:** Cost of feed for livestock is about 65-75% of total cost of production; however, use of byproduct (excreta, dried leaves, crop residues etc) reduces the cost of production, conversely it is same for the crop production as fertilizer requirement for crop is made available from animal. Thus, help in increasing the profit of farmers.
- ❖ **Sustainability:** In IFS, subsystem of one waste material or byproduct works as an input for the other subsystem and their byproduct or inputs are organic in nature thus providing an

opportunity to sustain the potentiality of production base for much longer periods as compare to monoculture farming system.

- ❖ **Balanced Food:** All the nutrient prerequisites of human are not exclusively found in single food, to meet certain balanced nutrient availability, different food have to be consumed by farmers. Such necessity can be fulfilled by adopting IFS at farmer level, enabling various sources of nutrition.
- ❖ **Environmental Safety:** To minimize the waste (excreta, dried leaves, crop residues etc) produced from various enterprises, it can be effectively recycled by linking appropriate components in different farming systems, thus minimizing environment pollution.
- ❖ **Income Rounds the year:** Due to interaction of enterprises, the production and productivity of crops, eggs, meat and milk are increased, thus resulting in rise in income round the year amongst farming community.
- ❖ **Meeting Fodder crisis:** Byproduct and crop residues are adequately utilized as fodder for livestock (Ruminants).
- ❖ **Employment Generation:** Integrating crop with livestock enterprises would increase the labour requirement significantly and would help in reducing the problems of under employment. IFS helps in providing enough employment opportunities for the family member round the year.

Conclusion

IFS is the most promising option for small and marginal farmers. It not only enhances the nutritional and economic status of farm families but also increases employment opportunities and makes optimal use of farm resources which results in more productivity. IFS is also an eco - friendly approach in which waste of one enterprise becomes the input of another thus making efficient use of resources. It helps in improving the soil health, weed and pest control, increase water use efficiency and maintains water quality. As this system minimizes the use of harmful chemical fertilizers, weed killers and pesticides and thus safeguards the environment from the adverse effects. The demonstration of Integrated Farming Systems all across the world has indicated sufficient gains in terms of economic returns, employment generation and environmental sustainability. The reduction in popularity of practicing agriculture as integrated system is due to several constraints faced by the farmers. The constraints vary across different agro climatic zones. The scientific interventions should be demonstrated by extension agencies for narrow down the limitations through enhancement of

productivity and income. The efforts of Government are also required to subsidise IFS models for achieving the target of doubling the farmers' income. Thus proper guidance should be provided by the government to the farmers about the significance of integrated farming system.

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CONSERVATION STRATEGIES FOR MARINE BIODIVERSITY

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ABSTRACT

The coastal zone is a region where land, ocean and atmosphere interact and hence it is dynamic in nature. Marine Biodiversity is increasingly threatened by habitat destruction, environmental changes, and overexploitation. Preventing reductions in biodiversity and promoting sustainable resource use requires new management strategies, more effective education, and strong research. There is a need to switch to less destructive and wasteful fishing methods to protect critical and sensitive habitats from development and overexploitation. Effective use of marine reserves requires the integration of scientific disciplines in fisheries, oceanography, computer science, system analysis, ecology, genetics, social science, and conservation. However, the state of the coastal ecosystems is degrading alarmingly quickly. The causes include overuse of species, the introduction of exotic species, industrial contamination, habitat loss, altered water diversion, over use of water resources, etc. Losses of marine diversity are highest in coastal areas largely as a result of conflicting uses of coastal habitats. The best way to conserve marine diversity is to conserve habitat and landscape diversity in the coastal area. A holistic approach is necessary to maintain healthy coastal ecosystems. By teaching people skills and techniques on replanting, restoration, removal of alien species and sharing of lessons learned, a synergy can be developed between people and coastal ecosystems.

Keywords: *Biodiversity, conservation, coastal, ecosystem, and management.*

Introduction

The coastal marine ecosystems play a vital role in India's economy by virtue of their natural resources, potential habitats and wide biodiversity. Marine biodiversity affords enormous economic, environmental and aesthetic value to human kind. Humans have long depended on marine aquatic resources for food, medicine and materials as well as for recreational and commercial purposes such as fishing and tourism. Marine organisms also rely upon the great biodiversity of habitats and resources for food, materials breeding and larval disposal environment (P.Nammalwar, S.Raja,

C.Thomson Jacob, T.D.Babu and S.Satheesh,2009). India has 8129 km long coastline with a 2.5 million km two Exclusive Economic Zone (EEZ). Marine biodiversity is precious to humanity in terms of economy, environment, and aesthetics (CRSARD). Humans have traditionally relied on marine aquatic resources for food, medicine, recreation and commerce like fishing and tourism. In addition, marine species rely on a wide variety of environments for food sources, breeding sites, and larval disposal. Maintaining a balance between them is critical because of their interconnectedness.

Some of the planet's most diverse and prolific biological systems are found in the coastal marine zones. These include regions with sophisticated and complex ecosystems susceptible to human activities, impacts, and interventions, such as mangroves, enclosed tidal and sea systems, salt marshes, coral reefs, and seagrass beds. These systems are under increasing pressure. Due to its riches, valuable habitats, and extensive biodiversity, the coastal marine environment is crucial to India's economy. Via coastal regions, the world's oceans and seas are connected to numerous freshwater bodies. The two constitute a separate ecosystem, giving rise to many of the planet's marine species.

A single system for managing and preserving the world's oceans and coastal regions in accordance with environmentally sustainable practises is provided by integrated coastal zone management (ICZM). Since 1993, the World Bank has helped client nations develop integrated coastal zone planning and management through a combination of partnerships, investment, and capacity building (Anon, 2002). These initiatives have coincided with assistance for preserving marine biodiversity and protecting the marine environment, including pollution management. Since fish and other seafood constitute a source of protein, the marine and coastal environments are even more crucial nowadays (Kathiresan, K. and S.Z. Qasim, 2005).

Areas with a Diverse Population

Finding places vitally essential and rich in species distribution and suitable habitats is a top priority for conserving marine biodiversity. It is feasible to use species diversity as a criterion for ranking conservation areas. More consideration should be given to an area's value, evolutionary significance, ecological impact, and endangerment since it supports a smaller array of species (De Roy & Thadani, 1992). On a biogeographic scale, they solely consider Species richness and diversity as a standard for priority conservation. For various reasons, areas with high biodiversity might not

be the most important to the sea. Although having a high species diversity, coral reefs typically have low levels of other biological characteristics like endemism.

Compared to salt marshes, mangrove forests, coral reefs, and seagrass beds can all be vital since they act as substantial nursery regions and support significant food webs through their production. In addition, even though their diversity is limited, some places are important during certain seasons because they are essential to fundamental aspects of marine biological diversity. They comprise stopover spots and areas for migration, spawning grounds, nursery grounds, and courting. Protecting productive areas, breeding sites, nursery grounds, and migration routes (Sasikala, 2004).

Impacts of human activities on marine biodiversity

For effective and efficient conservation and sustainable use of marine biodiversity, it is important to systematically and comprehensively understand problems in the target water.

Factors affecting marine biodiversity

Major anthropogenic factors that affect or may affect the biodiversity in Japan are (1) physical alterations that reduce habitats for organisms, (2) pollution of marine environment that deteriorates the quality of ecosystems, including releases of effluent, waste material, oil and chemical substances, (3) excessive harvests (including those of non-target species, or their bycatch), (4) introduction of alien species that may disturb ecosystems, and (5) impacts of the climate change that may affect the physicochemical environment or system of the ocean. Human activities are intensive especially in coastal water, and these factors are involved intricately

Indian Biodiversity Conservation Strategies

According to Bakus (1994), Effective management and conservation strategies for habitats for coral and mangroves along the Indian coast can be developed by the Ministry of Environment and Forest of the Indian government. This is because maintaining coral and mangrove habitats is essential for ecological and socioeconomic sustainability. Ramachandran (2001) asserts that the best way to manage biodiversity conservation in India is to adhere to the following principles:

- Reviving the 200-year-old practise of maritime biodiversity inventorying to understand, manage, control, and make sustainable use of bio-resources.
- Rebuilding or restoring extinct environments.

- Discord is lessened, and bycatch is tossed overboard.
- The creation and administration of maritime protected areas.
- management of fisheries based on ecosystems.
- creation of practical policy solutions.
- Revalidated economic values of India's coral reef ecosystem's biological resources on the world market and the effects of export.

Resilience of the coastal zone

However, in spite of the ecological richness and contribution to the national economy, India's coastal and marine areas have not received adequate protection and are under stress. About 34% of India's mangroves were destroyed during 1950-2000; almost all coral areas are threatened; marine fish stocks are declining; and several species of ornamental fish and sea cucumbers are fast disappearing. Such rapid depletion and degradation, unless arrested, will impact the livelihood, health and well being of the coastal population, affecting in turn prospects for India's sustained economic growth. (Arijit Banerjee, 2012). The issue is getting more attention globally. According to John R. Clark (1996), many marine and coastal resources vital to human life are being rapidly destroyed across the Third World. Among the most significant factors contributing to the degradation of coastal resources are siltation, nutrient-rich agricultural emissions, industrial waste discharges, and urban conurbations. The primary underlying cause is the quick population expansion that is occurring in the majority of tropical nations. The courses are very prestigious and frequently have growth rates of more than 5% annually. Conventional industries like fishing and shipping cannot address coastal deterioration (Grassle et al., 1991).

Need for Coastal Ecosystem Management

According to Annon (1987), several rivers erode the Indian coast, creating estuaries where they meet the sea. Mud flats, salt marshes, backwaters, mangroves, estuaries, and rocky terrain shorelines, and sandy stretches make up complex coastal ecosystems. Other Gulfs include the Lakshadweep and Andaman and Nicobar island ecosystems, the Gulf of Mannar on the eastern coast, the Gulf of Kutch on the western coast, and the Gulf of Cambay. India's islands contribute to a greater diversity of ecosystems. Both the Gulf of Mannar and the Gulf of Kutch include abundant coral reefs and mangroves, and both island environments are home to significant marine species.

It is suggested that diverse regional-sized marine ecosystems, which demand a biodiversity information data bank, use a comprehensive collection of biodiversity lessons discovered in different parts of the world. This information will enable meaningful comparisons between the causes and consequences of human activity-induced changes in biodiversity across a range of habitats (Menon & Pillai, 1996). It is imperative to make considerable progress in the recognition of marine creatures, the documentation of their distribution, the comprehension Understanding regional and local biodiversity patterns, as well as the mechanisms that create and keep these patterns over time (Ray, 1991).

The following steps are to be incorporated to make coastal ecosystem flourish.

- Creating a national information network for a rapidly expanding use of taxonomy to interpret, manage, conserve, and make sustainable use of biodiversity, as well as the requirement to combine the data already available from all sources
- Prioritizing the understanding for the critical values, which genes, species, and habitats, and how much biodiversity should be preserved
- Enhancing the programme methodology, creating more effective policies, and prioritising our goals
- Implementing a biodiversity conservation programme with specific goals in mind
- Acknowledging the communities' priorities
- Implementing anthropogenic goals to preserve biodiversity so that it can be helpful to humanity

Conservation of marine biodiversity

Conservation of marine biodiversity through coastal zone management Some coastal ecosystems are particularly at risk, including saltwater marshes, coastal wetlands, coral reefs, coral atolls and river deltas. Other critical resources, such as mangroves and seagrass beds, submerged systems and mud flats are at risk from climate change impacts, exacerbated by anthropogenic factors. Changes in these ecosystems could have major negative effects on tourism, freshwater supplies, fisheries and biodiversities that could make coastal impacts on important economic concern. Coastal zones comprise a continuum of aquatic systems including the network of rivers, the estuaries, the coastal fringes of sea and continental shelf and its slope. The functional value of diversity concept encourages analysis to take such a wider perspective and examine changes in large-scale ecological

processes, together with the relevant environmental and socio-economic driving forces. At the global scale, while climate has fluctuated through out time, a global warming scenario could lead to accelerated sea level rise, changes in rainfall patterns and storm frequency or intensity and increased siltation(P.Nammalwar, S.Raja, C.Thomson Jacob, T.D.Babu & S.Satheesh,2009).

Indian Initiatives for Coastal Management

In order to preserve coastal ecosystems, the Government of India has declared areas between high and low tide lines (HTL, LTL) and 500 m from HTL as the Coastal Regulation Zone (CRZ) and prohibited or restricted construction and industrial activities. The accurate delineation of HTL and LTL is very critical. They have been delineated based on tonal discontinuity on satellite images (Nayak [2009](#)). CRZ regulation needs to focus on protecting ecologically sensitive areas, while urban and rural areas are governed by existing laws of state and central governments with few conditions (Nayak et al. [Citation2015](#)). This regulation has helped to conserve most of the protected areas, ensure livelihood security of fishermen, provide resilience to impacts of hazards and promote socio-economic development based on scientific principles. The government has issued notifications under the Environment Protection Act, 1986, to regulate activities along India's coasts particularly regarding construction.

- **The Coastal Regulation Zone Notification (CRZ) 2019**, implemented by the Ministry, classifies the coastal area into different zones to manage infrastructure activities and regulate them.
- **National Centre for Sustainable Coastal Management:** It aims to promote integrated and sustainable management of the coastal and marine areas in India for the benefit and wellbeing of the traditional coastal and island communities.
- **Integrated Coastal Zone Management Plan:** It is a process for the management of the coast using an integrated approach, regarding all aspects of the coastal zone, including geographical and political boundaries, in an attempt to achieve sustainability.
- **Coastal Regulation Zone:** The Coastal Regulation Zone (CRZ) notification was issued in 1991 under the Environmental Protection Act, 1986, by the Ministry of Environment, Forest and Climate Change to regulate activities in coastal areas of India.

Management of the coastal zone is necessary in order to grow and use the coasts sustainably for sustainable growth. What's required is the use of technology, community engagement and

elimination of bottlenecks such as lack of communication at different levels. The introduction of current, affordable, waste management technologies will remove much of the industrial emissions. Many estuaries, lagoons, and bays that are now polluted can also be restored successfully if the wastes entering them are adequately treated. (Akshaya Chintala, 2020)

Conclusion

Ocean is an essential component to sustain lives on the Earth. Humans survive on various blessings from diverse organisms and ecosystems in the ocean. In recent years, there is a strong indication that marine biodiversity has been deteriorating at both domestic and international levels, and the Japanese people also take more interests in the conservation of marine biodiversity. While making up a sizable section of our globe, the oceans' biodiversity and biological resources are significantly less well known than those of the terrestrial ecosystem. This puts many ecosystems at risk. Furthermore, it is still being determined if there are any patterns in the sea that are similar to those that are found on land. We need to know what regulates it to ensure biodiversity and evaluate the effects of human endeavours like fishing, mariculture, waste disposal, and pollution. Because of this, understanding the scope of the issue, the fundamental causes of the problem, the limited resources that can be used to combat strong damaging trends will undoubtedly result in the best method of preserving India's marine biological variety.

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GREEN LIBRARY FOR ENVIRONMENT SUSTAINABILITY

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ABSTRACT

The concept of a green library is very new and is still in development. Since it is an evolving concept, academics, researchers, and library professionals from all over the world are beginning to appreciate it more and more. The amount of knowledge on Green Library and Sustainability," however limited at the moment, is growing. The related themes of green libraries and sustainability have conventional significant exposure in recent years from a variety of publications targeted on adopting green libraries. The word library implies utility and universality. The library has a significant impact on these universal phenomena. In recent years, publications oriented towards green libraries and sustainability extensively. In addition to providing users with the knowledge they require, libraries also provide a setting for lifelong learning. The green library movement, made up of librarians, communities, and institutions is dedicated to making libraries more environments friendly. This paper highlights the outline of green library for environment sustainability.

Keywords: *Green library, Academics, Institutions and Sustainability*

Introduction

Nowadays, green libraries are very well-liked. The majority of well-known libraries are converting their library structures into green spaces. The word "Green" refers to practices that have minimal negative effects on the environment and maximize the quality of the indoor environment through careful site selection, the use of natural building materials, resource conservation, and ethical waste management. The adjective "green" is crucial in this context because only the healthy survive. In recent years, there has been an increase in interest in the green revolution across many industries, including libraries. Green libraries are described as "a library designed to minimize negative impact on the natural environment and maximise indoor environmental quality through careful site selection, use of natural construction materials and biodegradable products, conservation of resources like

water, energy, paper, and responsible waste disposal recycling, etc." in the Online Dictionary of Library and Information Science (ODLIS).

Importance of green library

Early in the 1990s, the green library movement began to gain traction in the field of library and information science. A green library, sometimes referred to as a sustainable library, is one that was constructed with the environment in mind. The larger green building trend includes green libraries. Libraries, especially public and academic ones, serve as lifelong learning hubs for residents of all ages. Libraries are crucial information sources for spreading awareness of environmental issues in addition to being stores of knowledge. Through their collections, sustainable and environmentally friendly infrastructure, and public library programmes, green libraries inform the general public about environmental issues. Green libraries are mindfully constructed while taking into account site selection to structural design, energy use, materials utilized, and human health effects, among other things. They maximize the effects of natural sunlight and natural airflow.

Elements of green library

- ❖ **Location**-The library is the centre of any department, college, or university. To encourage users to focus on their reading or study, it should be at a suitable location. A essential component that should receive particular consideration while looking for a site is accessibility or connectivity via the public transit system. Different agencies and organizations, including LEED, USGBC, and Indian Green Building Council (IGBS), have provided varied criteria in this respect that should be taken into account when developing a green library.
- ❖ **Conserving water**- Conserving the water is important because it is one of the resources that are used constantly in all the places. It must be used with extreme caution because it is rare and expensive. A library should practice proper water management, which keeps the building sanitary and environmentally friendly. Libraries can conserve water and use it efficiently in a variety of ways, including by installing waterless urinals, low flow fixtures, and rainwater collecting systems. Additionally, libraries can use rainwater and waste water for gardening and plantations.
- ❖ **Energy conservation**-Although using energy is inevitable, it should be used less frequently. It can be saved in a library in a variety of ways. An adequate number of windows, glass windows, utilization of natural light, use of energy-efficient bulbs and lighting, etc., can be

found in a library. By installing solar panels on the library building's roof, even necessary electricity can be produced with the help of direct sunshine and also extra energy can be stored and used later on when it is needed.

- ❖ **Construction materials**-When considering a green library, the library building is the first thing that comes to mind. To create a green building by utilizing recyclable and environmentally friendly materials, there are numerous regulations and norms both inside and outside of India. Confederation of Indian Industry (CII), of which the Indian Green Building Council (IGBC) is a division, provides a range of services, including certification services, training programmes, and grading systems for green buildings. In order to create environmentally friendly, high-performing green buildings for a healthy environment, LEED is an internationally recognized programme. Materials for the library should be chosen so that they produce the least amount of waste and environmental harm possible.
- ❖ **Indoor air quality**- In today's world, having access to clean, breathable air is crucial. There is a need for clean air in the library building in particular. For this, a good plantation is required in the campus's immediate vicinity, which offers clean, pure air and additionally makes the library a cool area. In essence, trees provide cool air and regulate air conditioning use in the heat. In hilly areas, buildings should be located where they receive plenty of sunlight to increase temperature and cut winter heating costs. Additionally, suitable ventilation and air flow arrangements should be developed.

Conclusion

These days, greening the library environment is considerably more important. In light of this, today's library professionals should decide what tangible actions they will take to make their libraries greener and join the campaign for green libraries. Making libraries more environmentally friendly is a goal shared by numerous national and international organizations. However, in addition to these organizations, library patrons, librarians, and the government should take the initiative and actively contribute to the success of the green library movement. Nowadays, the library has ongoing issues with space and finances, much as books have issues with dust, moisture, and fungus and require specific care. A modern library that is "green" or "sustainable" uses the least amount of electricity possible while getting the most out of natural resources like air, sunlight, and woodlands. Creating the green library will lead to achieve the environment sustainability.

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A STUDY ON CONSUMER PERCEPTION TOWARDS GREEN PRODUCTS IN TIRUNELVELI DISTRICT

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ABSTRACT

Climate change is a real problem that everyone around the world is talking about. The environmental degradation is exacting a heavy price from the people around the world. by promoting recycling, and through various other means. The most important contributing factors for the environmental degradation is the purchasing and consumption of products that are harmful to the environment. The mediator of green trust plays a crucial role in increasing the green product purchase behaviour among the consumers. Similarly, the serial mediator of perception towards green products and the green trust plays a crucial role in increasing the green product purchase behaviour among the consumers.

Keywords: *Consumer, Green product, Perception, Tirunelveli*

Introduction

‘Green consumerism’ refers to a state in which consumers demand products and services that have undergone an eco-friendly production process or one that involves recycling and safeguarding the planets’ resources. In other words, green consumerism entails the production, promotion, and advancement of the utilization or use of goods and services based on their pro-environment benefits. Economic, social, and cultural forces have set the framework for green consumerism. This is because it is a social attitude and movement in the modern era, especially aimed at encouraging people to be more aware of the firms’ production processes and only to buy or use products and services that do not harm the environment. For this reason, green consumerism has created a balance between the buyers’ behaviors and the organizations’ profit objectives as it is mostly based on the sustainable and pro-environmental behavior of the consumers.

Statement of the research problem

Environmental degradation is no more a myth and is no more confined to a particular area. Due to the enormous carbon and plastic footprints left behind by the people around the world for the last two centuries, the people who are living today are paying a heavy price. The overall global temperature around the world has risen significantly which is very much visible in the recent

landslides that happened in the Himalayan range of mountains. Even the dormant ice in the Arctic and the Antarctic regions has started melting resulting in the rising sea level around the world. Thus, it is very clear that the environmental degradation is exacting a heavy price from the people around the world. But, as the proverb goes, it is never too late, and realizing this fact people have started doing various activities to protect the environment around them. Limiting the carbon and plastic footprints of the human beings has become the goal of many of the people. Being environmentally responsible is very much applicable to the manufacturing industries around the world and the consumers who consume those products. The governments are also doing their part in order to protect the environment by banning the use of plastics, by imposing strict rules against carbon emissions, by promoting recycling, and through various other means. The most important contributing factors for the environmental degradation are the purchasing and consumption of products that are harmful to the environment. Thus, it becomes very relevant to ask the question of how responsible the corporate companies are. How responsible are the consumers? In this context, the present research asks some of the relevant questions such as, what is the perception of the consumers related to green environment and green products? How are their environmental values on green products? What is their perception on green products? Does their perception lead to green trust? Does it result in the green purchasing behaviour of the consumers? These are some of the important questions that the present research aims to answer.

Objectives of the study

1. To find out the major factors that influence the consumers to purchase green products.
2. To analyse the consumers' perception towards green products in Tirunelveli district.
3. To analyse the relationship among consumers' environmental values, perception, green trust and their buying behaviour towards green products.

Scope of the study

The main focus of the present research is to analyse the perception of the consumers towards the green products. Various factors such as green packaging, green product values, eco-label, green environmental advertisement, and green corporate perception are being analysed here and how these factors lead to the green trust of the consumers. Finally, how the green trust leads to the purchase intention of the consumers towards the green products is being analysed in the present research. The study is located in the Tirunelveli district and the time period of the present study is from 2019 to 2021. Moreover, the study analyses the values of the consumer towards environment and also tries to identify the consumers' perception towards green products. Only when the perception is identified,

any measure can be taken to bridge the gap and increase the perception of the consumers towards green products. Moreover, the study also analyses the consumers' level of green trust along with the relationship among consumers' perception, green trust and their buying behaviour towards green products. Finally, the research aims to study the mediation effect of consumers' perception on the relationship between consumers' environmental values and buying behaviour towards green products. If the perception of the consumers affects the relationship between the environmental values of the consumers and their buying behaviour towards green products, then measures can be taken to improve the perception of the consumers and thereby increase the green products buying behaviour of the consumers

Methodology

In this study the researcher has used the Descriptive research design in single cross sectional research. Primary and secondary data have been used for the specific objectives of the study which have been stated earlier. Methods used for the collection and analysis of data are provided in this section. Specific tools of analysis and empirical models are also presented.

Collection of Data

This study is based on both primary and secondary data. The required primary data were collected from the selected respondents of consumers with the help of a comprehensive, pre-tested enquiry schedule, through personal interview and the questionnaire method. The data were collected over a period of 6 months (December, 2021 – May, 2022). Care has been taken to avoid bias, and necessary cross checks were applied to ensure the accuracy of data.

Sample Size

As far as the present study is concerned, the researcher has collected the data required from the sample population by snowball Sampling Technique under Non-probability Sampling Method. For this purpose, the researcher has used the Cochran's formula for calculating sample size when the population is infinite.

Sampling Design

As far as the present study is concerned, the minimum required sample size is 384, for the accuracy of the study and based on the pilot study experience. However, respondents have been selected by Snowball sampling technique from Non- probability sampling method. The primary data was collected with the help of Structured Questionnaire; and also the required information was gathered through questionnaire method

Limitations of the study

Every research will have its own limitations and similarly the present research also has its own limitations. The environmental values of the consumers are being analysed in the present study and how they impact the perception of the consumers towards green products in general. But no specific product or brand has been chosen for analysis in the present research. This is one of the most important limitations of the present research. Similarly, though the environmental values of the consumers are analysed, the awareness level of the consumers has not been analysed in the present research. Apart from these limitations, the time period of data collection also limits the present research. The data for the present research have been collected from December, 2021 till May 2022. The environmental values might increase in the future and it might affect their purchase behaviour. These are some of the notable limitations of the present research.

Review of literature

Keni,(2020) described that the research aims to examine whether 1) green perceived value and green perceived risk can influence green trust 2) green perceived value and green perceived risk can influence green purchase intention 3) green trust can influence green purchase intention 4) green trust mediates the effect on green perceived value and a green perceived risk on green purchase intention Sample was selected using convenience sampling method amounted to 150 respondents at Jakarta. Data was processed with structural equation modelling using Smart PLS.3.2.7 program. The results indicate green perceived value and green perceived risk have significant effect to predict green trust and green purchase intention, green trust have significant influence to predict green purchase intention, and green trust partially mediates the effect on green perceived value as well as green perceived risk on green purchase intention.

Baktash, Leila and Muzalwana Abdul Talib (2019) explained that the over last decades, rapid urbanization in many developing countries like Malaysia, has caused severe harm to the environment. Therefore, sustainable consumption offers a solution to environmental degradation through the use of eco-friendly products provided by marketers. The lack of prior studies on influential factors towards green products purchase attitude and customers loyalty has been urged to conduct a study in this regard. As a result, current study seeks to identify the intrinsic (green product quality and green trust) and extrinsic factors (age, education and employment status) influencing customer's attitude (as a moderating factor) and loyalty towards green product consumption. A survey was conducted to collect data from 192 Malaysian consumers in Klang Valley and structural equation modelling was employed. The findings indicate the significant impact of quality and trust

towards' customers attitude and loyalty. In addition, age and education significantly impact on customers' attitude towards quality of green products. The finding of this study is useful for marketers to help them in implementing green purchase strategies and developing "sustainable" consumption among Malaysian customers.

FACTORS INFLUENCING GREEN PRODUCT BUYING BEHAVIOUR

S.No	Factors	1	2	3	4	5	6	7	8	Total Weight	Rank
1	Eco-friendly	24	95	71	103	69	64	19	63	2367	3
		192	665	426	515	276	192	38	63		
2	Green product Advertisements	94	73	84	21	45	28	64	99	2363	4
		752	511	504	105	180	84	128	99		
3	Green product Labelling	72	72	34	43	71	100	71	45	2270	5
		576	504	204	215	284	300	142	45		
4	Word of mouth (friends and relatives)	113	55	60	72	53	21	41	93	2459	1
		904	385	360	360	212	63	82	93		
5	Price of the green product	39	16	88	59	80	73	84	69	2023	8
		312	112	528	295	320	219	168	69		
6	Quality of the green product	61	77	26	30	56	134	91	33	2174	7
		488	539	156	150	224	402	182	33		
7	Brand image	44	25	96	85	69	61	73	55	2188	6
		352	175	576	425	276	183	146	55		
8	Harmless	61	95	49	95	65	27	65	51	2444	2

The above weighted ranking score shows the major factors influencing the consumers to purchase the green products. The most important factor that motivates the consumers to buy green products is the word of mouth from the friends and relatives which has got the total weight of 2459. In the next place is the harmless nature of the green products and it has got the total weight of 2444. In the third place is the eco-friendly nature of the green products and it has got the total weight of 2367. In the fourth place is the green product advertisements and it has got the total weight of 2363. In the fifth place is the green product labelling and it has got the total weight of 2270. In the sixth place is the brand image of the green products and it has got the total weight of 2188. In the seventh place is the quality of the green products and it has got the total weight of 2174. In the final place is the price of the green products and it has got the total weight of 2023.

CONSUMERS' PERCEPTION TOWARDS ENVIRONMENTAL CONCERN

Sl. No.	Environmental Concern	Weighted Average Score	Result
1	I used to think about the quality of the environment.	3.19	Neither Agree nor Disagree
2	The deterioration of the environment in India is worrying me	3.22	Neither Agree nor Disagree
3	I am much worried about any activity that affects the environment in India	4.03	Agree
4	I always think about the various ways in which the quality of the environment can be improved	2.13	Disagree

In the above weighted average analysis, the perception of the consumers towards their individual environmental values, particularly with regard to the environmental concern has been analysed. The factor of the consumers being much worried about any activity that affects the environment in India, the consumers agreed (weighted average = 4.03). With regard to the factors of the deterioration of the environment in India is worrying the consumers (weighted average = 3.22) and the consumers used to think about the quality of the environment all the time (weighted average = 3.19), the

consumers neither agree nor disagree. In case of the factor of the consumers always think about the various ways in which the quality of the environment can be improved (weighted average = 2.13), the consumers disagreed.

**Family Monthly Income Wise Comparison of Consumers' Perception Towards
Green Products Attributes**

Family Monthly Income		N	Mean Rank	Kruskal-Wallis H	df	Asymp. Sig.
Green Packaging	Below Rs.15,000	64	32.50	362.771	3	0.000
	Rs.15,000 – 30,000	155	210.28			
	Rs.30,001 – 50,000	182	257.91			
	Above Rs.50,000	107	445.54			
Green Product Value	Below Rs.15,000	64	43.50	318.462	3	0.000
	Rs.15,000 – 30,000	155	196.75			
	Rs.30,001 – 50,000	182	280.89			
	Above Rs.50,000	107	419.46			
Eco – Label	Below Rs.15,000	64	76.00	359.620	3	0.000
	Rs.15,000 – 30,000	155	180.66			
	Rs.30,001 – 50,000	182	262.28			
	Above Rs.50,000	107	455.00			
Green Corporate Perception	Below Rs.15,000	64	47.45	335.149	3	0.000
	Rs.15,000 – 30,000	155	188.45			
	Rs.30,001 – 50,000	182	282.73			
	Above Rs.50,000	107	426.01			
Green Advertisement	Below Rs.15,000	64	65.00	362.587	3	0.000
	Rs.15,000 – 30,000	155	187.81			
	Rs.30,001 – 50,000	182	260.05			
	Above Rs.50,000	107	455.00			

In the above table, the difference in the consumers' perception towards green product attributes based on their family monthly income has been analysed. Since the p values are 0.000 which is less than 0.05 in all the cases, therefore it can be concluded that the null hypothesis is rejected and therefore there is a difference in the consumers' perception towards green products attributes based on their family monthly income. In case of the green packaging, the respondents who have above Rs. 50,000 family monthly income (mean rank = 445.54) have a higher perception compared to the other respondents (H= 362.771). In case of the green product value, the respondents who have above Rs. 50,000 family monthly income (mean rank = 419.46) have a higher perception compared to the other respondents (H= 318.462). In case of eco-label, the respondents who have above Rs. 50,000 family monthly income (mean rank = 455.00) have a higher perception compared to the other respondents (H= 359.620). In case of the green corporate perception, the respondents who have above Rs. 50,000 family monthly income (mean rank = 426.01) have a higher perception compared to the other respondents (H= 335.149). Finally, in case of the green advertisements, the respondents who have above Rs. 50,000 family monthly income (mean rank = 455.00) have a higher perception compared to the other respondents (H= 362.587). Thus, it can be concluded that the respondents who have a monthly income of Rs. 50,000 and above have the highest perception towards green product attributes compared to the other respondents.

Findings

- The most important factor that motivates the consumers to buy green products is the word of mouth from friends and relatives. Harmless and eco-friendly nature are similarly some of the high motivating factors. The least influencing factor that motivates the consumers to buy green products is the price of the green products.
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Suggestion

The most important factor that motivates the consumers to buy green products is the word of mouth from friends and relatives. Harmless and eco-friendly nature are similarly some of the high motivating factors. The least influencing factor that motivates the consumers to buy green products is the price of the green product.

Conclusion

Unlike the last two thousand years, the global temperature of the earth has risen rapidly in the last 200 years. This has further increased in the last 20 years due to the increased carbon and plastic footprints without any concern for the environment by the human beings around the earth. There is no human being on earth who is not a consumer in one way or the other. The degradation of the environment and the earth can be directly linked to the consumption pattern of the consumers around the world.

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AIR POLLUTION: TYPES, CAUSES AND ITS EFFECTS ON HUMAN HEALTH

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ABSTRACT

Air pollution is one of the major pollution and its effects is ranging from low-level syndrome to some non-curable diseases like cancer and breathing problems. There are many ways air pollution is being happened naturally or manually throughout the world. No one is against nature and environmental degradation, but due to many reasons knowingly or unknowingly, all are part of environmental issues. Like other pollutions, air pollution also could not be eradicated completely but it is required to have research, policies for administration, and appropriate monitoring so as to make its effects less and manageable for the welfare of society collectively. This paper dealt with the concept and types of air pollution and its effects on human health in a precise way.

Key words: *Air pollution, environmental degradation, environmental issues*

Introduction

Pollution is defined as the contaminants in the natural environment that produce an unfavourable change in nature and respective human living including living things on the earth consequently. Usually, the main forms of pollution are air pollution, soil pollution, water pollution, litter pollution, noise pollution, plastic pollution, thermal pollution, radioactive pollution, light pollution and visual pollution. Out of these pollutions, air pollution is one of the big problems for all living things since it is easily spread to a great extent and will affect living things easily with different dimensions.

Air Pollution

Air pollution is usually referred to as any physical or chemical or biological change/deviation in the air and this air pollution is due to the air pollutants – Carbon Monoxide, Lead, Nitrogen Oxides, Ozone, Particulate Matter, Sulfur Dioxide, and other Air Pollutants individually or by combinations on reactions. Thus, there will a primary air pollution category where an air pollutant is emitted directly from the sources and the second air pollution happened not through direct emission and by

interactions or reactions in the atmosphere. It is known there are four kinds of air masses – arctic, tropical, polar and equatorial where these above pollutions are being based on the presence of particles in the atmosphere. Air pollution is the contamination of air by harmful gases, dust particles and smoke which really affects the planet as a whole in different perspectives and living things drastically. There should be a balanced number of gases in the atmosphere to maintain the temperature and other reactions on the earth, and if there is any increase or decrease in the composition of the existing gases lead to harmful effect and thus makes the survival problem on it. Thus, the imbalance composition of gases in the earth's atmosphere increases the temperature variations on the earth and it leads to global warming as the collective result of air pollution in the earth's atmosphere.

Air Pollutants

In general, types of air pollutants are divided into two categories namely, primary pollutants where the pollutants cause air pollution directly and the pollutant formed by the combination and reaction of primary pollutants are named secondary pollutants. Thus,, the classification of pollution is necessary to know and it is explained in further part:

- i. *Particulate Pollutants*: Lead, Fly Ash, Metallic Oxides, and Nano-particles
- ii. *Gaseous Pollutants*: Carbon Monoxide. Carbon-di-oxide, Chlorofluorocarbons, Ozone, Nitrogen Oxide, and Sulfur Dioxide

The presence of particles in the air which are suspended can be defined as *particulate pollutants* these are the results of emissions of gases from vehicles, industries, construction activities, etc., and also by natural sources like pollen, volcanic explosions, natural gaseous precursors, so on which are all ranges from 0.001 to 500 micrometer diameter. In this, the air particles are divided into three based on their diameters – more than 10 micrometers called heavy particulate matter, less than 10 micrometers called suspended particulate matter and less than 0.02 micrometer called nano-particulate matter. In particulate pollutants, Lead is a more hazardous heavy metal and it causes serious damage to the human body – nervous system damage, digestive issues, kidney issues, and even in the influence of variation in intelligence meaning that if it has taken over a long period even very small quantity leads to lowers intelligence among the children. If we consider 'Fly Ash' which is nothing but a particle of oxides and other heavy metals and these are all produced by thermal power plants in major quantities. If these are not controlled and destroyed properly, it will cause major health issues to humans and other living things directly or indirectly. Nano-particles are

another important pollutant playing role in the formation of dust clouds, depletion of the Ozone layer, environmental hydroxyl radiation concentration and stratospheric temperature variations.

In the case of *gaseous pollutants*, the following are the nature and effect on living and non-living things in the environment: Carbon Monoxide is a toxic gas, which is produced from internal combustion engines by incomplete combustion. Also, it emits from volcanoes, and fires in the forest; Carbon Monoxide is highly toxic and it produces carboxyhemoglobin which reduces the oxygen-carrying capacity of the blood. Chlorofluorocarbons are being used in refrigerators, air conditioners, and aerosols and are highly destructive in nature and play a major role in thinning the ozone layer. Ozone is another gaseous pollutant that is very helpful in the atmosphere-stratosphere but it causes harmfulness in the ground layer of the earth which is creating irritation in the eyes and making them tear tediously. Nitrogen Oxide is another gas pollutant from engines and industries through combustion which aggravates the asthmatic condition and respiratory issues, especially in humans and these are the reasons for the formation of SMOG, Acid Rain and the Green House Effect. Similarly, Sulfur Dioxide is a type of colourless gas mostly from volcanic explosion, industrial processes and in production of sulfuric acid and these SO₂ gases produces respiratory problems, and premature deaths by affecting the nervous system. In addition to these gaseous pollutants, there are further gas particles are causing air pollution which are volatile organic components, Benzene, Ethylene, Asbestos, etc.

Impact of Air Pollution on the Health of Humans

Out of many air pollutants, the particulate matter which is very small in size easily penetrates into to respiratory system of the human through inhalation producing respiratory illness and cardiovascular diseases. In addition, these particulate matters affect reproductive and central nervous system dysfunctions and play a major role in producing cancer among humans. A sensitive person or low immunity person can easily affect by air pollution even if it is very low-level. It is observed that *short-term contact* with any type of air pollutants is closely related to Chronic Obstructive Pulmonary Disease, cough, shortness of breathing, wheezing, asthma, respiratory disease and a high rate of hospitalization too. Long-term effects of such pollutants, associated with air are producing chronic asthma, pulmonary insufficiency, cardiovascular disease, and cardiovascular mortality. As per the WHO (World Health Organization) estimated that 7 million people die each year from air pollution. In this, ground-level ozone causes muscles in the lungs to contract, making it difficult to breathe and exposure to high ozone levels can cause sore throat, coughing, lung inflammation, and permanent lung damage. Symptoms due to short-term exposure

resolve somewhat quickly, but long-term exposure is linked to serious illness and disease in multiple body systems – coughing, difficulty in breathing, irritation to eyes, nose and throat, headache, dizziness, fatigue, respiratory diseases like asthma, emphysema, cardiovascular damages, harm to liver, spleen and blood and its flow, nervous system damage, birth defects and finally causing death such as premature death.

Legislations and Rules for the Protection of the Environment in India

Water pollution

- *The Water Act, 1974*: To provide for the prevention and control of water pollution, and for maintaining or restoring of wholesomeness of water in the country
- *The Water Cess Act, 1977*: To provide for the levy and collection of a cess on water consumed by persons operating and carrying on certain types of industrial activities.

Air Pollution

- *The Air Act 1981, Amended 1987*: To provide for the prevention, control and abatement of air pollution in the country so as to preserve the quality of air

Environment Protection

- ❖ *The Environment Act, 1986, amended 1991*: For protection and improvement of the environment and for matters connected therewith. In addition, the Central Government shall have the power to give directions in writing to any person or officer or any authority for any of the purposes of the Act, including the power to direct the closure, prohibition, or regulations of any industry, operation, or process. No person carrying on industry, operation, or process shall discharge or emit any environmental pollutant in excess of standards prescribed by the Government. Further, persons handling hazardous substances shall comply with the procedural safeguards as may be prescribed by the authorities. As per the Act, where the discharge of any environmental pollutant in excess of the prescribed standard occurs or is apprehended to occur due to any accidental or other unforeseen act or event, the person responsible for such discharge shall be bound to prevent or mitigate the pollutant so caused as well as intimate the fact of such occurrence to the concerned authorities.
- ❖ **Wildlife** -*The Wildlife Protection Act, 1972, amended 1993, 2002, and 2006*: This act is for effectively protecting the wildlife of this country and to control poaching smuggling and illegal trade in wildlife and its derivations.

- ❖ **Forest Conservation**-*The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006*: to recognize and vest the forest rights and occupation in forest land in forest dwelling scheduled Tribes and other traditional forest dwellers
- ❖ *Forest (Conservation) Act, 1980, amended 1988*-This is to check rapid deforestation due to forestlands and other development projects which are allowed as per the Indian Forest Act, the Central Government enacted the Forest Conservation Act in 1980 with an amendment in 1988.
- ❖ *The Indian Forest Act, 1977*-This is for secure exclusive state control over forests to meet the demand for timber. Although this act is a federal one, many of the states have enacted this similar forest acts but with some modifications.
- ❖ **Biodiversity**-*Biological Diversity Act, 2002*: This Act gives provision for the Conservation of Biological Diversity (CBD) and it also addresses access to biological resources and associated traditional knowledge to ensure equal sharing of benefits arising out of their use to the country and its people. This included provisions like the prohibition on the transfer of Indian genetic material outside the country without specific approval of the Indian Government; prohibition on anyone claiming an Intellectual Property Right – Patent, over biodiversity or related knowledge, without the permission of the Indian Government.
- ❖ **National Green Tribunal** -*National Green Tribunal Act, 2010 (No.19 of 2010)*: This is for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to the environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto.
- ❖ **Animal Welfare** -*The Prevention of Cruelty to Animals Act, 1960*: to prevent the infliction of unnecessary pain or suffering on animals and to amend the laws relating to the prevention of cruelty to animals. After this Act, the Animal Board of India was formed for the promotion of animal Welfare.

Impact of COVID-19 Pandemic Lockdown on Air Quality

There are key air pollutants available in the air such as PM_{2.5}, PM₁₀, NO₂, SO₂, and O₃ during the pre-lockdown and post-lockdown phases which were investigated. Further, the monthly concentration of air pollutants in March, April and May of 2020 is also compared with that of 2019 to give details of the effect of restricted emissions under similar atmospheric conditions. To evaluate the global impact of COVID-19 on air quality, the ground-based data from the 162 monitoring stations from 12 cities across the globe are analyzed for the first time, especially in world-ever unseen

situations. The concentration of PM_{2.5}, PM₁₀ and NO₂ were reduced by 20–34%, 24–47%, and 32–64%, respectively and this is because of the restrictions on anthropogenic emission sources during the lockdown. However, a lower decrease in SO₂ was observed due to functional power plants. Ozone concentration was found to be increased due to the declined emission of Nitrous Oxide, but, the achieved improvements were temporary as the pollution level has gone up again in cities where the lockdown was released. The study might assist the environmentalist, authorities, government and policymakers to limit air pollution in the future by implementing the planned lockdowns at the pollution hotspots with minimal economic loss by executing appropriate operating mechanisms to save nature to some extent.

Conclusion

In the developing scenario, all man-made happenings will not be stopped or completely banned for the protection of the environment and also natural calamities could not be controlled and may be monitored and protected by people for their welfare to some extent. There may be some regulations and restrictions to be practiced by framing the policy-making with respect to the climatic nature of society and needs of the humans. In addition, everything cannot be done with laws, rules, regulations, restrictions, or prohibitions, and it could be achieved only when the proper mechanism is practiced to make the people realize the need and importance of protection and conservation of nature, environment and society and it can be done from the initial stage through the effective curriculum framing in teaching-learning context and by giving some awareness programmes – through media, campaign, documentary films, etc., to the common people so as to make them part of protection in our environment to some extent meaningfully.

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AWARENESS OF ENVIRONMENTAL LEGISLATIONS AND POLICY

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ABSTRACT

The awareness and consideration for environment covers several environmental issues such as pollution of water, air and soil, land degradation, industrialization, urbanization, depletion of natural resources etc. Environmental law plays a very crucial role in regulating the use of natural resources and in protecting the environment. The success of environment legislations mainly depends on the way they are enforced. Legislation also serves as a valuable tool for educating masses about their responsibility in maintaining healthy environment. Numerous legislations have already put forth at national and international levels. Indian legislations are called as Acts, whereas the international legislations are in the form of conventions, protocols and treaties. The genesis of various legislations and policies in the country lies in the environmental problems. There should be effective legislations to protect the environment or else the need for resources by the growing population will create havoc on the environment. The other important aspect is enforcement of these laws. To safeguard our environment from further degradation and pollution these must be enforce laws forcefully and effectively. Despite such deep rooted environmental and societal problems the methods of combating the problems have advance markedly. Measure includes the enactment of literally dozens of pieces of legislation, some overarching, others specify dealing with environmental problems.

Key words: *awareness,pollution,natural resources*

Introduction

India has well evolved institutes at central, state, district and local levels and has established a National Environmental Council headed by the Prime Minster to control the direction of environmental matters. The higher echelons of the Council hierarchy represent a think tank for the creation and development of appropriate plans and strategies. Recently in 2003, a National Forest Commission has also been established to control forestry matters under the Chairmanship of a retired

Supreme Court Judge. A media campaign was launched to increase public awareness and meetings were arranged to discuss development issues. A stakeholder group was established, consisting of government, academics, media and NGOs to review the inputs from the far-reaching community consultations, and to discuss issues of waste management and the concerns to improve slum areas.

National Legislation

At national level serious efforts have been made for the improvement and protection of environment by incorporating changes the constitution of India. Our constitution, originally, did not contain any direct provision regarding the protection of natural environment. However, after the United Nations Conference on Human Environment, held in Stockholm in 1972. Indian constitution was amended to include protection of the environment as a constitutional mandate. Although India had an Elephant's Preservation Act of 1879 and a Forest Act of 1927, environment related legislation came very late in 1972 with Wild Life Protection Act 1971. As we all know, India is one of the twelve mega diversity countries. There are innumerable species, whose potential is not even known till date. Biodiversity has direct consumption value in agriculture, medicine and industry apart from it being a nations' wealth. There is constitutional provision in India for biodiversity conservation. The forty second amendment Clause (g) to Article 51A of the Indian constitution made it a fundamental duty to protect and improve the natural environment. "It shall to be duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wild life and have compassion for living creatures." There is a directive, given to the State as one of the Directive Principles of State Policy regarding the protection and improvement of the environment. Article 48A states "The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country". The department of Environment was established in India in 1980 to ensure a healthy environment for the country. This later became the Ministry of Environment and Forests in 1985. This Ministry has overall responsibility for administering and enforcing environmental legislations and policies. The constitutional provisions are backed by a number of legislations – Acts and rules. Most of our environmental legislations are Acts of the Parliament or the State Legislatures. These Acts generally delegate powers to regulating agencies, to make rules for the purpose of their implementation. The Environment Protection Act of 1986 (EPA) came into force soon after the Bhopal Gas Tragedy and is considered umbrella legislation as it fills many lacunae in the existing legislations. Thereafter, a large number of environmental legislations have been passed to deal with specific environmental problems. For example, in the recent past the

use of CNG for public transport vehicles has been made mandatory in Delhi. This has reduced air pollution in Delhi.

The need for protection and conservation of environment and sustainable use of natural resources is reflected in the constitutional framework of India and also in the international commitments of India. The Constitution under Part IVA (Art 51A-Fundamental Duties) casts a duty on every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures. Further, the Constitution of India under Part IV (Art 48A-Directive Principles of State Policies) stipulates that the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country. Several environment protection legislations existed even before Independence of India. However, the true thrust for putting in force a well-developed framework came only after the UN Conference on the Human Environment (Stockholm, 1972). After the Stockholm Conference, the National Council for Environmental Policy and Planning was set up in 1972 within the Department of Science and Technology to establish a regulatory body to look after the environment-related issues. This Council later evolved into a full-fledged Ministry of Environment and Forests (MoEF). MoEF was established in 1985, which today is the apex administrative body in the country for regulating and ensuring environmental protection and lays down the legal and regulatory framework for the same. Since the 1970s, a number of environment legislations have been put in place. The MoEF and the pollution control boards ("CPCB", ie, Central Pollution Control Board and "SPCBs", ie, State Pollution Control Boards) together form the regulatory and administrative core of the sector.

Some of the important legislations for environment protection are as follows:

- The National Green Tribunal Act, 2010
- The Air (Prevention and Control of Pollution) Act, 1981
- The Water (Prevention and Control of Pollution) Act, 1974
- The Environment Protection Act, 1986
- The Hazardous Waste Management Regulations, etc.

The National Green Tribunal Act, 2010

The National Green Tribunal Act, 2010 (No. 19 of 2010) (NGT Act) has been enacted with the objectives to provide for establishment of a National Green Tribunal (NGT) for the effective and

expeditious disposal of cases relating to environment protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. The Act received the assent of the President of India on June 2, 2010, and was enforced by the Central Government vide Notification no. S.O. 2569(E) dated October 18, 2010, with effect from October 18, 2010. The Act envisages establishment of NGT in order to deal with all environmental laws relating to air and water pollution, the Environment Protection Act, the Forest Conservation Act and the Biodiversity Act as have been set out in Schedule I of the NGT Act. Consequent to enforcement of the National Green Tribunal Act, 2010, the National Environment Tribunal Act, 1995 and the National Environment Appellate Authority Act, 1997 stand repealed. The National Environment Appellate Authority established under s 3(1) of the National Environment Appellate Authority Act, 1997 stands dissolved, in view of the establishment of the National Green Tribunal under the National Green Tribunal Act, 2010 vide Notification no. S.O. 2570(E) dated October 18, 2010.

The Air (Prevention and Control of Pollution) Act, 1981

The Air (Prevention and Control of Pollution) Act, 1981 (the "Air Act") is an act to provide for the prevention, control and abatement of air pollution and for the establishment of Boards at the Central and State levels with a view to carrying out the aforesaid purposes. To counter the problems associated with air pollution, ambient air quality standards were established under the Air Act. The Air Act seeks to combat air pollution by prohibiting the use of polluting fuels and substances, as well as by regulating appliances that give rise to air pollution. The Air Act empowers the State Government, after consultation with the SPCBs, to declare any area or areas within the State as air pollution control area or areas. Under the Act, establishing or operating any industrial plant in the pollution control area requires consent from SPCBs. SPCBs are also expected to test the air in air pollution control areas, inspect pollution control equipment, and manufacturing processes.

The Water (Prevention and Control of Pollution) Act, 1974

The Water Prevention and Control of Pollution Act, 1974 (the "Water Act") has been enacted to provide for the prevention and control of water pollution and to maintain or restore wholesomeness

of water in the country. It further provides for the establishment of Boards for the prevention and control of water pollution with a view to carry out the aforesaid purposes. The Water Act prohibits the discharge of pollutants into water bodies beyond a given standard, and lays down penalties for non-compliance. At the Centre, the Water Act has set up the CPCB which lays down standards for the prevention and control of water pollution. At the State level, SPCBs function under the direction of the CPCB and the State Government. Further, the Water (Prevention and Control of Pollution) Cess Act was enacted in 1977 to provide for the levy and collection of a cess on water consumed by persons operating and carrying on certain types of industrial activities. This cess is collected with a view to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution constituted under the Water (Prevention and Control of Pollution) Act, 1974. The Act was last amended in 2003.

The Environment Protection Act, 1986

The Environment Protection Act, 1986 (the "Environment Act") provides for the protection and improvement of environment. The Environment Protection Act establishes the framework for studying, planning and implementing long-term requirements of environmental safety and laying down a system of speedy and adequate response to situations threatening the environment. It is an umbrella legislation designed to provide a framework for the coordination of central and state authorities established under the Water Act, 1974 and the Air Act. The term "environment" is understood in a very wide term under s 2(a) of the Environment Act. It includes water, air and land as well as the interrelationship which exists between water, air and land, and human beings, other living creatures, plants, micro-organisms and property. Under the Environment Act, the Central Government is empowered to take measures necessary to protect and improve the quality of environment by setting standards for emissions and discharges of pollution in the atmosphere by any person carrying on an industry or activity; regulating the location of industries; management of hazardous wastes, and protection of public health and welfare. From time to time, the Central Government issues notifications under the Environment Act for the protection of ecologically-sensitive areas or issues guidelines for matters under the Environment Act.

In case of any non-compliance or contravention of the Environment Act, or of the rules or directions under the said Act, the violator will be punishable with imprisonment up to five years or with fine up to Rs 1,00,000, or with both. In case of continuation of such violation, an additional fine of up to Rs 5,000 for every day during which such failure or contravention continues after the

conviction for the first such failure or contravention, will be levied. Further, if the violation continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which may extend to seven years.

Hazardous Wastes Management Regulations

Hazardous waste means any waste which, by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics, causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances. There are several legislations that directly or indirectly deal with hazardous waste management. The relevant legislations are the Factories Act, 1948, the Public Liability Insurance Act, 1991, the National Environment Tribunal Act, 1995 and rules and notifications under the Environmental Act.

Some of the rules dealing with hazardous waste management are discussed below:

- **Hazardous Wastes** (Management, Handling and Transboundary) Rules, 2008, brought out a guide for manufacture, storage and import of hazardous chemicals and for management of hazardous wastes.
- **Biomedical Waste** (Management and Handling) Rules, 1998, were formulated along parallel lines, for proper disposal, segregation, transport, etc, of infectious wastes.
- **Municipal Solid Wastes** (Management and Handling) Rules, 2000, aim at enabling municipalities to dispose municipal solid waste in a scientific manner.

In view of the short-comings and overlapping of some categories causing inconvenience in implementation of the Biomedical Waste (Management and Handling) Rules, 1998 as well as the Municipal Solid Wastes (Management and Handling) Rules, 2000, the Ministry of Environment, Forest and Climate Change has formulated the draft Bio-Medical Waste (Management & Handling) Rules, 2015 (Draft BMW Rules) and the draft Solid Waste Management Rules, 2015 (Draft SWM Rules) and sought comments on the draft Rules.

The Draft BMW Rules are to replace the Biomedical Waste (Management and Handling) Rules, 1998, and the Draft SWM Rules are to replace the Municipal Solid Waste (Management and Handling) Rules, 2000. The objective of the Draft BMW Rules is to enable the prescribed authorities to implement the rules more effectively, thereby, reducing the bio- medical waste generation and also for its proper treatment and disposal and to ensure environmentally sound management of these

wastes, and the Draft SWM Rules aim at dealing with the management of solid waste including its segregation at source, transportation of waste, treatment and final disposal.

- **E - Waste** (Management and Handling) Rules, 2011 have been notified on May 1, 2011 and came into effect from May 1, 2012, with primary objective to reduce the use of hazardous substances in electrical and electronic equipment by specifying threshold for use of hazardous material and to channelize the e-waste generated in the country for environmentally sound recycling. The Rules apply to every producer, consumer or bulk consumer, collection centre, dismantler and recycler of e-waste involved in the manufacture, sale, purchase and processing of electrical and electronic equipment or components as detailed in the Rules.

- **Batteries** (Management & Handling) Rules, 2001 deal with the proper and effective management and handling of lead acid batteries waste. The Act requires all manufacturers, assemblers, re-conditioners, importers, dealers, auctioneers, bulk consumers, consumers, involved in manufacture, processing, sale, purchase and use of batteries or components thereof, to comply with the provisions of Batteries (Management & Handling) Rules, 2001.

Other Laws Relating to Environment

- **The Wildlife Protection Act, 1972** - The Wild Life (Protection) Act, 1972 was enacted with the objective of effectively protecting the wild life of this country and to control poaching, smuggling and illegal trade in wildlife and its derivatives. The Act was amended in January 2003 and punishment and penalty for offences under the Act have been made more stringent. The Ministry has proposed further amendments in the law by introducing more rigid measures to strengthen the Act. The objective is to provide protection to the listed endangered flora and fauna and ecologically important protected areas.
- **The Forest Conservation Act, 1980** -The Forest Conservation Act, 1980 was enacted to help conserve the country's forests. It strictly restricts and regulates the de-reservation of forests or use of forest land for non-forest purposes without the prior approval of Central Government. To this end the Act lays down the pre-requisites for the diversion of forest land for non-forest purposes. The Scheduled Tribes and Other Traditional Forest Dwellers

(Recognition of Forest Rights) Act, 2006, recognises the rights of forest-dwelling Scheduled Tribes and other traditional forest dwellers over the forest areas inhabited by them and provides a framework for according the same. The Indian Forest Act, 1927 consolidates the law relating to forests, the transit of forest-produce and the duty leviable on timber and other forest-produce.

- **Public Liability Insurance Act, 1991**-The Public Liability Insurance Act, 1991 was enacted with the objectives to provide for damages to victims of an accident which occurs as a result of handling any hazardous substance. The Act applies to all owners associated with the production or handling of any hazardous chemicals.)

- **The Biological Diversity Act, 2002** -The Biological Diversity Act 2002 was born out of India's attempt to realise the objectives enshrined in the United Nations Convention on Biological Diversity (CBD), 1992 which recognises the sovereign rights of states to use their own Biological Resources. The Act aims at the conservation of biological resources and associated knowledge as well as facilitating access to them in a sustainable manner. The National Biodiversity Authority in Chennai has been established for the purposes of implementing the objects of the Act.

- **Coastal Regulation Zone Notification** -The Ministry of Environment and Forests had issued the Coastal Regulation Zone Notification vide Notification no. S O. 19(E), dated January 06, 2011 with an objective to ensure livelihood security to the fishing communities and other local communities living in the coastal areas, to conserve and protect coastal stretches and to promote development in a sustainable manner based on scientific principles, taking into account the dangers of natural hazards in the coastal areas and sea level rise due to global warming.

Conclusion

Environmental sensitivity in our country can only grow together a major public, awareness campaign. This has several tools- the electronic media, the press, school and college education, adult education, which are all essentially complementary to each other. Green movements can grow out of

small local initiatives to become major players in advocating environmental protection to the Government. Policy makers will only work towards environmental preservation if there is sufficiently large bank of voters that insist on protecting the environment. A recurring theme in India 's strategy has been to place a heavy onus on developed countries to lead the way to environmental improvement and effectively assist developing countries. Ultimately there is still a need for identification of programs that have multiple benefits and can exploit ecological linkages between agreements. Public awareness of the various conventions would also stir the impetus of implementation.

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**A STUDY ON THE ENVIRONMENTAL PROTECTION AWARENESS OF HIGHER
SECONDARY SCIENCE GROUP STUDENTS AND THEIR
PARTICIPATION IN NATIONAL GREEN CORPS**

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ABSTRACT

This research article focused attention on the higher secondary science group students' environmental protection awareness in terms of their participation in National Green Corps. The authors adopted survey method for data collection. The population of the present study comprises all the science group students studying in the higher secondary schools in Tirunelveli district. From the population, the researcher selected 393 students using simple random sampling technique. The data were collected using a self-constructed scale to collect data. Mean, Standard Deviation and 't' test were used for analyzing the data. The findings of the study revealed that the students who are participating in National Green Corps have better environmental protection awareness.

Keywords: *Environmental Protection Awareness, National Green Corps.*

Introduction

Environment refers to the sum total of conditions surrounding a man at a specific point of space and time. The environment of the early people consisted of only physical aspects of the planet, land, air, water and biological elements. With the march of time and advancements in the society, people extended their environment through the social, economical and political activities. In other words, environment refers to the surroundings of an organism, which includes both living and non-living components.

Ecology is the part of science dealing with various principles governing the relationship between organisms and their environment. It is very important for any individual almost in various

aspects such as biologically, economically and aesthetically. The basic characteristic of the environmental system comprises a thin skin on the globe (Panneer Selvam, A. and Mohana Rama Krishnan,1996). It is few miles of air from the surface of sea level. It may be considered as the aggregate of all external conditions and influences affecting life and development of the total organism. It is not merely the air, water, soil and the associated biosphere that forms the environment but also social, cultural and economic conditions.

Environmental Resources

Any material, which can be transformed in a way that it becomes more valuable and useful, can be termed as a resource. Land, water, minerals, forests, wildlife as well as human beings are resources. The earth has only a certain amount of resources. So, it is the responsibility of each and every human being to protect these resources.

Resources include biotic and abiotic factors. Biotic factors are obtained from the biosphere. Forest products, crops, birds, animal, fish and other marine life forms are examples of biotic resources. Abiotic factors are of non-living inorganic matter. Land, water and minerals like iron, copper, lead and gold are abiotic (Sharma, 1997). Life on this planet is sustained by the inseparable interdependence and interrelatedness between the biotic and abiotic factors.

There are both renewable and non-renewable resources. The materials that can be replaced are renewable resources. Renewable resources comprise such things as timber, crops, cattle and fish and raw materials for clothing such as cotton, leather, wool and fur. The nutrients of these materials can be recycled by burning or allowing decaying in the soil.

Non-renewable resources cannot be replaced, when once they have been used up. Non-renewable resources include fossil fuels (coal, oil, natural gas), inorganic fertilizers and metals. People's attempts to produce more and more agricultural produce, they have exploited agricultural produce, natural resources and, thus, the laws of nature were violated in most of the parts of the globe where irrigation facilities have been developed. Unfortunately, both in irrigated and rain-fed agriculture where the natural resources have been over exploited to meet the present need, the degradation of soil, land, water and climate has started.

At present, our largest problem is how to stop this degradation process. More than 90 percent of future population growth relies mostly on environmental resources for survival and economic progress. The major global threats to human beings are Population, Poverty, Pollution, Global Warming, Climatic Change, Ozone Depletion, Acid Rains, Deforestation, Energy Crisis and Loss of Biological Diversity (Venmathi, 1994).

National Green Corps (Ngc)

National Green Corps is a programme covering around 1,20,000 schools in India with NGC School Eco Clubs. Environmental activity in schools is promoted through the National Green Corps. Each NGC School Eco Club has 30 to 50 NGC Students or NGC Cadets who form the National Green Corps. These NGC students participate in activities related to biodiversity conservation, water conservation, energy conservation, waste management, land use planning and resource management.

Locale specific issues are focused by the NGC Eco Clubs. When young girls and boys from NGC take up the environmental awareness activities and outreach activities, they attract huge public attention, which eventually becomes public support for an environmental cause or environmental intervention. Water harvesting, plantation, composting of biodegradable waste are most popular activities in the NGC School Eco Clubs (Joy, 1991). These NGC School Eco Clubs promote environmental discipline and environmental responsibility through the selected schools in India using environmental awareness as the medium. Each of the 250 districts in India has about 250 NGC Eco Clubs. These NGC Eco Clubs are provided with an annual grant of Rs 2500. Each of the Indian State has a State Nodal Officer who implements this programme.

The NGC Children are making a huge impact in the country. Andhra Pradesh, Gujarat, Maharashtra, Orissa, Kerala, Punjab, Jammu and Kashmir, Assam, Chhattisgarh, Madhya Pradesh and Tamil Nadu are some of the states where this programme is making huge impact on the society. In Andhra Pradesh, the state has a separate Directorate for conducting this programme, while all other states conduct this programme through one of those organisations interested in environmental awareness and conservation aspects.

Since school children are involved most of the activities of National Green Corps. Children are linked to the culture and cultural aspects of conservation of natural resources and environment. There are master trainers trained by the State Nodal Officers with the help of the State Resource Agencies who train the Teachers-In-Charge of the NGC Eco Clubs. Each district has the District Implementation and Monitoring Committee, supported by the District Coordinator.

This is the largest such programme anywhere in the world. When these trained NGC Students grow up and take the environmental challenges of this second the most populous country, it is expected that there will be huge difference made to way the resources are consumed and conserved. Tamilnadu is trying to groom the NGC Cadets as an environmentally disciplined force. It has introduced uniform and band along with a structured programme of formation for five teams of cadets exclusively in all NGC School Eco Clubs. These NGC Cadets are protecting the natural resources from misuse and promoting the conservation of the natural resources. These cadets are getting the pride place during the National Days when they participate in full NGC Uniform during the ceremonial parades along with other uniformed forces of the country.

Need and significance of the study

Healthy and clean environment is a precious gift of nature to the humanity. The environment made of the layer of air, water and soil of the earth is habitat of man and for all other living things. Every one has an equal right to live in a healthy and clean environment and a nation which provides these essentials of life are people-responsible.

Man's environment consists of natural and socio-cultural environment. Due to present environmental pollution or crisis, man has to concentrate for improving the quality of environment found around him. The problem of environmental pollution is due to over consumption of natural resources, huge population, wide urbanization and industrialization, and unfavourable attitude towards science of the people. Natural resources have been improperly utilized to meet the demand of better living, that it has caused serious ecological and environmental imbalances.

Man's demands are unlimited and ever increasing which results in thoughtless degradation of the natural environment with the development of science and technology, and the growth of

population and industrialization came the tremendous changes in the national environment thereby posing danger to the physical, mental and social health of man.

Deforestation has lead to destruction of wildlife, soil erosion, loss of soil fertility, recurring floods and formation of deserts. Unplanned industrialization and urbanization have accentuated the problems of waste disposal, sanitation, similarly increasing use of nitrogenous fertilizers and pesticides creating a problem of pollution. Now we are facing dangerous levels of pollution in water, air and earth causing undesirable disturbances to the ecological balance of the biosphere.

The best insurance for the environment is a commitment to prevent the deterioration of land, water and air. So, the introduction of environmental education is the only need of the hour. Environmental protection awareness is to make the people to be aware and inculcate positive or favourable attitudes of the people towards protection of environment. So, the students should follow certain measures to protect their environment from various hazardous. Among the students, the participation of National Green Corps would also promote favourable attitude of protecting environment.

The above discussion highlights the theme of the present study. The investigator strongly opines that the participation of such programme in the schools also stimulate the interest and involvement of the students leading to protect their environment from dangerous hazards. For this, the investigator would like to conduct a survey on the environmental protection awareness of higher secondary science group students in relation to their participation in National Green Corps. Moreover, the findings of the present study may throw light on the highlighted problem.

Objectives

1. To find the level of environmental protection awareness among higher secondary science group students in terms of their participation in National Green Corps.
2. To find the significant difference between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness.
3. To find the significant difference between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness with regard to gender, locality of residence, type of management and locality of school.

Analysis and findings

1. To find the level of environmental protection awareness among higher secondary science group students in terms of their participation in National Green Corps.

Table - 1 : Level of Environmental Protection Awareness among Higher Secondary Science Group Students in terms of their Participation in National Green Corps

Participation in National Green Corps	Low		Average		High	
	N	%	N	%	N	%
Yes	33	15.14	95	43.58	90	41.28
No	49	28.00	96	54.86	30	17.14

It is found from the above table that the 15.14% of higher secondary science group students those who are participating in National Green Corps have low, 43.58% of them have average and 41.28% of them have high environmental protection awareness.

28% of higher secondary science group students those who are not participating in National Green Corps have low environmental protection awareness, 54.86% of them have average environmental protection awareness and 17.14% of them have high environmental protection awareness.

Differential analysis

Null Hypothesis – 1

There is no significant difference between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness.

Table - 2: Difference between the Higher Secondary Science Group Students those who are Participating and Not Participating in National Green Corps in their Environmental Protection Awareness

Participation in National Green Corps	N	Mean	SD	Calculated 't' Value	Table Value	Remark
Yes	218	33.22	4.80	4.44	1.96	S
No	175	31.12	4.55			

Since the calculated 't' value (4.44) is greater than the table value (1.96) for 391 degrees of freedom at 0.05 level of significance, the null hypothesis is rejected. Hence, Significant difference is found between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness. The students who are participating in National Green Corps Programme have better environmental protection awareness.

Null Hypothesis – 2

There is no significant difference between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness with regard to gender.

Table - 3: Difference between the Higher Secondary Science Group Students those who are Participating and Not Participating in National Green Corps in their Environmental Protection Awareness with regard to Gender

Gender	Participation in National Green Corps	N	Mean	SD	Calculated 't' Value	Table Value	Remark
Male	Yes	117	33.65	4.35	4.68	1.96	S
	No	69	30.71	4.01			
Female	Yes	101	32.72	5.24	1.90	1.96	NS
	No	106	31.39	4.87			

Since the calculated 't' value (4.68) is greater than the table value (1.96) for 184 degrees of freedom at 0.05 level of significance, the null hypothesis is rejected with regard to male students. Significant difference is found between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness with regard to male students. The male students who are participating in National Green Corps programme have better environmental protection awareness.

Since the calculated 't' value (1.90) is less than the table value (1.96) for 205 degrees of freedom at 0.05 level of significance, the null hypothesis is accepted with regard to female students. Hence, they do not differ significantly in their environmental programme awareness with regard to female students.

Null Hypothesis – 3

There is no significant difference between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness with regard to locality of residence.

Table - 4: Difference between the Higher Secondary Science Group Students those who are Participating and Not Participating in National Green Corps in their Environmental Protection Awareness with regard to Locality of Residence

Locality of Residence	Participation in National Green Corps	N	Mean	SD	Calculated 't' Value	Table Value	Remark
Rural	Yes	174	34.26	4.28	6.69	1.96	S
	No	144	30.90	4.61			
Urban	Yes	44	32.16	4.55	3.00	2.00	S
	No	31	29.11	4.18			

Since the calculated 't' values (6.69 and 3.00) are greater than the table value (1.96) for 316 and 73 degrees of freedom at 0.05 level of significance, the null hypothesis is rejected. Hence, there is significant difference between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness with regard to locality of residence. The students irrespective of their locality of residence who are participating in National Green Corps Programme have better environmental protection awareness.

Null Hypothesis – 4

There is no significant difference between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness with regard to type of management.

Table - 5: Difference between the Higher Secondary Science Group Students those who are Participating and Not Participating in National Green Corps in their Environmental Protection Awareness with regard to Type of Management

Type of Management	Participation in National Green Corps	N	Mean	SD	Calculated 't' Value	Table Value	Remark
Government	Yes	106	34.06	4.81	5.47	1.96	S
	No	104	30.55	4.47			
Private	Yes	112	32.43	4.66	0.67	1.96	NS
	No	71	31.96	4.57			

Since the calculated 't' value (5.47) is greater than the table value (1.96) for 208 degrees of freedom at 0.05 level of significance, the null hypothesis is rejected with regard to the higher secondary science group students studying in government schools. Hence, there is significant difference between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness with regard to government school students. The students studying in government schools who are participating in the National Green Corps programme have better environmental protection awareness.

Since the calculated 't' value (0.67) is less than the table value (1.96) for 181 degrees of freedom at 0.05 level of significance, the null hypothesis is accepted with regard to higher secondary science group students studying in private schools. Hence, they do not differ significantly in their environmental protection awareness.

Null Hypothesis – 5

There is no significant difference between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness with regard to locality of school.

Table - 6: Difference between the Higher Secondary Science Group Students those who are Participating and Not Participating in National Green Corps in their Environmental Protection Awareness with regard to Locality of School

Locality of School	Participation in National Green Corps	N	Mean	SD	Calculated 't' Value	Table Value	Remark
Rural	Yes	137	34.46	4.23	7.70	1.96	S
	No	107	30.11	4.49			
Urban	Yes	81	32.71	4.98	2.10	1.96	S
	No	68	31.12	4.22			

Since the calculated 't' values (7.70 and 2.10) are greater than the table value (1.96) for 242 and 147 degrees of freedom at 0.05 level of significance, the null hypothesis is rejected. Hence, there is significant difference between the higher secondary science group students those who are participating and not participating in National Green Corps in their environmental protection awareness with regard to locality of school. The students irrespective of their locality of school who are participating in the National Green Corps programme have better environmental protection awareness.

Conclusion

From the findings of the present study, it is concluded that the male students, both rural and urban area students, government school students, and both rural and urban school students who are participating in the National Green Corps programme have better environmental protection awareness. From these observations, it is obvious that the participation in National Green Corps programme may improve their environmental protection awareness. Hence, it is the liability of the state and central governments to introduce the National Green Corps programme in all the schools across over the country to promote good level environmental protection awareness among the future generation, then only we can protect the globe from the environmental threats.

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INTEGRATED FARMING SYSTEM FOR LIVELIHOOD AND NATURAL RESOURCE SECURITY

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ABSTRACT

Integrated farming system is a sustainable agricultural practice that combines crops and animals, including fish, to create a self-sustaining environment. This system helps to reduce the environmental impact of farming, while providing a secure source of income for farmers. It also helps to maintain natural resource security by preserving the soil, water, and other resources necessary for farming. Integrated farming systems provide a variety of benefits to farmers. They can reduce the cost of inputs and increase the yield of crops. They also help to conserve water, reduce soil erosion, and improve soil fertility. Additionally, integrated farming systems can increase biodiversity and help to maintain a healthy environment.

Key words: *Integrated farming, yield of crops, agricultural practice.*

Introduction

Integrated farming systems are a sustainable and efficient way to manage land and resources for the benefit of both farmers and the environment. It involves the use of multiple crops, livestock, and other natural resources to create a balanced, diverse, and productive system that yields high yields and a secure livelihood for farmers. Integrated farming systems are beneficial because they increase the resilience of the system to climate change, reduce the need for external inputs, and provide a secure source of income and food security. They also help to conserve natural resources and provide a more diverse and nutritious diet for the farmer and their family. Integrated farming systems can help to reduce environmental degradation by reducing the need for chemical inputs and promoting soil fertility.

Benefits of Integrated Farming Systems

Integrated farming systems also provide a secure source of income for farmers. By combining crops and animals, farmers can diversify their income streams, making them less vulnerable to

market fluctuations. This can help to ensure that farmers have a steady source of income, even during difficult times. Integrated farming systems can provide a variety of benefits to the environment. These systems can improve soil fertility, increase crop yields, and reduce the need for external inputs. They can also help to conserve water, reduce the risk of erosion, and provide a more diverse and nutritious diet for the farmer and their family. Integrated farming systems can also help to reduce environmental degradation by reducing the need for chemical inputs and promoting soil fertility. Additionally, they can help to create jobs and increase the economic security of farmers by providing a secure source of income. Finally, integrated farming systems can help to increase the resilience of the system to climate change, providing a secure livelihood for farmers in the face of a changing environment.

Challenges of Integrated Farming Systems

Integrated farming systems are not without their challenges. The cost of inputs can be high, and the yield of crops can be unpredictable. Additionally, the system requires a significant amount of time and effort to maintain. Farmers must be willing to invest the necessary resources in order to reap the benefits of integrated farming. Another challenge is the lack of access to markets. Many farmers in developing countries lack access to markets, making it difficult to sell their products. This can make it difficult for farmers to make a profit, and can lead to a lack of motivation to invest in integrated farming systems. Despite the many benefits of integrated farming systems, there are also some challenges that must be addressed. These systems require a significant investment of time and resources, and can be difficult to implement in areas where there is limited access to land and resources. Additionally, these systems can be vulnerable to environmental changes, such as drought, floods, and pests, which can result in crop losses and reduced yields. Integrated farming systems also require a significant amount of labor, which can be difficult to maintain in areas with limited access to labor. Finally, these systems can be difficult to scale up due to the complexity of the systems and the need for specialized knowledge and skills.

Strategies for Overcoming Challenges

There are a variety of strategies that can be used to overcome the challenges associated with integrated farming systems. One strategy is to create partnerships with local businesses and organizations. These partnerships can help to provide access to markets and financial resources, making it easier for farmers to invest in integrated farming systems. Another strategy is to create

incentives for farmers to invest in integrated farming systems. This can include providing subsidies and other forms of support to farmers who are willing to invest in the system. This can help to ensure that farmers have the resources they need to make a profit and maintain their farms. One solution is for governments and institutions to provide farmers with access to resources and support, such as training, loans, and access to markets. Another solution is for farmers to form cooperatives and associations to share resources and knowledge, and to access markets more easily.

Goals of Integrated Farming Method:

- Increasing output per square foot.
- Proper disposal of garbage.
- Generations with year-round, consistent income.
- Cutting back on the use of chemicals.
- Maximize the yield of each component company.
- Management of soil health.

Principles of Integrated Farming Method:

- It is important to produce an adequate amount of high-quality food, fiber fodder, and industrial raw materials.
- For the integrated farming system to meet societal needs, a productive farming operation must be maintained.
- The program ought to safeguard the environment.
- To ensure the sustainability of natural resources through the system.

Elements:

- Trees, birds, cattle, and crops make up the majority of any IFS.
- Subsystems for crops can include monochromatic, mixed/intercrop, multi-tiered crops of cereals, legumes (pulses), oilseeds, and forage, among others.
- Bees, chickens, milk cows, goats, and sheep are examples of livestock.
- Fruit trees, a timer, fuel, and fodder are a few possible tree components.

Conclusion

Integrated farming systems can provide a variety of benefits to farmers, including a secure source of income and natural resource security. However, there are a variety of challenges associated with the system, including the cost of inputs and lack of access to markets. By creating partnerships and providing incentives, these challenges can be overcome, allowing farmers to reap the benefits of integrated farming systems. Integrated farming systems can provide a secure source of income for farmers, while also helping to maintain natural resource security. By investing in integrated farming systems, farmers can ensure that their farms are sustainable and secure, while also helping to protect the environment. Integrated farming systems are a sustainable and efficient way to manage land and resources for the benefit of both farmers and the environment. These systems can provide a variety of benefits, including increased yields, improved soil fertility, and increased economic security. However, these systems also come with a variety of challenges that must be addressed, such as the need for specialized knowledge and skills and the vulnerability to environmental changes. Despite the challenges, integrated farming systems can be an effective way to ensure a secure livelihood and natural resource security. With the right resources and support, these systems can be a viable way to ensure sustainable and efficient management of resources for the benefit of both farmers and the environment.

Takeaway

Integrated farming systems are a sustainable agricultural practice that can provide a variety of benefits to farmers. They can reduce the cost of inputs and increase the yield of crops, while also helping to conserve water, reduce soil erosion, and improve soil fertility. Additionally, integrated farming systems can provide a secure source of income for farmers. However, there are a variety of challenges associated with the system, including the cost of inputs and lack of access to markets. By creating partnerships and providing incentives, these challenges can be overcome, allowing farmers to reap the benefits of integrated farming systems.

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WOMEN EMPOWERMENT THROUGH INTEGRATED FARMING SYSTEMS

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ABSTRACT

Integrated Farming Systems (IFS) is an environmentally beneficial method that better uses farm resources by turning waste from one sector into input for another. IFS is a mixed farming system that consists of at least two distinct but conceptually related crop and animal enterprise components. IFS improves soil health, weed and pest control, and water quality maintenance. Toxic chemical fertilizers, weed killers, and pesticides should be kept to a minimum in the integrated agricultural system to protect the environment from unintended effects. The economic well-being of small and marginal farmers is strengthened, which positively affects their social, health, and educational responsibilities and their ability to support themselves. To provide society with healthy, chemical-free food, using chemicals (fertilizers and pesticides) can be decreased through the IFS strategy. Poor women invest in little animals according to the experience of an ideal progression for farm families, and the household gradually escapes poverty. To meet the needs of these people, research on local resources faces a significant and unmet challenge.

Keywords: *Integrated Farming System, Principles, Objectives, Benefits, and Women Empowerment.*

Introduction

Gratis food grains will be provided to around 81.4 crore people under the National Food Security Act for one year starting on January 1, 2023, according to the Economic Report of India, which began in 2008. Our country's population is predicted to reach 1370 million by 2030 and 1600 million by 2050. To meet future demand, we must produce 289 and 349 mt of food grains over the relevant time periods. According to the country's current situation, land under cultivation may continue to decline, and by 2030, the current cultivable area will be used for non-agricultural

activities to the extent of more than 20%. (Gill et al., 2005). In India, the issue is rendered more challenging by the shrinking average farm size and financial limitations on additional agricultural investment because 80% of farm households belong to the small and marginal farmer groups. The key to ensuring nutrition and food security for a big population may lie in productivity development. Modern agronomic techniques and technology must be used to boost the productivity of established agricultural systems. The authorised use of chemical fertilisers and pesticides, among other agronomic practises, dramatically enhanced productivity during the 20th century. However, the profitability and sustainability of these approaches have come into doubt due to unfavourable environmental degradation and increased operational expenses in agriculture (IAASTD, 2009 and FAO, 2010). Animals were once employed in integrated farming systems as a direct food source or to perform other tasks like power generation (draught animals) or transportation (horses). Moreover, animals were indirectly utilised to provide services like weed and pest control, fertilisation, and pollination as well as food like milk, eggs, or honey. Also, using animals provided the business with resources like leather or dung that could be sold directly or used to create products with added value (Devendra & Thomas, 2002).

Unsustainable farming causes environmental contamination, endangering the way of life for millions of families that own small farms. Growing the sustainability and profitability of agricultural production systems is essential to improving income, food, and nutrition security in developing nations (Ravallion, 2007). IFS is a comprehensive, integrated technique that successfully deals with the problems that small and marginal farmers face. By merging several farm companies and recycling crop wastes and leftovers on the farm, IFS seeks to boost small-holding employment and income. To live at least marginally above the poverty level, farmers need a reliable source of income. To address the problems posed by the current economic, political, and technological environment, production must improve or output must steadily rise. One of the most effective ways to handle this particular situation is with a farming system approach since it enables the careful implementation of various enterprises and the creation of site-specific systems based on the available resources, both of which will promote sustainable development (Dashora & Hari, 2014) In the IFS system, "waste" from one component is converted into an input for a different component, saving costs and increasing farmer output or income. According to IFS, agricultural wastes can be used as resources for other types of agriculture. Because it turns waste into resources, we get rid of the trash and ensure that the entire agricultural system is more productive (CARDI, 2010). IFS is a group of resource-saving methods

intended to increase productivity and profitability while minimising the negative effects of intensive farming and protecting the environment. (Lal and Miller, 1990; Gupta et al., 2012).

Principles of IFS

A mixed farming system known as IFS consists of at least two theoretically independent but distinct parts of crop and livestock enterprises (Okigbo, 1995). The IFS was defined as an aquaculture system that is integrated with animals and in which fresh animal waste is used to feed fish by (Edwards, 1997 and Jitsanguan, 2001) in addition to reporting that there are synergies and complementarities between enterprises that comprise a crop and animal factor that form the basis of the concept of IFS. The term "farming arrangement" refers to a combination of farm enterprises in which farm owners allocate resources to effectively use the actual operations to boost farm production and profitability. Some farm businesses include crop, agroforestry, livestock, aquaculture, agri-horticulture, and sericulture (Singh, 2004). IFS is described as a farming system component by (Radhamani et al., 2003) that improves the exploitation of organic wastes and agricultural residues from the field while enhancing productivity and reducing risk and profit. IFS is a component of FRS (Farming System Research), which, according to Jayanthi (2006), offers a shift in agricultural practises for enhancing crop output and assuring excellent resource usage. According to the principle of high complementarity, the output of one business or component should serve as the input for the other businesses (Panke et al., 2010). Similarly, the authors claimed that IFS aims to reduce wastes generated by the various farm subsystems, which enhances rural residents' access to work possibilities, nutritional security, and income.

Objectives of Integrated farming system

1. Maximizing the yield of all component businesses to ensure a consistent and predictable income.
2. Achieving agroecological equilibrium and rejuvenating/improving the system's productivity.
3. Manage weed, disease, and insect populations naturally using cropping systems, and keep them at a low degree of intensity.
4. Lowering the usage of chemicals (fertilizers and pesticides) to give society produce and an environment that is chemical-free and healthy (Manjunatha, 2014).

Benefits of IFS

It is more advantageous for farmers to use resources, recycle rubbish, and hire family labour in order to produce more. It is advantageous to all studies because it provides a feeling of previous

research and provides a framework for analysing and discussing findings for follow-up research investigations (Sasikala et al., 2015). (Ngambeki et al., 1992) showed that crop-based farming can be profitable by include animals by increasing financial returns and making better use of intermediate farm resources including manure, draught power, and crop wastes. According to Singh et al., 1993 and Singh et al., 1997, Integrating different businesses on different-sized land holdings typically results in higher profits and more employment than arable farming alone. Over the course of five years, integrating poultry, mushrooms, and fish with rice farming improved net farm income and on-farm labour compared to the typical rice cropping system. The comparison research also indicated that, provided access to labour and stable tenure, resource management integration and diversification might be effective, profitable, and manageable. According to (Ashby, 2001), farmers are subject to a significant degree of production and income variability, and consequently risk, because they rely on a limited number of crops and face a high chance of crop failure owing to a variety of factors, such as disease, drought, etc. Animal faeces is a useful fertiliser because it contributes to the soil in addition to the three crucial chemical nutrients of N, P, and K. As a crop growing input, manure continues to connect agricultural and animal output in emerging nations. The primary issue is maximising the benefits of manure for society and the environment (Tania, 1996).

The greatest strategy to boost agricultural production is to use livestock excrement to magnify nutrients that increase soil fertility and reduce the need for chemical fertilisers. Agricultural waste can be fed to animals (Gupta et al., 2012). Farm output is more sustainably produced due to the integration of several businesses, each with a particular economic significance. Recycling waste that is generated within the system helps to save natural resources and lessen dependency on high-energy inputs from outside sources. The agricultural method generates a consistent income for the farmer throughout the entire year through the sale of eggs, edible mushrooms, milk, honey, silkworm cocoons, etc. This will make it easier for a farmer with limited means to elude creditors or collection agents. Recycling organic wastes helps to reduce the demand for chemical fertiliser. Also, biogas production can supply all the energy needed for a home. IFS is, therefore, very effective in resolving energy issues (Manjunatha, 2014).

IFS's empowerment of women

In the management of the household, including agricultural operations, women are particularly important. For tribal and hilly places, in particular, this is true. By strategically deploying

family labour, adopting creative strategies, and assuring multiple applications of different household resources, there is a significant opportunity to increase household profitability. Women's empowerment through site-specific training and crucial need-based support makes this feasible. The role of women in agricultural and family resource management will become more significant as education levels rise in the coming years. Long-term feminization of agriculture is projected since men are moving into rural non-farm sectors, and developing women-centric agricultural system models will be a significant issue.

Conclusion

There is no proof that the poorest households, especially when employment is done by women, have a strong ability to escape the most extreme forms of poverty while also directly assisting the most vulnerable groups, such as young children and expectant mothers. The plan to build feeding systems based on the use of regional resources must take socioeconomic aspects into account. Using animal waste and agricultural waste cuts down on the requirement for outside inputs like electricity, agrochemicals, feeds, and fertilisers. The farming family's labour and land resources can generate higher net returns, but there must be an explicit knowledge of how this relates to the realities of the farmer's condition. Innovative prospects for preserving and enhancing biodiversity exist thanks to integrated farming systems. Such systems focus more on resource usage optimization than on system component maximization. The welfare of subsistence farmers can be enhanced by merging the skills and expertise of farmers, scientists, researchers, and students from other countries with equivalent eco-sociological conditions, i.e. through an integrated farming system.

Our primary obligation is to the young of today. It will be crucial to give young people a platform to develop farming systems that are professional and business-oriented. Also, the management of knowledge-intensive farming systems will benefit significantly from highly educated and skilled youth involvement. By enhancing their skills through advanced training, the youth population will be better equipped to establish primary and secondary agriculture supply chains. Developing microbusiness models in farming, which provides the opportunity for consistent, continuous income, is the only way to keep young people in the agricultural industry. Youths from metropolitan regions with connections to the rural system may be lured to work in rural areas by farming systems that are highly productive, commercially successful, environmentally friendly, and sustainable. This may encourage agro ecotourism and reverse the process of transmigration.

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ROLE OF WOMEN IN ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT

Ecological movements are organized at all periods of time at different parts of the world for environmental protection and conservation. As a result, the environment is protected from getting deteriorated. Exploitation of natural resources and overpopulation by the people to meet their own needs create threats to the environment. Women have direct contact with all natural resources especially in rural areas where 70% of Indian population directly depends upon natural resources. Women play an important role since ancient times to conserve the environment without taking care of their lives. Woman was always there in contact with nature for their house hold works and their daily needs. So they can understand nature's pain and how will it affect the future generation. Before 18th and 19th century, it was considered that women have no role in environmental conservation and promotion, as well as they were avoided in all major sphere of social life. But after spreading awareness about their rights and duties and taking cognizance of their surroundings. They consciously tried to raise voice against environment degradation; various environmental movements like Bishnoi movement, Chipko Movement, Aapiko movement, the silent Valley Movement and Narmada Bachao Andolan are the significant environmental movements that reflect the integral leadership of women in the society. Women always play a pivotal role in conservation of biodiversity, water resource and against the construction of hydroelectric project. The government of India has adopted various policies and programmes which include women as decision makers while making environmental policies by involving women from the grassroots level and spread awareness towards conservation of the environment. But India has long miles to go to make equitable gender sensitive environmental policies in true sense.

Keywords: *Environmental movement, women, water resource, grassroots level, gender sensitive.*

Introduction

Environment comes from the French word 'environmer' means surround. Environment is the sum total of water, air, land and their interrelationships among themselves and also with human beings,

other living organisms, and property. India is considered itself as mother of earth. As a mother nurtured their children, take care of her children in their womb, like wise earth also take care of its people reside in it. But the super animal human being has been aggressively exploiting the very natural environment to fulfill their needs. Overpopulation and technological advancement are continuously putting threat to the environment and exploits the natural resources. Women were considered as a weaker sex since ancient times but women were predominantly responsible for management and conservation of resources for their families. In 1970s, an interest in women and their connection with the environment was sparked by a book titled “Woman's Role in Economic Development” written by Ester Boserup. Starting in the 1980s, policy makers and governments became more mindful of the connection between the environment and gender issues. According to the World Bank in 1991, "Women play an essential role in the management of natural resources, including soil, water, forests and energy and often has a profound traditional and contemporary knowledge of the natural world around them". The interdependence of women with nature can be evolved from the following observations:

1. Women are having base and skills for natural resource management.
2. They are better managers for natural resources.
3. They have sensitiveness towards environmental changes and climatic variations.
4. They have high ecological consciousness.

Recent studies revealed that women are the direct victims of such environmental degradation, pollution etc. to illustrate, in some areas a few decades back women went to fetch water from sources that were few feet away. But now, because of excessive mining and allied activities, they have to walk miles together for a pot of drinking water. Though environmental degradation affects the human beings in general, women are considered to be the main victims of environmental degradation. Women’s direct contact with environment has produced them deep- knowledge about the environment. Women in India are playing a crucial role in protection and conservation of environment. Women in our country have brought a different perspective to the environment debate, because of their different experience base. Poor women's lives are not compartmentalized and they see the issues in a broad perspective. They understand clearly that economics and environment are compatible. Women have recorded successes in solving environmental problems all over the world. In India, the women realized that degradation of productive land has led to the erosion of top soil; the choking of water drainage was causing salinity and loss of food crops. They collectively lease

degraded land and revived them through traditional farming. In three years, 700 acres of land were restored to productive use. Women and the environment are closely bound and interconnected. Throughout history, women have been immortalized as powerful symbols of nature: Mother Earth, Earth Goddess, and Artemis in the Greek mythology, and Mother River (the Yellow River) in Chinese history.

Role of women in environmental conservation

The women participation in conservation of Environment is well known from 1731, near Jodhpur, Rajasthan by the Bishnoi Women. Amrita Bai of Khejarali Village sacrificed her life as she embraced the Khejri tree as the Bishnois regarded this tree as sacred which is considered as the first environmental movement in world. In 1972, in Chamoli district in Uttarakhand, Chipko Movement had started by Sundarlal Bahuguna, Bachni Devi and Gaura devi. Then in 1978, on the silent valley of Palakkad district of Kerala, where poetess Sughatha Kumari had played an important role against construction of hydroelectric project. In 1982, Navadanya Movement had started by environmental activist Vandana Shiva which was an ecofeminist movement to promote biodiversity by engaging women. In 1983, Aapiko movement had started by villagers of Uttarkannada district of Karnataka province which involves a large number of rural women in participation. The movement was against the commercial forest policy which had caused the destruction on ecosystem of the Sirsi forest. Another most significant environmental movement where women had played a pivotal role is Narmada Bachao Andolan. Under the leadership of Medha Patkar, in 1989 some activists had launched this movement against the construction of Sardar Sarovar Dam on the Narmada River, Gujrat. Currently, there are many more environmental activists who have been working vehemently for the protection and conservation of the environment. Among them Padma Shri award winner Sunita Narain, who focuses on sustainable development and fighting climate change. Another Padma Shri award winner Jamuna Tadu, who is also known as ‘Lady Tarzen’ of Jharkhand forest. She along with 100 Adivasi women has been protecting Jharkhand forest from mafia from last 20 years. Radha Bhatt, who started Nadi Bachao Abhiyan in 2008 opposing construction of hydroelectric power project which has created the devastation of river Ganga as well as damaged the ecosystem of all tributaries adjoining of it. Thus women actively participate in environment protection than men as women are directly affected and influenced by nature than men. Women have been involved in several governmental and non-governmental forestry and environment programs.

Bishnoi Movement -1731

The first ever environmental movement is not only in India but also in the world had started in 1731 where women sacrifice their life to save trees. Bishnois movement began with the royal order of Maharaja Abhay Singh to cutting of Khejri trees, worshipped by Bishnois, for construction of fortress. The villagers under the leadership of Amrita Devi protested against the order as she hugged the tree. Amrita Devi and her three daughters were beheaded for disobeying royal order. Just before her death, Amrita Devi declared, “If a tree is saved even at the cost of one's head, its worth”. This movement started by Amrita Bai in 1731 A D was revived by Bachni Devi and Gaura Devi of Uttar Pradesh in 1972. They snatched the axe from the wood cutters and warned contractors not to cut the trees. There were 363 villagers were killed by the soldiers for the check of protection of trees. At last the king cease the operation and designated Bishnoi as protected area which is exist as same till now. They are upholding eco friendly principles still by saving water by traditional water harvesting system, indigenous cultivation method for local areas and not killing any animals. Thus Bishnois movement laid the foundation of environment protection movement in India.

Chipko Movement – 1973-In 1973, in Uttarkhand’s Chamoli district District the entire ash tree was allotted to the Simon Company for commercial purpose. The movement begins with the government refusal to supply ash tree to the Dasholi Gram Swarajya Mandal (DGSM), (workers' cooperative) for processing plant of forest produces (especially for making plough) in Chamoli District. Instead government gave green signal for Simon Company to cut ash trees for production of sporting goods. The DGSM organised protest against government decision to promote Simon Company instead of villagers. The movement was led by Sundarlal Bahuguna, Gura Devi and Sudesha Devi. Chipko (a hindi word, meaning “to hug” or “cling to”) which was used to describe the local women was literally hugging the tress from cutting by the loggers. Gaura Devi referred to the trees as her “maika” (mother’s home) and invited the loggers to shoot them instead of harming the forest. Similarly, Sudesha Devi spearheaded the women’s drive to protect the Rampur forest from contractors. After many days of protest, the government canceled the company’s permit and granted it to the villagers.

Appiko movement- 1983- Appiko movement is important environment conservation movement in Karnataka, to protect Western Ghats forest. Appikko movement was initiated by Panduranga Hegde. In September 1983, men, women and children of Salkani (a village in Western Ghats) "hugged the trees" in Kalase forest. This movement was against government policy to open forest for industrial

development. The members of Mahila Mandal include Adivasi women joined for protection of rainforest by writing down to the government for halting of woodcutting. The village women conducted awareness programmes through foot marches, slideshows, folk dance, street plays, and dramas. Thus with the strong protest from people, Government forced to halt industrial policy on Western Ghats which resulted in destruction of forest.

Silent Valley movement- 1976 -Silent Valley is one of the important biodiversity hotspot in Southern end of Western Ghats in Kerala. The Silent Valley Movement was against the decision of Kerala Government to construct a dam for hydroelectric power project in the Silent Valley forest. The Malayalam poet and environmentalist, Sugatha Kumari was the prominent leader in this movement. Despite the offer of employment and development in the area, people, especially women opposed the hydro electricity project. As a result the project was cancelled by personal interventions of the then Prime Minister Indira Gandhi in 1980 and Silent Valley was declared as a National Park in 1984.

Narmada Bachao Andolan - 1985 -India's Narmada Bachao Andolan (NBA) is an environment movement against the building of a number of dams along the Narmada River funded by World Bank. The NBA spread to three states of Gujarat, Maharashtra, and Madhya Pradesh consist of 30 major, 135 medium and 3000 small dams whereas the dam would displace 3,20,000 tribal and submerged over 37000 hectares of forest and agricultural land as the construction of Sardar Sarovar Dam affect the environment and settlement of people of these areas. NBA, which led by the Medha Patkar, Baba Amte, and Arundhati Roy had turned into the international protest, gaining support from NGO'S all around the globe. It was basically a Gandhian way of protest of non-violence as organized satyagraha and hunger strike. With strong protest from NBA World Bank withdraw project in 1993. But the case continued in Supreme Court.

Navdanya movement- 1984- Navdanya is India's largest organic movement. Navdanya began in 1984 as a program of the Research Foundation for science, Technology and Ecology (RFSTE), a participatory research initiative to provide direction and support to environmental activism. "Navdanya" means "nine crops" that represent India's collective source of food security (Preston –Pile, 2007). The main aim of Navdanya is to save seeds from biopiracy³⁴ and with this intention, setup 111 Community seed banks³⁵ in 17 states in India. They are strongly campaigning

against Genetically Modified Seeds and actively participating in biodiversity conservation. Mostly the members of Navdanya Movement are women farmers from various parts of country.

Women concern for nature around India

Women have an integral relation with the environment. In fact, women have contributed greatly to the conservation movements in the past.

- ❖ Amrita Devi: woman who started Bishnoi movement.
- ❖ Gaura Devi: an activist who organized Chipko Movement.
- ❖ Medha Patkar: An environmentalist known for her active role in the Narmada Bachao Andolan.
- ❖ Sunita Narain: She is the Director General of Centre for Science and Environment (CSE), and publisher of Down to Earth. After the loss of tigers in Sariska, Sunita chaired the Tiger Task Force for conservation in 2005. She is a member of the Prime Minister’s Council for Climate Change and National Ganga River Basin Authority (which employ practices to clean the river).
- ❖ Menaka Gandhi: She is an animal rights leader as well as an environmentalist. In 1994, she founded people for Animals, the largest organisation for animal’s welfare in India. She believed in ahimsa and the fact that India was in need of a movement to stop the cruel treatment meted out to animals. So she anchored a TV program “Heads and Tails” and authored a book. She now chairs the Jury of International Energy Globe Foundation which annually awards the best environmental innovations of the year.
- ❖ Vandhana Shiva: A Delhi based environmentalist and eco feminist well known for her proletarian efforts to protect forests, organize women’s networks, and conserve local biodiversity. She was awarded the 1993 Right Livelihood Award, considered parallel to the Nobel Prize. Navdanya, a national movement to protect the diversity of living resources, was created in 1991. Since its 20 years of existence, more than 2000 varieties of rice have been conserved and 34 seed banks established in 13 states nationwide.
- ❖ Sugathakumari – A poet and environmentalist. Prakriti Samrakshana Samithi was founded by her who also participated in the ‘Save Silent Valley’ protest.
- ❖ Radha Bhatt – Actively formulating in the Uttarakhand Nadi Bachao Abhiyan in 2008 to oppose the construction of a series of hydel power projects that not only threatened the flow of the Ganga and most of its tributaries but imperiled the fragile, heavily deforested ecosystem of the Himalayan state, Radha Bhatt led 2000 kilometers march to voice for people’s water rights.

Conclusion

Women played a significant role in the environmental protection. Furthermore, women can help control population explosion which has been one of the major factors in environments dreadful conditions. Women have always played a critical role in meeting household and community energy needs. Inadequate energy resources and a lack of access to efficient technologies of energy utilization force the people to depend on their own labour, animal power and bio-mass energy to meet their daily requirements. With adequate environmental education and awareness women can conserve energy resources far more efficiently as compared to men. Women are responsible for the cleanliness of the household, on which depends the health and wealth of the family members. With proper education and training one can minimize the experiences and incidences of most of the water, food and airborne diseases. Traditionally women were kept away from the powers of decision making. Their unequal access to education and lack of decision making authority at all levels has lowered their position in the society. As a result it has had adverse effects on income, nutrition, health, social support networks and domestic knowledge. The World Bank estimated that environment degradation is costing around 5.7% of the country's GDP every year. History witnessed that how women have been playing an integral part and parcel in conserving and protecting environment which is so much successful so far. Women have been always considered the symbol of kindness and love. Therefore, being a mother they know the pain when their children get hurt likewise they know the pain of earth when her plants, rivers are damaged. Development is necessary, but it should not at the cost of environment. Development is fruitless without lives and without environment no lives can be exist in the earth. It is need of hour to pay strong attention towards women involvement in the decision making process and making gender sensitive environmental policies.

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ENVIRONMENTAL MANAGEMENT

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ABSTRACT

Environment is a fundamental and most essential part of our day to day life. Environmental management offers us a better livelihood by ensuring proper management in different sector of our life. Environment comprises various types of forces such as physical, intellectual, economic, political, cultural, social, moral and emotional. Environment is the sum total of all these external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturation of living organisms. And environmental management is an attempt to control human impact on and interaction with the environment in order to preserve natural resources. It focuses on the improvement of human welfare for present and future generations.

Keywords: *Environmental Management, Technology in environmental management*

Definitions of Environmental Management

The process of allocating natural and artificial resources so as to make optimum use of the environment in satisfying basic human needs at the minimum, and more if possible, on a sustainable basis (Jolly, 1978). Environmental management cannot hope to master all of the issues and environmental components it has to deal with. Rather, the environmental manager's job is to study and try to control processes to try and reach particular objectives (Royston, 1978). Management of the environmental performance of organizations, bodies and companies (Sharratt, 1995).

Functions of Environmental management

Environmental management system is simply a collection of activities undertaken to ensure that environmental issues are managed.

It provides the following functions –

- Consistently complying with environmental laws;
- Improving overall environmental performance;
- Addressing environmental liability from current or past practices;
- Maximizing investment in environmental affairs;
- Integration of environmental objectives into overall mission and business objectives;

- Providing an environmentally safe workplace.

Basically an Environmental Management Framework is Plan, Do, Check and Act with a continuous cycle.

Importance of Environmental management

Importance of Environmental Management Environmental management promotes physical, social and economic environment of the enterprise or project. It encourages planned investment at the start of the production chain rather than forced investment in cleaning up at the end. The importances of environmental management are as follows –

- To clarify modern environmental concept like how to conserve biodiversity;
- To know the more sustainable way of living;
- To use natural resources more efficiently;
- To know the behaviour of organism under natural conditions;
- To know the interrelationship between organisms in populations and communities;
- To aware and educate people regarding environmental issues and problems at local, national and international levels.

Nature of Environmental Management

The nature of environmental management Environmental management is an approach to environmental stewardship which integrates ecology, policy making, planning and social development. Its goals include:

- the prevention and resolution of environmental problems;
- establishing limits;
- establishing and nurturing institutions that effectively support environmental research, monitoring and management;
- warning of threats and identifying opportunities;
- sustaining and, if possible improving, existing resources;
- where possible improving ‘quality of life’;
- Identifying new technology or policies that are useful.

Management of Degraded Environment

This aims to develop understanding of some aspects of the impact of human activities on the environment and remedial actions which can be taken.

- a. **Reforestation** -Reforestation refers to the replanting of trees on land that has previously had trees, but where these were cut down recently. This is not to be confused with afforestation, which also refers to the planting or replanting of trees, however it refers to the planting of trees in an area where trees have not recently been cut down. The principle difference between the two definitions is time.
- b. **Erosion Control** -Erosion control is the practice of preventing or controlling wind or water erosion in agriculture, land development, coastal areas, river banks and construction. Effective erosion controls handle surface runoff and are important techniques in preventing water pollution, soil loss, wildlife habitat loss and human property loss.
- c. **Integrated Vector Management** -Integrated Vector Management is a decision-making process focused on protecting public health through the environmentally sound management of vector populations and reducing or interrupting the transmission of vector-borne pathogens.
- d. **Integrated Waste Management**-Integrated Waste Management rising energy prices and increasing worldwide commitment to reducing greenhouse gas emissions and landfill are driving the development of new approaches to the management of solid waste.
- e. **Pollution Control** -Pollution control is the process of reducing or eliminating the release of (contaminants, usually human-made) into the environment. It is regulated by various environmental agencies that establish limits for the discharge of into the air, water, and land.

Technology in Environmental management

- **Environmental Technology**-Environmental technology, green technology or clean technology is the application of one or more of environmental science, green chemistry, environmental monitoring and electronic devices to monitor, model and conserve the natural environment and resources, and to curb the negative impacts of human involvement.
- **Technology Disposal** -New advances in technology often render old technology useless. Discarding outdated or worn out technological goods is a significant source of environmental damage. For example, contemporary compact fluorescent light bulbs contain mercury, which is toxic to both humans and animals. Old thermometers also contained mercury, as do some batteries manufactured prior to the mid-1990s. Discarded vehicles left in place for long periods eventually leak toxic fluids into the ground, where they kill plants, animals and soil

microbes. Rainfall can wash pollutants from the discarded technology into waterways, spreading poisons into natural systems and the human food supply (Gellert, 2018).

- **Recent Trends in Environment Law Making** -The following aspects are covered under the process and current trends of environmental law making. Strengthening co-ordination of environmental institutions – inter-linkages, Environmental standards setting, Integration of environment into development planning, Economic instruments for environmental management, Preventive measures and environmental impact assessment (EIA), Environmental monitoring and inspection, Environmental audit, Environmental education and public awareness, Environmental restoration, Creation of Environment Fund, Dispute Settlement, Sanctions and penalties and International Environmental Conventions.

Conclusion

Environmental management is vital to confirm socio-economic development project to environmental safety and thereby ensure sustainable economic development. Its impact on the environment is also ever increasing, leading to rapid deterioration in environmental conditions. It helps the planning and management to take long term measures for effective management as well as environment conservation. Advances in technology have both negative and positive impacts in the lives of persons and the environment. Thus, what is needed in the management and manufacturing of recent technology is for the stake holders to strike a balance. This can come by education and public awareness. Also the disposal of used and worn-out technological equipment and gadgets should be done having in the principles of environmental management.

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EARTH WATER & EARTH LIFE MANAGEMENT

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ABSTRACT

Water makes up 60-75% of human body weight. A loss of just 4% of total body water leads to dehydration, and a loss of 15% can be fatal. Likewise, a person could survive a month without food but wouldn't survive 3 days without water. This crucial dependence on water broadly governs all life forms. Water also contributes to the formation of membranes surrounding cells. Every cell on Earth is surrounded by a membrane, most of which are formed by two layers of molecules called phospholipids. The phospholipids, like water, have two distinct components: a polar "head" and a non polar "tail." Due to this, the polar heads interact with water, while the non polar tails try to avoid water and interact with each other instead. Seeking these favorable interactions, phospholipids spontaneously form bilayers with the heads facing outward towards the surrounding water and the tails facing inward, excluding water. The bilayer surrounds cells and selectively allows substances like salts and nutrients to enter and exit the cell. The interactions involved in forming the membrane are strong enough that the membranes form spontaneously and aren't easily disrupted. Without water, cell membranes would lack structure, and without proper membrane structure, cells would be unable to keep important molecules inside the cell and harmful molecules outside the cell. All plants and animals need water to survive. There can be no life on earth without water. 60 percent of our body weight is made up of water. Our bodies use water in all the cells, organs, and tissues, to help regulate body temperature and maintain other bodily functions. Because our bodies lose water through breathing, sweating, and digestion, it's crucial to rehydrate and replace water by drinking fluids and eating foods that contain water.

Keywords: *phospholipids, rehydrate, and drinking fluids*

Introduction

Our solar system alone has nine planets and dozens of moons. Yet the only one these planetary bodies that is absolutely suitable for life is EARTH. Water is used as a symbol and ritual object. Water is essential for life. Water is liquid gold. It is the medium in which all living processes occur. It is a primary element and building block of sentient life (Plants, animals and humans). Water

dissolves nutrients and distributes them to cells, regulates body temperature, supports structures and removes waste products. In short it is the life blood of our planet, mother earth. We use water, waste it, pollute it, and let it run down the drain, flush it away and we take it granted.

Formation of water

Water is the signature of our planet. We are the blue planet. The planet of life. In the beginning, there was water. Earth's life-sustaining liquid came from the dust from which the planet was born. Several theories are put forth regarding the formation of water on earth.

- i) It is true that the earth is bombarded by asteroids, comets and meteors on a regular basis. According to one theory, comets, trans-Neptunian objects or water rich meteorite, some of which contains ice (proto planets) from the outer reaches of the asteroid, rammed into the earth and provided all our water.
- ii) The cooling of primordial Earth to the point where the out gassed volatile components was held in an atmosphere of sufficient pressure for the stabilization and retention of liquid water.
- iii) Earth is composed of rocky materials. During accretion the dusty debris that came together to form earth would have had relatively little water.
- iv) Gradual leakage of water stored in hydrous minerals of the earth's rocks.
- v) Photolysis: Radiation can break down chemical bonds on the surface.

Why water is still here on the earth?

Water is constantly moving, driven by solar energy. During water cycle, some of the water in the ocean and fresh water bodies such as lakes and rivers is warmed by the sun and let in to the atmosphere as water vapour. This is a continuous process and the sea should have dried up by this time. But the total volume of water in the world remains constant.

Evidence of water beyond Earth,

Spectral studies conducted by space craft have found out evidences of water molecules in the atmospheres and the surfaces of some of the planets, **ice on the moon**. Recently Terrain Mapping Camera fitted during Chandrayan mission launched by India has confirmed the presence of water molecules in the surface of the moon.

- **Comets:** Comets also called as dirty snowballs and they pass near the sun, the sunlight melts some of the comets material, which results in a long tail. This has fed the ocean with water.
- **Mars:** Photographs of the Red planet taken by the pathfinder has shown long jagged structures that appear to be old rivers and canyons. The atmospheric pressure of Mars is 10 times less

than that of the earth and so water cannot exist as liquid. The ice caps detected are largely composed of frozen carbon dioxide but small amounts of water-ice also been detected.

- **Europa:** The Galileo space craft orbiting Jupiter has photographed its four largest moons. One of its moon, the Europa's surface appears as if it is cracked with many fissures and it is believed to be made up of ice.
- **Interstellar clouds:** The spectrum of water has been detected in interstellar gas/dust clouds.
- **Cassini Spacecraft** has found water and dust particles from a moon of Saturn and Mars.
- **Comet:** Object moving in a path about the sun (With a nucleus of ice surrounded by gas with a tail pointing away from the sun).
- **Asteroid:** Asteroids are lumps of rock orbiting the sun, mostly in the asteroid belt between the orbits of Mars and Jupiter.
- **Meteor:** A small solid body from outer space that become incandescent (Glowing with heat) when entering the earth's atmosphere.
- **Meteorite:** It is a fallen meteor or fragment of natural rock or metal from outer space.
- **Neptunian:** A tran-uranic metallic element produced when Uranium atom absorb bombarding neutron.

“The World is not running out of water, but it is not always available when and where people need it”.

Water Resources

The earth is the only place in the universe, as far as we know, where liquid water exists in substantial quantities. Water resources are sources of water that are useful or potentially useful to humans. Uses of water include agricultural, industrial, household, recreational and environmental activities. Visually all of these human uses require fresh water. At present time, about 70% of earth surface is covered with water. Oceans, glaciers, underground aquifers (fresh), lakes and rivers atmosphere (water vapour) and biosphere are the main sources in the universe. 97% of water on the earth is salt water, 3% is fresh water of which slightly over two third is frozen in glaciers and polar ice caps. The remaining unfrozen fresh water is mainly found as ground water, with only fraction present above ground or air. India is bestowed with rich water resources like rivers, lakes and springs.

Water resources are divisible into five distinct categories: Surface water, Under river flow, Ground water, Desalination and Frozen water

Surface water

Surface water is water in river, lake or fresh water – wetland. Surface water is naturally replenished by precipitation (rain) and naturally lost through discharge to the oceans, evaporation, evapo-transpiration and sub-surface seepage.

Sources of surface water

- **Surface run-off:** rainfall that fallen in the surrounding land and that flows directly over the surface into the water body.
- **Direct precipitation:** rainfall that falls directly into the water body.
- **Interflow:** excess soil moisture which is constantly draining in to the water body.
- **Water table discharge:** an aquifer below the water body and the water table is high enough; the water will discharge directly from the aquifer in to the water body.

Factors determining the availability of surface water

The availability of surface water is depending on many factors which include the storage capacity of lakes, wetlands and artificial reservoirs, the permeability of soil beneath these storage bodies, the runoff characteristics of land in the water bodies, the timing of precipitation and local evaporation rates. Human often increase storage capacity by constructing reservoirs, dams etc, and decrease it by draining wetlands. Humans can cause surface water to be lost through pollution also.

- **Precipitation:** the small droplets of water in clouds form larger droplets and precipitation occurs and the rain drop falls to earth.
- **Evaporation:** It is the process where a liquid changes from its liquid state to a gaseous state.
- **Transpiration:** Water from plants evaporates through leaves, adding to the amount of water vapour in the air.
- **Fresh Water habitats:** Lakes, ponds, temporary ponds, springs, mountain torrents, streams, lowland rivers, large tropical lakes and gravel pits are some of the important fresh water habits.
- **Under river flow:** The total volume of water transported downstream throughout the river ass two components. One is the visible surface water flowing downstream.
- **Ground Water:** Ground water is fresh water located in the lower soil layers or within the poree space of soil and rocks (fossil water), also known as water tabs. The natural input to sub-surface water is seepage from surface water. The natural outpus from sub-surface water are springs and seepage to the oceans.

- **Aquifers:**An aquifer is an underground water-bearing layer of soil, gravel and porous rock through which water can flow, after it has passed downwards (infiltration) through the upper layers of soil.

Qualities of ground water

1. The nature of rain water
2. The nature of existing ground
3. The nature of soil through which water must percolate.
4. The nature of the rock comprising the aquifer.

The presence of above salts determines the quality of the water i.e., hard water or soft water.

- **Soft water & Hard water:** Water which gives lather readily with soap is called soft water. Water which does not give lather with soap is called hard water.
- **Desalination:** Desalination is an artificial process by which saline water (sea water) is converted to fresh water. The most common desalination processes are distillation and reverse osmosis. Desalination is currently expensive compared to most alternative sources of water, and only a very small fraction of total human use is satisfied by desalination.
- **Frozen water:** Frozen water is the water present in glaciers and icebergs. It is possible to divert and make use of the icebergs as water source. But practically it is very difficult and till to date this has only been done for novelty purposes.
- **Distillation:** Distillation is a method of separating mixtures of miscible liquids by boiling.
- **Osmosis:** It is a process in which the solvent molecule (water) will pass through a semi permeable membrane from less concentrated solution to the more concentrated solution.

Conclusion

Fresh water is essential for life. Fresh water is a renewable resource, yet the world's supply of clean, fresh water is steadily decreasing. Water demand already exceeds supply in many parts of the world and as the world population continues to rise, so too does the water demand. Awareness of the global importance of preserving water for ecosystem services has emerged only recently during the 20th century. More than half the world's wetlands have been lost already along with their valuable environmental services. Water is the most precious natural resource. Clean water is the first and foremost human right. Some water to all rather than all water for some would need to be a goal. We have the liberty to use whatever water available on earth but no authority to destroy the available resources. We have the right to utilize whatever water is available but no unrestricted freedom has

been given to us. So we have to take steps to save the fresh water. Let's take a pledge. **“save water and protect water bodies”**. Water is a gift of god. It is not left to us by our parents but was lent to us by or children. We have no authority to pollute it nor have the right to price it. It should be preserved for the future generation at any cost.

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THE IMPACT OF CLIMATE CHANGE ON AGRICULTURAL INSECT PEST (*Epilachna varivestis* Mulsant)

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ABSTRACT

Climate change is one factor driving the spread of pests and diseases, along with increasing global trade. Climate change can affect the population size, survival rate and geographical distribution of pests; and the intensity, development and geographical distribution of diseases. 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. The changing climate impacts pollinators by shifting growing and blooming seasons and potentially weakening the plant populations that pollinators depend on. Additionally, warmer temperatures have altered migration patterns, affecting pollinator species like butterflies. As such, it is very important to monitor pest's appearance and abundance as the conditions of their occurrence can change at a high pace. Climate change and extreme weather events have a major impact on crop production and agricultural pests. As generally adaptable organisms, insect pests respond differently to different causes of climate change. In this review, we address the effects of rising temperatures and atmospheric CO₂ levels, as well as changing precipitation patterns, on agricultural insect pests.

Keywords: *climate change, global warming, food security, crop production*

Introduction

Agriculture in the arid land is vulnerable to climate changes since it depends on water resources and prevailing atmospheric conditions. The influences and consequences of these variables on agriculture might operate negatively or positively. There is a reciprocal effect between climate change and animal production. As in agriculture, climate change can intervene in normal plant physiologies like photosynthesis, respiration, transpiration, nutrient uptake, mineral balance, ionic exchange etc. As well as, climate change can interfere crop production via modification of population

and function of pests and pathogens. Climate variables like temperature, humidity, precipitation etc. are the factors for the growth, development and multiplication of creatures like insects, fungi, bacteria, virus etc., pest population is also expected to change as with the change in the climate. Along with this, climate change is expected to bring changes in host plant resistance against diseases and pests. The resistance can be overcome by quicker disease cycles and modified physiologies of insect pest. Crops grow and develop ideally within the range of T_{opt} and at a slower rate beyond the range (the so-called sub/supra- T_{opt}). It was found that the rate of many development processes is a positive linear function of T between T_{base} and T_{opt} and a negative linear function of T between T_{opt2} and T_{FG} (Roberts and Summerfield 1987; Wheeler *et al.* 2000) Temperature impact can be imposed on any growth and development processes, on grain yield components and final grain yield, on grain quality and other aspects. For example, T in the mid 30s°C can lead to a reverse of the vernalisation effects of cold T s in wheat (Porter and Semenov 2005). This design assumes that leaf quality differences resulting from growth at different carbon dioxide concentrations were not immediately reversed by switching plants between carbon dioxide treatments. Carbohydrate contents can change within a few days of switching plants between carbon dioxide concentrations (Sasek *et al.* 1985). The observed differences in larval survival between switched and unswitched plants indicate that the assumption is valid for at least some leaf quality factors. The initial average larval fresh mass, and the number and mass of surviving larvae after 4 d were determined. Total leaf nitrogen content was determined with an automated nitrogen analyzer, and soluble carbohydrates and total non structural carbohydrates were determined colorimetrically after extraction and enzymatic digestion of ground leaf tissue (Britz *et al.* 1987).

Climate under change

The effects of climate change on agriculture can result in lower crop yields and nutritional quality due to drought, heat waves and flooding as well as increases in pests and plant diseases. The effects are unevenly distributed across the world and are caused by changes in temperature, precipitation and atmospheric carbon dioxide levels due to global climate change. In 2019, millions were already suffering from food insecurity due to climate change. Further, the predicted decline in global crop production is 2% - 6% with each decade. In 2019 it was predicted that food prices would rise by 80% by 2050. This will likely lead to increased food insecurity, disproportionately affecting poorer communities. A 2021 study estimated that the severity of

heatwave and drought impacts on crop production tripled over the last 50 years in Europe – from losses of 2.2% during 1964–1990 to losses of 7.3% in 1991–2015.

Pest insect

Currently, pathogens take 10-16% of the global harvest and this level is likely to rise as plants are at an ever-increasing risk of exposure to pests and pathogens. Warmer temperatures can increase the metabolic rate and number of breeding cycles of insect populations. Insects that previously had only two breeding cycles per year could gain an additional cycle if warm growing seasons extend, causing a population boom. Temperate places and higher latitudes are more likely to experience a dramatic change in insect populations. Some insect species will breed more rapidly because they are better able to take advantage of such changes in conditions. Historically, cold temperatures at night and in the winter months would kill off insects, bacteria and fungi. The warmer, wetter winters are promoting fungal plant diseases like wheat rusts (stripe and brown/leaf) and soybean rust to travel northward. Soybean rust is a vicious plant pathogen that can kill off entire fields in a matter of days, devastating farmers and costing billions in agricultural losses. Another example is the Mountain Pine Beetle epidemic in British Columbia, Canada which killed millions of pine trees because the winters were not cold enough to slow or kill the growing beetle larvae. The increasing incidence of flooding and heavy rains also promotes the growth of various other plant pests and diseases. On the opposite end of the spectrum, drought conditions favour different kinds of pests like aphids, whiteflies and locusts.

Locusts

Locusts (derived from the Latin *locusta*, meaning grasshopper) are various species of short-horned grasshoppers in the family Acrididae that have a swarming phase. These insects are usually solitary, but under certain circumstances they become more abundant and change their behaviour and habits, becoming gregarious. No taxonomic distinction is made between locust and grasshopper species; the basis for the definition is whether a species forms swarms under intermittently suitable conditions; this has evolved independently in multiple lineages, comprising at least 18 genera in 5 different acridid subfamilies.

Normally, these grasshoppers are innocuous, their numbers are low, and they do not pose a major economic threat to agriculture. However, under suitable conditions of drought followed by rapid vegetation growth, serotonin in their brains triggers dramatic changes: they start to breed abundantly,

becoming gregarious and nomadic (loosely described as migratory) when their populations become dense enough. They form bands of wingless nymphs that later become swarms of winged adults. Both the bands and the swarms move around, rapidly strip fields, and damage crops. The adults are powerful fliers; they can travel great distances, consuming most of the green vegetation wherever the swarm settles.^[3]

Beetles

Some species of beetle have evolved immunity to insecticides. For example, the Colorado potato beetle, *Leptinotarsa decemlineata*, is a destructive pest of potato plants. Its hosts include other member of Solanaceae, as nightshade, tomato, eggplant and capsicum, as well as the potato. Different populations have between them developed resistance to all major classes of insecticide. The Colorado potato beetle was evaluated as a tool of entomological warfare during World War II, the idea being to use the beetle and its larvae to damage the crops of enemy nations.^[161] Germany tested its Colorado potato beetle weaponisation program south of Frankfurt, releasing 54,000 beetles.

Reduviidae

The Reduviidae is a large cosmopolitan family of the order Hemiptera (true bugs). Among the Hemiptera and together with the Nabidae almost all species are terrestrial ambush predators: most other predatory Hemiptera are aquatic. The main examples of nonpredatory Reduviidae are some blood-sucking ectoparasites in the subfamily Triatominae. Though spectacular exceptions are known, most members of the family are fairly easily recognizable; they have a relatively narrow neck, sturdy build, and a formidable curved proboscis (sometimes called a rostrum). Large specimens should be handled with caution, if at all, because they sometimes defend themselves with a very painful stab from the proboscis.

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ORGANIC FARMING – A POSITIVE LINE TOWARDS SUSTAINABLE AGRICULTURE AND HEALTHY FUTURE

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ABSTRACT

Modern agriculture is based on the use of high yielding varieties of seeds, chemical fertilizers, irrigation water, pesticides, etc. But it also put severe pressure on natural resources like, land and water. However, given the continuous growth of modern technology along with the intensive use of natural resources, many of them of nonrenewable, it is felt that agriculture cannot be sustainable in future because of the adverse changes being caused to the environment and the ecosystem. This paper highlights the ill effects of the modern farming practices by using fertilizers and pesticides and the need to move to the traditional organic farming along with the challenges to be overcome for the positive shift to organic farming

Keywords: *Organic Farming , Natural resources, non-renewable sources*

Introduction

In India there were times when people lived close to nature with access to flora and fauna in healthier and cleaner surroundings. One has to look back at our present metropolitan cities or other large towns before the past fifty years as recorded in history/memories of the present elder generation to see the striking differences in the surroundings in which the people lived there. Land, water and air, the most fundamental resources supporting the human life, have degraded into such an extent that they now constitute a threat to the livelihood of millions of people in the country. Modern agriculture is based on the use of high yielding varieties of seeds, chemical fertilizers, irrigation water, pesticides, etc. But it also put severe pressure on natural resources like, land and water. However, given the continuous growth of modern technology along with the intensive use of natural resources, many of them of nonrenewable, it is felt that agriculture cannot be sustainable in future because of the adverse changes being caused to the environment and the ecosystem. Growing awareness of health and environmental issues associated with the intensive use of chemical inputs has led to interest in alternate forms of agriculture in the world. Organic agriculture is one among the broad spectrum of production methods that are supportive of the environment. Covid-19

pandemic has changed the perception of organic food, with spotlight now on safety and healthy food that is nutritious to build a strong immune system. Among the host of healthy food options available, organic food is perceived as the preferred choice. Therefore, organic food witnessed an uptake since the onset of pandemic. Organically grown foods generally contain higher levels of antioxidants, certain micronutrients, no harmful chemicals, pesticides and fertilizers, better taste and most important thing is organically grown produce aids in the sustainability of the planet and in maintaining ecological balance. This paper highlights the ill effects of the modern farming practices by using fertilizers and pesticides and the need to move to the traditional organic farming along with the challenges to be overcome for the positive shift to organic farming.

Negative impact of modern farming practices

- **Fertilizers-** Consumption of chemical fertilizers has been increasing in India during the past thirty years at a rate of almost half a million tonnes on an average, a year. It is true that the increasing use of fertilizer at high rates has boosted agricultural production in the country. But it has also caused adverse impact on soil and water as well as environment. Several studies on the effects of high level of fertilizer application on soil and water have confirmed the adverse impacts. Both drinking and irrigation water wells in large numbers have been found contaminated with fertilizers well above the safe level. Rainfall and excessive use of irrigation water cause these chemicals to change the alkaline or acidic nature of the soil.
- **Pesticides** -The use of chemical pesticides began with the discovery of toxicological properties of DDT and HCH during the Second World War. There are about 1000 agrochemicals in use in the world over. India accounts for about 3.7 per cent of the total world consumption. Agricultural chemicals have become a major input in Indian agriculture with the increasing demand for food, feed and fiber. Increasing application of fertilizer also leads to increasing use of pesticides to control pests and diseases. The trend of increasing fertilizer use also compels the farmers to enhance the use of pesticides as well.
- **Salinity and Water logging** Water is one of the important inputs for the vigorous growth and high yields of crops. The modernization of Indian agriculture has resulted in the increased use of irrigation water. The excessive irrigation in certain areas results in wastage as evident from the water logging. Seepage of canal water leads to salts present in the lowest layer of soil come up to the surface and the soil may turn alkaline or saline.
- **Depletion of Energy Resources** Chemical fertilizers, pesticides, herbicides, etc. are manufactured using the non-renewable materials like the fossil fuels. The global demand for

oil and natural gas is increasing and thus the price of the inputs to agriculture is bound to rise. Increasing demand for chemicals and energy in agriculture sector will have affects on our energy sources.

Input-Output Imbalance The soil nutrients in the form of farm produces continue to be exported. The import of chemical fertilizers cannot compensate the loss of soil nutrients through exports. The Earth can produce only a limited amount of biomass from a given area. If man tries to extract more, the system degenerates.

- **Reduction in Genetic Diversity** The genetic base of crops is very important and a reduction of genetic diversity leads to the emergence of pests on a large scale. The new hybrid technology adopted to increase productivity then depends upon the replacement of the local/traditional varieties of seeds. But this results in the reduction of genetic diversity and increase in genetic erosion.

Need for Organic Farming

Organic agricultural practices are based on a maximum harmonious relationship with nature aiming at the non-destruction of the environment. The major beneficial factors which are considered to be important to move to organic farming are as follows:

- **Healthy Foods** A study conducted in USA on the nutritional values of both organic and conventional foods found that consumption of the former is healthier. Apples, pears, potatoes, corn, wheat and baby foods were analyzed and found that the organic foods, in general, had more than 20 per cent less of the bad elements and about 100 per cent more of the good elements.
- **Improvement in Soil Quality** Natural plant nutrients from green manures, farmyard manures, composts and plant residues build organic content in the soil. This indicates that sufficiently higher amounts of nutrients are made available to the crops due to enhanced microbial activity under organic farming.
- **Increased Crop Productivity and Income** The organic farming methods yielded a high productivity and income when compared to the conventional farming (using fertilizers and pesticides) and integrated farming over the years. Many research studies have proved that the input costs were low under organic farming and with a 20 per cent of premium prices of output, the net income increased progressively.

- **Low Incidence of Pests**_Bio-control methods like the neem based pesticides to Trichoderma are available in the country. Indigenous technological products such as Panchagavya (five products of cow origin) which was experimented at the University of Agricultural Sciences, Bangalore found to control effectively wilt disease in tomato.
- **Employment Opportunities**_According to many studies, organic farming requires more labour input than the conventional farming system. Thus, India which has unemployment as a vital problem can find organic farming an attraction. Moreover, the problem of periodical unemployment will also get mitigated because of the diversification of the crops with their different planting and harvesting schedules resulting in the requirement of a relatively high labour input.
- **Indirect Benefits**_Several indirect benefits from organic farming are available to both the farmers and consumers. While the consumers get healthy foods with better palatability and taste and nutritive values, the farmers are indirectly benefited from healthy soils and farm production environment. Protection of the ecosystem, flora, fauna and increased biodiversity and the resulting benefits to all human and living things are great advantages of organic farming.

Challenges in Organic Farming

The most important constriction felt in the progress of organic farming is the inability of the government policy making level to take a firm decision to promote organic agriculture. Unless such a clear and unambiguous direction is available in terms of both financial and technical supports, from the Centre to the Panchayat levels, mere regulation making will amount to nothing. The following are found to be the major problem areas for the growth of organic farming in the country:

- **Lack of Awareness**_It is a fact that many farmers in the country have only vague ideas about organic farming and its advantages as against the conventional farming methods. Use of bio-fertilizers and bio pesticides requires awareness and willingness on the part of the farming community.
- **Output Marketing Problems**_It is found that before the beginning of the cultivation of organic crops, their marketability and that too at a premium over the conventional produce has to be assured It was found that the farmers of organic veggies got lower prices than those of the conventional veggies. The cost of marketing of both types of products was also same and the buyers were not prepared to pay higher prices to the organic variety.

- **Shortage of Bio-mass**_Many experts and well informed farmers are not sure whether all the nutrients with the required quantities can be made available by the organic materials. The crop residues useful to prepare vermi compost are removed after harvest from the farms and they are used as fodder and fuel. Even if some are left out on the farms termites and insects destroy them. Experiments have shown that the crop residues ploughed back into soil will increase productivity and a better alternative is conversion into compost. Increasing pressure of population and the disappearance of the common lands including the wastes and government lands make the task difficult.
- **High Input Costs**_The small and marginal farmers in India have been practicing a sort of organic farming in the form of the traditional farming system. They use local or own farm renewable resources and carry on the agricultural practices in an ecologically friendly environment. The groundnut cake, neem seed and cake, vermi-compost, silt, cow dung, other manures, etc. applied as organic manure are increasingly becoming costly making them unaffordable to the small cultivators.
- **Marketing Problems of Organic Inputs**_Bio-fertilizers and bio-pesticides are yet to become popular in the country. There is a lack of marketing and distribution network for them because the retailers are not interested to deal in these products, as the demand is low.
Lack of Financial Support_Supports for the marketing of the organic products are also not forthcoming neither from the State nor from the Union governments. Even the financial assistance extended to the conventional farming methods are absent for the promotion of organic farming.
- **Low Yields**_Restoration of full biological activity in terms of growth of beneficial insect populations, nitrogen fixation from legumes, pest suppression and fertility problems will take some time and the reduction in the yield rates is the result in the interregnum. Small and marginal farmers cannot take the risk of low yields for the initial 2-3 years on the conversion to organic farming. There are no schemes to compensate them during the gestation period.
- **Vested Interests**_Hybrid seeds are designed to respond to fertilizers and chemicals. The seed, fertilizer and pesticide industry as also the importers of these inputs to the country have a stake in the conventional farming. Their opposition to organic farming stems from these interests.

Lack of Quality Standards for Biomanures_Most farmers are not aware of the pitfalls of

using the commercially available biomanure products. Even though the farmers are using manure produced by different methods, proper parameters for biomanure are yet to be finalized. Most farmers are still unaware of the difference between biomanure and bio-fertilizer, it is point out. While biomanure contains organic matter, which improves the soil quality, bio-fertilizers are nutritional additives separated from the organic material, which could be added to the soil, much like taking vitamin pills.

Conclusion

The ill effects of the conventional farming system are felt in India in terms of the unsustainability of agricultural production, environmental degradation, health and sanitation problems, etc. Organic agriculture is gaining momentum as an alternative method to the modern system. Many countries have been able to convert 2-10 per cent of their cultivated areas into organic farming. The demand for organic products is growing fast in the major developed countries. It appears that India is lagging far behind in the adoption of organic farming. A vigorous campaign to highlight the benefits of organic farming against the conventional system is essential to increase the awareness of the farmers and consumers. Agricultural practices of India date back to more than 4000 years, and organic farming is very much native to this country. Organic farming is one of the several approaches found to meet the objectives of sustainable agriculture.

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AIR POLLUTION

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ABSTRACT

One of our era's greatest scourges is air pollution, on account not only of its impact on climate change but also its impact on public and individual health due to increasing morbidity and mortality. There are many pollutants that are major factors in disease in humans. Among them, Particulate Matter (PM), particles of variable but very small diameter, penetrate the respiratory system via inhalation, causing respiratory and cardiovascular diseases, reproductive and central nervous system dysfunctions, and cancer. Despite the fact that ozone in the stratosphere plays a protective role against ultraviolet irradiation, it is harmful when in high concentration at ground level, also affecting the respiratory and cardiovascular system. Furthermore, nitrogen oxide, sulfur dioxide, Volatile Organic Compounds (VOCs), dioxins, and polycyclic aromatic hydrocarbons (PAHs) are all considered air pollutants that are harmful to humans. Carbon monoxide can even provoke direct poisoning when breathed in at high levels. Heavy metals such as lead, when absorbed into the human body, can lead to direct poisoning or chronic intoxication, depending on exposure. Diseases occurring from the aforementioned substances include principally respiratory problems such as Chronic Obstructive Pulmonary Disease (COPD), asthma, bronchiolitis, and also lung cancer, cardiovascular events, central nervous system dysfunctions, and cutaneous diseases. Last but not least, climate change resulting from environmental pollution affects the geographical distribution of many infectious diseases, as do natural disasters. The only way to tackle this problem is through public awareness coupled with a multidisciplinary approach by scientific experts; national and international organizations must address the emergence of this threat and propose sustainable solutions.

Keywords : *Morbidity, Nervous system dysfunction, polycyclic aromatic hydrocarbons (PAHs)*

Introduction

Air pollution refers to the release of pollutants into the air—pollutants which are detrimental to human health and the planet as a whole. According to the World Health Organization (WHO),

each year air pollution is responsible for nearly seven million deaths around the globe. Nine out of ten human beings currently breathe air that exceeds the WHO's guideline limits for pollutants, with those living in low- and middle-income countries suffering the most. In the United States, the Clean Air Act, established in 1970, authorizes the U.S. Environmental Protection Agency (EPA) to safeguard public health by regulating the emissions of these harmful air pollutants.

Impact of air pollution on human health

The long-term effects associated with air pollution are chronic asthma, pulmonary insufficiency, cardiovascular diseases, and cardiovascular mortality. According to a Swedish cohort study, diabetes seems to be induced after long-term air pollution exposure. Moreover, air pollution seems to have various malign health effects in early human life, such as respiratory, cardiovascular, mental, and perinatal disorders, leading to infant mortality or chronic disease in adult age .

National reports have mentioned the increased risk of morbidity and mortality. These studies were conducted in many places around the world and show a correlation between daily ranges of particulate matter (PM) concentration and daily mortality. Climate shifts and global planetary warming could aggravate the situation. Besides, increased hospitalization (an index of morbidity) has been registered among the elderly and susceptible individuals for specific reasons. Fine and ultrafine particulate matter seems to be associated with more serious illnesses , as it can invade the deepest parts of the airways and more easily reach the bloodstream. Air pollution mainly affects those living in large urban areas, where road emissions contribute the most to the degradation of air quality. There is also a danger of industrial accidents, where the spread of a toxic fog can be fatal to the populations of the surrounding areas. The dispersion of pollutants is determined by many parameters, most notably atmospheric stability and wind.

Effects of Air Pollution

The effects of air pollution on the human body vary depending on the type of pollutant and the length and level of exposure—as well as other factors, including a person's individual health risks and the cumulative impacts of multiple pollutants or stressors.

Smog and soot

These are the two most prevalent types of air pollution. Smog (sometimes referred to as ground-level ozone) occurs when emissions from combusting fossil fuels react with sunlight. Soot (also known as particulate matter) is made up of tiny particles of chemicals, soil, smoke, dust, or allergens—in the form of either gas or solids—that are carried in the air. The sources of smog and soot are similar. “Both come from cars and trucks, factories, power plants, incinerators, engines, generally anything that combusts fossil fuels such as coal, gas, or natural gas,” Walke says.

Smog can irritate the eyes and throat and also damage the lungs, especially those of children, senior citizens, and people who work or exercise outdoors. It’s even worse for people who have asthma or allergies: these extra pollutants can intensify their symptoms and trigger asthma attacks. The tiniest airborne particles in soot, whether gaseous or solid, are especially dangerous because they can penetrate the lungs and bloodstream and worsen bronchitis, lead to heart attacks, and even hasten death. In 2020 a report from Harvard’s T. H. Chan School of Public Health showed COVID-19 mortality rates in areas with more soot pollution were higher than in areas with even slightly less, showing a correlation between the virus’s deadliness and long-term exposure to fine particulate matter and illuminating an environmental justice issue.

Because highways and polluting facilities have historically been sited in or next to low-income neighborhoods and communities of color, the negative effects of this pollution have been disproportionately experienced by the people who live in these communities. In 2019 the Union of Concerned Scientists found that soot exposure was 34 percent higher for Asian Americans, on average, than for other Americans. For Black people, the exposure rate was 24 percent higher; for Latinos, 23 percent higher.

Hazardous air pollutants

A number of air pollutants pose severe health risks and can sometimes be fatal even in small amounts. Almost 200 of them are regulated by law; some of the most common are mercury, lead, dioxins, and benzene. “These are also most often emitted during gas or coal combustion, incinerating, or—in the case of benzene—found in gasoline,” Walke says. Benzene, classified as a carcinogen by the EPA, can cause eye, skin, and lung irritation in the short term and blood disorders in the long term. Dioxins, more typically found in food but also present in small amounts in the air, can affect

the liver in the short term and harm the immune, nervous, and endocrine systems as well as reproductive functions. Mercury attacks the central nervous system. In large amounts, lead can damage children's brains and kidneys, and even minimal exposure can affect children's IQ and ability to learn.

Another category of toxic compounds, polycyclic aromatic hydrocarbons (PAHs), are by-products of traffic exhaust and wildfire smoke. In large amounts they have been linked to eye and lung irritation, blood and liver issues, and even cancer. In one study, the children of mothers exposed to PAHs during pregnancy showed slower brain-processing speeds and more pronounced symptoms of ADHD.

Greenhouse gases

By trapping the earth's heat in the atmosphere, greenhouse gases lead to warmer temperatures, which in turn lead to the hallmarks of climate change: rising sea levels, more extreme weather, heat-related deaths, and the increased transmission of infectious diseases. In 2018 carbon dioxide accounted for 81 percent of the country's total greenhouse gas emissions, and methane made up 10 percent. "Carbon dioxide comes from combusting fossil fuels, and methane comes from natural and industrial sources, including large amounts that are released during oil and gas drilling," Walke says. "We emit far larger amounts of carbon dioxide, but methane is significantly more potent, so it's also very destructive." Another class of greenhouse gases, hydrofluorocarbons (HFCs), are thousands of times more powerful than carbon dioxide in their ability to trap heat. In October 2016 more than 140 countries reached an agreement to reduce the use of these chemicals—which are found in air conditioners and refrigerators—and develop greener alternatives over time. Though President Trump was unwilling to sign on to this agreement, a bipartisan group of senators overrode his objections in 2020 and set the United States on track to slash HFCs by 85 percent by 2035. According to David Doniger, senior strategic director of NRDC's Climate and Clean Energy program, "the agreed-to HFC phasedown will avoid the equivalent of more than 80 billion tons of carbon dioxide over the next 35 years."

Pollen and mold

Mold and allergens from trees, weeds, and grass are also carried in the air, are exacerbated by climate change, and can be hazardous to health. Though they aren't regulated and are less directly connected

to human actions, they can be considered a form of air pollution. “When homes, schools, or businesses get water damage, mold can grow and can produce allergenic airborne pollutants,” Knowlton says. “Mold exposure can precipitate asthma attacks or an allergic response, and some molds can even produce toxins that would be dangerous for anyone to inhale.”

Pollen allergies are worsening because of climate change. “Lab and field studies are showing that pollen-producing plants—especially ragweed—grow larger and produce more pollen when you increase the amount of carbon dioxide that they grow in,” Knowlton says. “Climate change also extends the pollen production season, and some studies are beginning to suggest that ragweed pollen itself might be becoming a more potent allergen.” If so, more people will suffer runny noses, fevers, itchy eyes, and other symptoms.

Air pollution is now the world’s fourth-largest risk factor for early death. According to the most recent State of Global Air report—which summarizes the latest scientific understanding of air pollution around the world—4.5 million deaths were linked to outdoor air pollution exposures in 2019, and another 2.2 million deaths were caused by indoor air pollution. “Despite improvements in reducing global average mortality rates from air pollution, the world’s most populous countries, India and China, continue to bear the highest burdens of disease,” says Vijay Lamaye, staff scientist at the NRDC Science Center. “This report is a sobering reminder that the climate crisis threatens to worsen air pollution problems significantly if we fail to act to cut carbon pollution.”

Conclusion

The effective way to control air pollution, regardless of spatiotemporal boundaries, is probably by cutting down emissions. Air pollution control's effectiveness depends on the country's economic status, governmental concerns, and political circumstances. Using public transport is a sure short way of contributing to less air pollution as it provides with less gas and energy, even carpools contribute to it. In addition to less release of fuels and gas, using a public transport can also help in saving money. The energy that the lights take also contribute to air pollution, thus less consumption of electricity can save energy. Use energy saving fluorescent lights to help the environment. The concept of recycle and reuse is not just conserve resources and use them judiciously but also is helpful for air pollution as it helps in reducing pollution emissions. The recycled products also take less power to make other products. The use of plastic products could be very harmful to the environment as they take a very long time to decompose, due to their material made up of oil. The use of paper bags

instead is a better alternative as they decompose easily and are recyclable. The collecting of garbage and getting it on fire in dry seasons or dry leaves catching fires is a huge factor for causing air pollution, moreover smoking also causes air pollution and causes the air quality to worsen along with obviously damaging one's health. The usage of AC's takes a lot of energy and emits a lot of heat which is bad for the environment. AC's also take a lot of power and energy to work as compared to fans.

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ORGANIC FARMING AS TOOL FOR SUSTAINABLE LIVELIHOODS OF WOMEN

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ABSTRACT

“Women are leading the way in sustainable and organic agriculture,”

Organic Farming empowers women and promotes gender equality. Development of natural resources is deeply committed to the empowerment of women as a means for social change. Organic farming has positive impacts on women, such as improvements in health and food security .Organic farming is exploiting the potential for empowering women fully and they would require technical training and working beyond traditional social structures. Government and various NGO’s offer different training programmes which raise self-esteem and self-confidence of women in administrative levels. This paper explains about the Sustainable Livelihoods through Organic Farming.

Keywords: *Women Empowerment, Organic Farming*

Introduction:

Empowerment of women means women to be economically independent, self-reliant, having positive self-esteem to enable them to face any difficult situation, and make them capable of participating in developmental activities. Farming utilize women more than men. Empowering and mainstreaming workforce in agriculture can bring paradigm shift towards economic growth. It will enhance food and nutrition security and alleviate poverty and hunger. Empowerment of women workforce in agriculture, by ensuring equal access and opportunity will lead to a foundational transformation in India's rural economy, improving lives of millions

Organic Farming

Organic Farming, as an alternate way to participate in agriculture. As an emerging industry, organic farming’s steep learning curve along with the new agricultural model and giving opportunities for women. The organic farming movement proved it was possible to farm intensively on smaller plots, significantly lowering barriers to entry such as access to large tracts of land and expensive machinery with which to work it. It also redefined where farming could take place, opening the door for farming models based in urban and suburban locations, increasing access to farm-generated income for women.

Women's Impact on Organic Farming

Organic Farming has opened doors for women in agriculture. Organic farming can help women to gain access to education, increase their power in decision-making as well as improve their health. Organic farming additionally empowers women by allowing them to apply their traditional knowledge and embrace their role as ‘keeper of seeds’ which in turn encourages biodiversity. Further, through higher and more diverse income as well as lower input costs women face less financial risks and are less at risk of exploitation due to a higher level of social awareness.

Sustainable Livelihoods through Organic Farming

The different activities are carried out by the government for the sustainable livelihoods in organic farming such as

Field activities

Organic Seed Production

One of the critical inputs required for organic farming is good quality organic seeds. It is the time to produce organic seeds and enable farmers to access good quality organic seeds. Certified organic seeds and truthfully labelled seeds (TFL) were produced. Inputs like quality breeder seeds and foundation seeds of paddy varieties, groundnut, black gram and sesame, organic inputs like green manure seeds, neem cake, biofertilizers, vermicompost and mechanical traps were distributed to the beneficiaries.

- ❖ **Training on Seed Production**-Trainings on certified seed production were conducted for the farmers as well as for the staff involved in monitoring farmers’ fields to enable them to guide the beneficiaries and other practical techniques were also provided.
- ❖ **Conversion to Organic by Providing Input Support and Crop Loan**-Conversion to organic farming by providing input support and crop loan. Inputs like neem cake, biofertilizers, vermicompost and mechanical traps were distributed. Crop loans have been provided for the cultivation and for establishing vermicompost production units. crops like paddy, groundnut, chilli, tomato, sesame, sunhemp, pulses, cereals, cotton, ragi etc., have been cultivated.
- ❖ **Organic Farming Demonstration Fields**-Demonstration of various organic farming technologies like preparation and application of plant growth regulators, using pheromone traps and mechanical traps for pest control, preparation of vermicompost and compost, Azolla cultivation, collection and usage of cow’s urine, using farm ponds for irrigation etc.,were done.

- ❖ **Creating an enabling environment**-To create an enabling environment to do organic farming, activities like training programmes, exposure visits, participation in agri-exhibitions and fairs, conducting food festivals etc., were taken up.
- ❖ **Training Programmes**-To build the capacity of the beneficiaries on organic farming and related Technologies training programmes on soil fertility, non – chemical pest and disease management, organic crop protection methods, preparation of bio pesticides, organic farming technologies, organic paddy cultivation etc. were conducted.
- ❖ **Exposure Visits**-Exposure Visits to organic farms and fields, input production units, paddy processing units, Agri exhibitions etc. were organized
- ❖ **Participation in Exhibitions**-To disseminate the importance and technologies of organic farming to a wide range of people and to raise sufficient consumer awareness about organic farming and its benefits we have participated in agricultural fairs.
- ❖ **Food Festivals Organised**-Food Festivals are Organised to create awareness about the importance and nutritional value of traditional and organic foods. The participants were served with different traditional dishes. There were stalls with displays of medicinal herbs traditional paddy varieties, value added products, organic products, biopesticides and millets
- ❖ **Capacity Building of NGOs / CBOs**-To strengthen the organic farming activities and to build the capacity of other NGOs, Centre for Improved Rural Health and Environmental Protection (CIRHEP).Support has been provided for CIRHEP to establish vermicompost production unit in its research farm as a demonstration unit of vermicompost for the farmers
- ❖ **Infrastructure Development**- Infrastructures like a seed grading and processing unit, threshing yard and a training centre have been constructed. Biopesticide and vermicompost production units were setup in the beneficiary villages.

Seed grading and processing unit

- ❖ **Bio pesticide Unit**

In organic agriculture, the botanicals play a major role in the management of pests and diseases. To provide quality bio pesticides of different types for various purposes, a bio pesticide unit were constructed

- ❖ **Temporary Training Shed**

To conduct training programmes regularly for the beneficiaries in a common place a temporary training shed was established with necessary equipment and training aids.

- ❖ **Demo Vermicomposting and Bio pesticide Units**

To encourage farmers to get involved in the production of organic inputs and to develop community based production units' support has been provided for bio pesticide preparation and vermicomposting production.

Educational materials

- ❖ **Calendar on Organic Foods** -A New Year Calendar on organic foods has been brought out. The importance of organic food and organic farming has been highlighted with catchy pictures and
- ❖ thought- provoking slogans with information.
- ❖ **Pesticides Basic Facts (Poochikolligal sila Mukkiya Thakavalgal)** -It provides basic information on chemical pesticides. It also provides information on the status of pesticide usage in India, harmful effects and health hazards caused to human beings and animals, environmental pollution etc. It also discusses the alternative practices to avoid the use of chemical pesticides.
- ❖ **Organic Kitchen Gardening (Iyyarkaivazhi Kaikari Thottam)** -Organic Kitchen Gardening focuses on how to grow vegetables in your garden without the use of chemical fertilizers and pesticides. It gives information about the
- ❖ importance and techniques of the preparation of compost. Cultivation details of some important vegetables are given. Description of pests and diseases attacking vegetables and their control measures are also provided.
- ❖ **Organic Paddy Cultivation (Iyyarkaivazhi Nel Sagupady)** -It gives information about seed selection techniques, seed treatment and use of organic manures to improve soil fertility. Pests and diseases affecting paddy are described in detail with their organic control measures. It also gives information on pests attacking storage grains and their control. Information about important indigenous paddy varieties with their special characteristics are also described in detail.
- ❖ **Pamphlet on Traditional Food (Parambariya Vunavu – Sila Thagavalgal)**-An informative pamphlet on traditional food has been prepared and distributed during the food festival. Information like characteristics of different food items, medicinal properties and nutritive values of foods are described briefly.

Women as a tool in the Dynamic Future of Organic Farming

Women need to occupy a greater number of agricultural research positions in order to enrich the available body of research with women's perspectives and self-identified objectives.

- Women need more access to technical training. This includes training with farm equipment, extension service support and trained farmers.
- Women need access to capital funds for land and equipment, as well as financial support to purchase things like tools, seeds, and other farming inputs.
- Agriculture needs more policies that target a reduction of the gender gap in farming and farm earnings, and supporting action to ensure such policies work toward meaningful change.
- Agriculture needs to cultivate more women leaders, both to inspire a continued increase in women farmers and to steer action, research, and access in a direction that is supportive of and accessible to women.

Conclusion

Women profit from organic farming in some areas. Farming households can diminish health risks, reach independency from external inputs .Women are especially empowered through Sustainable Livelihoods through Organic Farming and get training on diversifying their income sources which raise the economic status of women.

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Conceptualizing Feminism, Environmental policies from Ecological Perspectives

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ABSTRACT

Women are the foundation of every society. Although their sacrifice and commitment to the political, economic, and social spheres are not recognized, their commitment to household activities can not be repudiated. On account of the denial, they are more inclined towards the environment. Women depend more on the environment to carry out their household jobs-right from cooking to relaxing. They are preeminent collectors of natural resources and it is inevitable to rely on water, land, and trees for their household chores. Therefore, the dilapidation of the environment directly affects the lives of women. This article attempts to illustrate the connection between women and the environment.

Keywords: *Feminism, Ecology, Environmental Movements & Policies*

Introduction

Ecofeminism started in the 1970s and 1980s as the multitude of forms of environmental theories, activists, and feminists in many parts of the country. The term “Ecofeminism” was propounded by Francoise d’Eaubonne in her book *Feminism or Death* published in 1974. It is a movement that envisages an intrinsic connection between the exploitation and deprivation of the environment and the subjugation of women and oppression in the existing society. It confronts contemporary patriarchal principles and embraces that the relationship between women and nature cannot be separated. The last decades witnessed many women environmentalists and environmental movements emerged for women’s rights (Mellor, 1997).

Feminization of agriculture

A survey taken during 2017-2018 reveals that with the increasing rural-to-urban migration by men, there is a feminization of the agriculture sector, with a growing number of women in various roles as entrepreneurs, laborers, and cultivators. World widely, there is empirical evidence

that women have an influential role in ensuring preserving local agro-biodiversity and food security. In most parts of the world, women are given the responsibility of working on the farm and domestic food production (Tiondi, 2001). The number of women is expanding their involvement in agricultural work. It has been known that in many African tribes, more work associated with food production is left to the management of women (Boserup, 1970). The findings in a study conducted by Schultz et al (2001), revealed that 90% of women in the developing country keep engaging in farming and agricultural work. Women and nature have been regarded as subordinates entity by men throughout history, which expresses a close association between them (Wenz, 2001).

Attitude of Women towards Environment

Women in developing countries are chiefly responsible for the conservation and management of resources for their families. They indulge in accumulating and storing water, protecting fuel, food, and fodder, and managing and maintaining land –be it wetlands, forests, or agricultural land. In 1991, the World Bank opined that women play a significant part in the management of natural resources, including soil, forests, water, and energy. They have insightful traditional and contemporary knowledge of the natural world around them. As a result, the effect of environment has an on the well-being and health of women. Every home and society relies on women as they are principal caregivers to children, elders, and the sick. The hereditary and traditional knowledge on how to give medicines, nutritional balance food, and crop rotation methods are well known to most women. Women’s lives and family lives are deeply affected during drought, unpredictable rainfall, or rigorous storm affect their basic resources. Findings of several studies on the environment and women revealed that natural disasters excessively hit women, minimizing their life expectancy rates, particularly where there is disproportionate gender equality.

Ecological movements initiated by women

The contribution of women in the renovation and preservation of forests can be seen through their various activities in ecological movements. They are :

1. Chipko Movement-Chipko Movement started in 1973 intending to preserve and conserve the forests in Gharwala, Uttar Pradesh. The movement brought a situation of inconsistency in the status of women in society. Women raised chaos, that prevented Bhyunder valley, the Allahabad-based sports company, Symonds from felling fourteen ash trees. Women demand their rights in the

decision-making process along with men. Primarily the movement was a process of women's participation. (Jain Shobhita, 1994). The conflict reveals the connection between women and the environment.

2. Appiko Movement-The word 'Appiko' means 'hug' in Kannada, and was founded and led by Panduranga Hegde in 1983 in Karnataka. The movement initiated protests against the government policy to open forests for the development of industries. The agitated people including, men, women, and children hugged trees. The major part was organized by Adivasi women (Elwell, 2016).

3. Silent Valley Movement-The Silent Valley Movement was organized and led by Sugatha Kumar in the year 1976. It is one of India's last remaining parts of virgin tropical evergreen forest. This valley is an important biodiversity hotspot in the southern end of the Western Ghats in Kerala. This movement protested against the government's construction of a dam for the hydroelectric power project. Later, the forest was declared a National Park.

4.Narmada Bachao Andolan-The Narmada Bachao Andolan is a social movement organized by activist Medha Patkar in 1985. The protests aimed to stop the construction of large dams across the Narmada river. Nari Shakti ka Sanman was the popular slogan among the Adivasis, environmental activists. Women were ready to negotiate their life to preserve the river and stop the construction of the dam (Borah, B. (2020). Celebrities including Booker Prize Winner Arundhati Roy and Bollywood actor Aamir Khan also supported the movement.

5. Navdanya Movement-Navdanya is the largest organic movement led by Dr.Vandana Shiva in 1984. It means nine crops that represent India's collective source of food security (Warren, 2011). The primary focus of this movement was to save seeds from biopiracy. The activists were most women farmers from various states of India.

Women and Environment protection policies and programs

There are many environmental policies at the national and International levels. Various policies and programs have been created by the government, NGOs, and also by individuals. Women constitute half of the population so empowerment is required for the overall growth of the nation. Therefore women are expected to be a part of developmental policies about the environment as they

are very sensitive toward the environment. In light of this, the government of India undertakes the following environmental programs including women in the mission and vision of the nation. They are :

- ❖ Environmental Gender Index (EGI) ranks 46th out of 72 countries in the world. It advocates how they permit gender and environment into their policies and planning. It controls gender equality and women's empowerment in protecting the environment.
- ❖ National Forest Policy 1988 was introduced during the 1990s to control deforestation along with the support of state Forest Departments and local communities to reforest the degraded forest. Women comprise 33% of the membership of the Vana
- ❖ The National Policies for Women 201 gives importance to poor women as they can use natural resources and also collect and can make assets out of natural resources to encounter poverty. It also ensures that organically grown produce will be strengthened to make a decent life for women.
- ❖ Forest Rights Act permits women to use forest products and widens their roles in governing the forests
- ❖ National Television and All India Radio broadcast several programs about environmental protection. It has become a part of the education system in schools and colleges which promoted awareness among women about their role to protect the environment.

Conclusion

Women have a unique relationship with nature. Their interaction with nature and their actions to environmental violation must be analyzed and identified irrespective of gender, class, caste, and race. Women are the fatalist of environmental degradation and at the same time, they are active agents in reforming, restructuring, and protecting the environment. Practically being close to nature, women are always able to realize and observe environmental problems better. Since women are the prospective users of the facilities, it is important to regard their opinion and views in planning to save the environment and implementing projects for the same. Therefore, conservation of natural resources and promotion of environment cannot be done without involving the women in planning and training for promoting the values for conservation and promotion of environment.

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ENVIRONMENTAL MANAGEMENT SYSTEMS

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ABSTRACT

Environmental management systems are becoming more and more in demand from stakeholders and environmental organisations because they are one of the best ways to reduce an organization's environmental impact. It helps an organization address its regulatory requirements in a systematic and cost effective manner. This proactive approach can help reduce the risk of non-compliance and improve health and safety practices for employees and the public. All firms can benefit from implementing an Environmental Management System (EMS), regardless of their size, location, industry, or stage in the ecological journey. This article talks about environmental management system and its benefits.

Keywords: *Environmental Management System, environmental performance, environmental impact, organization, ecological journey.*

Introduction

Environmental Management System (EMS) refers to the management of an organisation's environmental programmes in a comprehensive, systematic, planned and documented manner. It includes the organisational structure, planning and resources for developing, implementing and maintaining policy for environmental protection. The International Organisation for Standardisation (ISO) has defined environmental management system as that "part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy (ISO, 1996).

Functions of EMS

An Environmental Management System (EMS) performs the following functions:

- Serves as a tool to improve environmental performance
- Provides a systematic way of managing an organisation's environmental affairs

- Is the aspect of the organisation's overall management structure that addresses immediate and long-term impacts of its products, services and processes on the environment
- Gives order and consistency for organisations to address environmental concerns through the allocation of resources, assignment of responsibility and ongoing evaluation of practices, procedures and processes
- Focuses on continual improvement of the system

Basic elements of EMS

The key elements of any environmental management system are:

- **Environmental policy** - Develop a statement of the organisation's commitment to the environment. Use this policy as a framework for planning and action.
- **Environmental aspects** - Identify environmental attributes of products, activities, and services. Determine those that could have significant impacts on the environment.
- **Legal and other requirements**- Identify and ensure access to relevant laws and regulations, as well as other requirements to which the organisation adheres to.
- **Objectives and targets** - Establish environmental goals for the organisation, in line with the policy, environmental impacts, the views of interested parties, and other factors.
- **Environmental management programme** - Plan actions necessary to achieve objectives and targets.
- **Structure and responsibility** - Establish roles and responsibilities for environmental management and provide appropriate resources.
- **Training, awareness, and competence** - Ensure that the employees are trained and capable of carrying out their environmental responsibilities.
- **Communication** - Establish processes for internal and external communications on environmental management issues.
- **EMS documentation** - Maintain information on EMS and related documents.
- **Document control** - Ensure effective management of procedures and other system documents.
- **Operational control**- Identify, plan, and manage the operations and activities in line with the policy, objectives, and targets.
- **Emergency preparedness and response** - Identify potential emergencies and develop procedures for preventing and responding to them.

- **Monitoring and measurement** - Monitor key activities and track performance. Conduct periodic assessments of compliance with legal requirements.
- **Non-conformance and corrective and preventive action** - Identify and correct problems and prevent their recurrence.
- **Records** - Maintain and manage records of EMS performance.
- **EMS audit** - Periodically verify that the EMS is operating as intended.
- **Management review** - Periodically review the EMS with an eye to continual improvement.

Main steps in EMS

An EMS is a structured framework for managing an organisation's significant environmental impacts. It provides a process through which organisations can engage with employees, customers, clients and other stakeholders. An EMS concentrates resources on implementing the commitments outlined in the organization's policy, which may involve minimising or eliminating the detrimental environmental effects of its operations while/or maximising their beneficial ones (Boiral, 2007). Whatever scheme is adopted, the elements of the EMS will largely be the same, following the Cycle of: • Plan what is to be done; • Do what is planned ; • Check to ensure that it is done; and • Act to make improvements. Through this cycle, all EMSs set a framework through which the organisation can build on-going 'Continuous improvement' of environmental performance.

Environmental review

An environmental review is a scoping study to collect information about an organisation's current activities and related environmental aspects, impacts and legal requirements. The review also provides an opportunity to demonstrate the potential benefits of implementing an EMS and thereby gain management and staff commitment to the EMS process.

An environmental review will:

- identify the environmental aspects and related impacts and other environmental issues associated with an organisation's operational activities
- identify key activities or processes (aspects) that may generate significant environmental impacts
- highlight activities, processes and operations that can be prioritised for improvement
- provide baseline data against which improvements in environmental performance can be measured.

EMS or PDCA model

An effective model is developed for better organisation of EMS. This model involves the following elements (Nandar Nwe, 2015)

- ❖ **Plan:** i. environmental factors ,ii. Legal and other prerequisites ,iii. Programs, aims, and objectives
- ❖ **Do:** i. Power, responsibility, and resources, ii. Skill, knowledge, and awareness iii. Communication; iv. Documentation; v. Document control vi. Operational management, vii. Emergency reaction and preparation
- ❖ **Check:** i. Keep an eye on and gauge ii. Assess compliance iii. Nonconformity, remedial action, and preventive measures iv. Record-keeping oversight v. Internal audits
- ❖ **Act:** i. Management evaluation ii. ISO 14001 assessment

Developing an Environmental Management System

For an EMS to operate successfully, several conditions have to be satisfied.

Firstly, the procedures instituted must be orientated towards preventing the occurrence of incidents that might cause environmental damage, rather than being mere fault detection systems that allow faults to be put right before someone complains about the environmental effects. Secondly, when introducing an EMS, it is very important that employees at all levels in a company are aware of the reason for it, understand fully how to operate it, and cooperate enthusiastically in implementing it. Thirdly, whilst it is necessary to appoint an EMS manager with designated authority for implementation and operation of the procedures designed to minimise the environmental impact of the company's operations, the responsibility for environmental protection must never be seen as being the responsibility of this one person alone.

Benefits of EMS

Environmental Management Systems helps to identify the degradation factors and implement strategies to mitigate them. Some of its benefits are:

- ❖ Improve environmental performance;
- ❖ Enhance compliance;
- ❖ Prevent pollution and conserve resources;
- ❖ Reduce/mitigate risks;
- ❖ Attract new customers and markets (or at least retain access to customers and markets with EMS requirements);
- ❖ Increase efficiency/reduce costs;

- ❖ Enhance employee morale (including the possibility of enhanced recruitment of new employees);
- ❖ Enhance image with public, regulators, lenders, investors;
- ❖ Achieve/improve employee awareness of environmental issues and responsibilities.

Conclusion

Identifying an interface with the environment, to characterize the nature of the effect and estimating the degree of impact and developing programs to minimize environmental impacts and improve compliance with environmental regulations is of prime importance. Creating awareness among faculty, staff, and students to integrate environmental considerations in educational research must be done at once. Providing a framework to set environmental goals, improve performance, and reduce environmental costs and liabilities is essential.

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Environmental Technology: A Rescuer of Natural Resources

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ABSTRACT

The systematic treatment has created a tremendous path for the development of society through technology. The application of technology has impacted and still impacting its positive and negative effects in numerous fields without any limit and Environment is not an exception in that case, thus comes the biggest wanted saviour “Environmental Technology.” Most of the people believed that the environmental technology is a curse for humankind, but the truth is that it is an authentic rescuer of the natural resources. In this article, have been described how it plays a key role in the enrichment and rescue of our long-lasting treasure of natural resources. In most of the instance, displaying about the negative influence of the environmental technology in one side, the other side how the technology is saving the natural treasures. Through this article, have been brought up the applications which are the saviours of the natural treasure for the present as well as for the future generation. The main aim of this article is to comprehend that, technology serves for the humankind in various life perspectives in order to assure the sustainable living without abolishing the food chain. Environmental Technology is one the principal invention of sustainable development which helps to monitor the harms caused by ourselves to this nature. Thus, this article also helps to explore how to make use of the expanding environmental technology in positive perspectives.

Key words: *Environmental Technology, saviour, human kind, rescuer, natural treasures, sustainable*

Introduction

The result of scientific knowledge being utilised for practical purposes in terms of methods, systems, approaches, processes, and devices are known as Technology. Technology is changing fast and it's also rapidly broadening in its field which also includes environment. Technology is a purpose for making things trouble free in the community, environment plays the major role in making the

community and technology makes it simpler. In this 2023, approximately 8 billion people are distributed all over the world which indeed displays that all natural resources are being used by us to attain our basic needs. But the controversy is that we are carving for a sophisticated life and over exploiting the treasure of natural resources. This controversy not only leads to depletion of natural resources, it creates varied changes in the environment which includes pollution, climatic changes and even replaces economic growth etc., This is the high time we have to focus on the other part of technology which provides a path to safeguard the treasures for the upcoming generation. Environmental Technology has ample applications in which have been used for hydroelectricity, wind power, solar power etc., these are some applications which are installed in various parts of the world, yet there is a green technology updates like monitoring, protecting and making proper use of the natural resources, this article mainly focuses on the recent development in the green technology as ‘Environmental Technology’.

Environmental Technology (ET)

Environmental Technology is an application of environmental sciences, technology is attaining its heights gradually and also provides different opportunities in enhancing the environment. Its implementation has impacted the natural resources in both positive and negative aspects. Everywhere, the more spells only on negative aspects and forget who created that issue, the humankind exploited the treasures using the intensified technologies and blocked out the environmental applications that was intended to save them from extinction. There is an array of ET where the human only chose the ones which make us congenial.

Importance of ET

Even though it has negative impacts it has the same potential to bring about a change for the protection of natural resources through technology,

- waste materials are recycled and produce products like animal feeds
- dirty water is recycled and ends up being used by human beings

These recycling acts save money, preserve natural resources, and avoid environmental damages. These are some of the basics which keeps us moving forward in taking the positive aspects of saving our resources. However, the development, the deployment, the transfer, and the diffusion of technology are a complex process, yet can make it easier by the involvement.

Technology may not be able to fix all environmental issues but it invariably can contribute to its betterment when has been channelised correctly. The reason why the environment is in such bad shape is due to the wrong implementation and practice of technology. Climate Changes, Global Warming, and Pollution are influenced not by technology but the mismanagement of it. Therefore, it is the use of technology that determines the positive or negative impact and the aim should be, to position the technology in a right way where the current health of the environment which surrounds are cured and emphatically reinstituted.

The Applications of ET as Rescuer

There are many smart applications of rescuing the natural resources, some of the recent developments are discussed below. There are,

- Smart Technology
- Electric Vehicles
- Renewable Energy Storage
- Upcycling

Smart Technology

Smart Home technology uses devices such as linking sensors and other appliances connected to the Internet of Things (IoT) that can be remotely monitored and programmed in order to be as energy efficient as possible and to respond to the needs of the users. The Internet of Things (IoT) is a network of internet-connected objects able to collect and exchange data using embedded sensor technologies. This data allows devices in the network to autonomously ‘make decisions’ based on real-time information. For example, *intelligent lighting systems* only illuminate areas that require it and a *smart thermostat* keeps homes at certain temperatures during certain times of day, therefore it helps to reduce the wastage.

The ET has been enabled by increased connectivity to the internet as a result of the increase in availability of *Wi-Fi, Bluetooth, and Smart Sensors* in buildings and cities. Experts are predicting that cities of the future will be places where every car, phone, air conditioner, light and more are interconnected, bringing about the concept of energy efficient ‘smart cities.’

The technology of the internet further demonstrates a positive impact of technology on the environment due to the fact that social media can raise awareness of global issue and worldwide virtual laboratories can be created. Experts from different fields can remotely share their research, experience and ideas in order to come up with improved solutions. In addition, travel is reduced as meetings/communication between friends and families can be done virtually, which reduces pollution from transport emissions.

Electric Vehicles (EV)

Energy stored in rechargeable batteries along with one or more electric motors are installed in electric vehicle is the best utility example of ET. Since 2008, there has been an increase in the manufacturing of EV due to the desire to reduce environmental concerns such as air pollution and greenhouse gases in the atmosphere.

EV demonstrate a positive impact of technology on the environment because they do not produce carbon emissions, which contribute towards the ‘greenhouse effect’ and leads to global warming. Furthermore, they negatively contribute to air pollution, which means they are cleaner and less harmful to human health, animals, plants, and water.

Recently, there are several environmental technology government incentives have been encouraging to plug-in vehicles, tax credits and subsidies to promote the introduction and adoption of EV. The companies such as Bloomberg have predicted that they could become cheaper than petrol cars by 2024 which helps the society move forward to become more greener by means of EV.

Renewable Energy Storage

In the transition to renewables, one key problem is working out how to make clean energy available consistently, even the clouds are surmounted the sun for days on end, or wind hasn’t spun turbines in weeks. So that it emerges the need to store large amounts of energy for long periods of time, at little cost. Innovative companies around the world, including Aquion Energy, Malta (Google X) and Highview Power, are developing unique long-term storage solutions for the power generated by renewable energy sources. Fossil fuels are out, renewables energies are in, it results the demand for storage technology.

Upcycling (Circular Waste Management)

Upcycling - turning waste into new, usable materials or products has never been more popular. Innovative companies and organizations around the world are finding ways to upcycle existing waste into everything from fuel and fertilizer to clothes and bicycles. Upcycling is part of the *circular economy*, a model where ‘waste’ doesn’t exist it simply becomes the raw material for something new.

Sustainable Development Goal (SDG 12)

In *Sustainable Development Goal*, have a place for *Responsible Consumption and Production of Resources*, it is about ensuring sustainable consumption and production patterns, which is key to sustain the livelihoods of current and future generations. In order to achieve economic growth and sustainable development by changing the way of production and consumption of goods and resources to reduce the ecological footprint urgently. Agriculture is the biggest user of water worldwide, and irrigation now claims close to 70 percent of all freshwater for human use.

The important targets to achieve the goal is the efficient management of our shared natural resources, also the way to dispose of toxic waste and pollutants. Encouraging industries, business and consumers to recycle and reduce waste is equally important, in order to move towards more sustainable patterns of consumption by 2030 with the help of developing countries.

Even the basic needs of large share of world population, is far too little consumption. Halving the per capita of global food waste at the retailer and consumer levels is also important for creating more efficient production and supply chains. This can help with food security, and shift us towards a more efficient resource economy.

There are more applications like *waste water treatment* and *water purification*, *waste management* and *recycling*, *waste-to-energy*, electric transport, programmable thermostats, self-sufficient buildings, low carbon construction, carbon capture and storage, LED lighting, vertical farming, wave energy, batteries, green materials, carbon tracking software etc., all these innovations lead the nation to the sustainability in resources and development.

Final Thoughts

Whatever may be the new innovations, installation or updation may happen it is in human hands that is how do the human to make use of it. The humankind plays an important role in the development and protection of the environment. The uses of various technology for the growth in varied manner, but the humankind must be sensible about how to use the technology. If human have to encounter, check and monitor properly, easily reducing the wastage of resources in a gradual

manner. Environment and its resources are the basic needs of the humankind. Humankind might not become the reason for knocking down the natural treasure, but also, they can control the over usage and misuse of technology. They can opt the alternative technology for preserving the resources when monitoring any problem.

Talking about the negative aspect of ET is a mere waste of time, instead we can create awareness about the positive impacts of ET for the sake of the peaceful living to assure the life of future generation. This article would create the awareness of positive possibilities present in ET. Thus, whatever or however the technology can widen, it can also be a savior, it is a value of humankind, who can rescue and enrich the treasure of Natural Resources.

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WOMEN: A POWER FOR NATURAL RESOURCE MANAGEMENT

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ABSTRACT

Women are the backbone of the farming system, but are often the ones who suffer more from the adverse effects of pollution and environmental degradation. Deforestation, monoculture practices in agriculture, loss of groundwater, flooding, landslides and destruction of biomass have worsened the situation of the women in the state and increased their workload. Women and girls tend to have responsibility for sourcing, collecting and transporting natural resources for domestic purposes. In the majority of developing countries, men are more prone to use natural resources for commercial purposes (agriculture, fishing, timber). Women's role as managers, users and beneficiaries of natural resources is an often unexplored opportunity for increasing their contribution for natural resource management. Rural women is crucial for ensuring that local knowledge and practices in biodiversity management are not lost during a period of far-reaching environmental change. Adopt longer term "transformative" perspectives, supporting women's participation in decision-making and changing prevalent negative attitudes on women's leadership capacities and social roles. Allocate resources for women, capacity building and awareness raising at all levels and in ways that are adapted to the needs of different target groups (for example, programme staff, women beneficiaries of NRM programmes, members of natural resource user groups, staff from local institutions and/or service delivery organisations, marginalised communities, indigenous women). Thus let the women to protect natural resources and others join hand to the welfare of nation.

Keywords: *natural resource management, capacity building, awareness*

Introduction

Natural resources are fundamental to sustaining the human population, serving as the basis for many of the goods and services on which humans depend, including food, energy, clothes, manufacturing, medicine and sanitation. Across the world, the rural poor have the greatest dependence on natural resources; there are over 1.3 billion subsistence farmers, hunters and

gatherers, waged farm labourers and fishers that require access to land, water and plant/animal species for their livelihoods¹. Approximately 60 million indigenous people rely fully on forests for survival; in developing countries, roughly 1.2 billion people depend upon agroforestry farming systems to increase agricultural yields and make a living (FAO et al., 2009).

Women have the potential to play a critical role in this process, as they use and manage land and other natural resources, while meeting water, food and energy needs in households and communities. Women in direct contact with natural resources such as forests, water, land and wildlife. Since women utilize and conserve these resources to supply basic needs for their families, they are closer to nature than men (Kiran, 2015; Joshi and Bhardwaj 2015). (Kirani 2015; Kiewish 2015) assert that their closeness to nature makes women perfect managers of an ecological unit. Women in poor rural households are burdened with a significant responsibility for family subsistence and are important, often the primary, and in many female-headed households the sole economic providers. However, their ability to fulfil this responsibility is significantly constrained by the limited (and declining) resources and means at their command.

Womankind had not only to discover suitable plants and appropriate methods for their cultivation but must also devise special implements for tilling the soil, reaping and storing the crop and converting it into food. Technologies such as the digging stick (used to dig out tubers and wild plants, and precursor to the plough), hoe, the saucer-shaped stone for grinding grain, baskets and vessels for grain storage, jars, jugs, strainers and beakers for holding water and fermented liquor, the oven for baking bread, and the loom, are all attributed to women, as are techniques such as hoeing, winnowing, making bread (involving some knowledge of biochemistry), spinning and weaving, and the chemistry of pot making (Childe, 1942). Ignoring the role of women in resource management can perpetuate inequalities and grievances linked to natural resource rights, access and control, which have proven to be powerful catalysts for violence.

Challenges for Women

Women are the backbone of the farming system, but are often the ones who suffer more from the adverse effects of pollution and environmental degradation. Deforestation, monoculture practices in agriculture, loss of groundwater, flooding, landslides and destruction of biomass have worsened the situation of the women in the state and increased their workload. women remain largely excluded

from owning land, benefiting from resource wealth or participating in decision-making about resource management in happy life settings. This exclusion often extends to negotiations over the way that natural resources are allocated following a deal for peace, with the result that women's specific needs are rarely met during the peacebuilding process.

It is increasingly being recognised that women can play a key role in natural resources management as they have the knowledge and experience gained from working closely with their environment, and their analytical skills in their community can play a vital role in developing water and forest resources in a sustainable manner. "Women bear the brunt of conflicts in many ways. They often have to become the sole caretakers of their families and communities and are agents of peace and recovery," said Phumzile Mlambo-Ngcuka Under-Secretary-General and UN Women Executive Director. "Sustainable natural resource use is the cornerstone of development. Women's full participation, and access to natural resources, are urgent priorities for rebuilding peaceful societies."

Role of Women

Typically, women and men have different roles and responsibilities when it comes to the use and management of natural resources, such as land, water, forests, trees, biomass (fuelwood, dung, etc.), livestock and fisheries. Women and girls tend to have responsibility for sourcing, collecting and transporting natural resources for domestic purposes. In the majority of developing countries, men are more prone to use natural resources for commercial purposes (agriculture, fishing, timber). Women's role as managers, users and beneficiaries of natural resources is an often unexplored opportunity for increasing their contribution for natural resource management. In nearly all developing countries, women and girls are the main individuals responsible for collecting, transporting and managing water for domestic use (drinking, cleaning, etc.) (IFAD, 2012). In the division of resources, women are often left with the most instable, marginal lands, which are particularly susceptible to environmental shocks. Land degradation and deforestation also impacts upon common property, on which many poor rural women rely for natural resources such as fuelwood, fodder and food. In general, land and water degradation increase food scarcity, malnutrition and instability (all of which affect the pool of natural resources). Lower access to resources can also heighten risks to women's health and security (for example, longer journeys can increase women's susceptibility to gender-based violence; degradation of water can bring greater likelihood of contracting waterborne diseases – such as cholera and diarrhea – during the process of

collection). Land degradation can bring additional social costs, such as the migration of men from rural communities, leaving women to take on the traditional 'male responsibilities', but without the same ability as men to access supporting resources (for example, financial services, technology, social networks) (Lambrou and Laub 2004). Traditional practices can also undermine women's rights to water and land. women may have trouble in taking full advantage of markets, for example due to lower rates of literacy and limited access to private transport, information and commercial networks. In some areas, women are more like to sell domestic crops in local markets, whereas men more likely to focus on national/international markets.

Women are under-represented within local, national and international decision making bodies in natural resources management, which reduces their power to influence the allocation and use of the resources. Women have far-reaching knowledge of where to find natural resources to support household food security and nutrition, but these are often ignored or underestimated in NRM policies/programmes (FAO et al., 2009). global agroindustry often rests on moving towards more uniform, high-yield crop varieties. This mode of farming can leave women farmers behind, given the barriers they face in accessing agricultural credit, technology and commercial seeds and fertilisers. Furthermore, given that women are the main individuals managing seeds, domesticating indigenous plant varieties and practising agroforestry techniques, the move towards agroindustry may also undermine the role they play in maintaining local genetic diversity. For instance, home gardening is a prominent, multispecies form of land use by women, within the subhumid tropics of South and Southeast Asia. The marketisation of agriculture has resulted in species losses from home gardens, particularly in Sri Lanka, India and Indonesia, where multiple mango and jackfruit varieties have gone extinct. (FAO et al., 2009). if women are under-represented in decision-making bodies on natural resources management, it is important to consider methods of supporting actively their involvement, such as working with rural women's groups, introducing membership quotas, strengthening women's legal rights in relation to natural resources, scheduling meetings at alternative times/venues, reducing entry criteria for women and/or offering leadership training. For example, as part of a land certification scheme in Ethiopia, it was a requirement for land administration committees to have a minimum of one woman involved; furthermore, land certificates encouraged the recognition of joint ownership by leaving space for pictures of both partners within a couple. These steps enhanced the capacity of women to have an influence within land administration committees (SIDA, n.d.). Adopt longer term “transformative” perspectives,

supporting women's participation in decision-making and changing prevalent negative attitudes on women's leadership capacities and social roles.

Steps to be taken

- Promote women's participation in formal and informal decision-making structures and governance processes related to natural resource management in their life.
- Adopt proactive measures to protect women from resource-related physical violence and other security risks early in their life period.
- Organize Natural resources management (NRM) programmes thus have the dual challenge of protecting and widening access to resources, at the same time as promoting more sustainable practices for managing them.
- Remove obstacles in their family and societal life for protecting natural resources.
- Frame policies and provide rights to work them with freedom.

Conclusion

Increasing the involvement of women in community governance requires deliberate effort. Restrictive gender norms that hinder woman's participation and leadership in decision-making are strong, although the depth of resistance varies across communities and between women and men. It is crucial to sensitize communities and engage traditional leaders (who most of the time are men) to influence positive shifts on the acceptance of women as leaders. Increase the acceptance of women's participation and leadership in natural resource management. The skills training for women focused on providing with real-time knowledge and technical and foundational skills such as self-confidence, public speaking, campaign tactics, and networking. Negotiation skills were part of the training so that women could advocate for the support of their spouses and their family members. Women that got a high number of votes were helped mostly by family. Women who came from larger and more influential families received more support and increased chances of winning. Candidates without such connections did not get support, regardless of individual qualities. In more remote villages, women travelled together to campaign for security reasons and worked with each other to distribute their campaign materials. Due to limited resources, most of the women preferred door-to-door campaigning, unlike men, who mostly held group meetings that had associated costs such as providing food and drinks. To promote women's meaningful participation and leadership, essential

policies and programmes should be arranged for their work with freedom for focussing the welfare of human beings in nation and world.

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CLIMATE CHANGE: AN OVERVIEW

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ABSTRACT

Climate change in all perspectives makes a vast difference in the domain without any doubt. Climate Change in the temperature and temperament of the earth will cause an abrupt change in the environment to a greater degree with different impacts on both living and nonliving things on the earth. Climatic change is not only by the natural routines, disasters and changes in revolutions and rotations of solar systems and their components; it is also due to man-made behaviours and practices without being aware of deep environmental issues and responsibility on natural resources. This paper focused on the reasons behind the climate changes both by natural routines and by man-made behaviours. In addition, few of the reports on environmental climate change with policies and Acts for the protection and conservation natural resources in India discussed.

Key words: *Climate change, natural disaster, natural resources*

Introduction

Climate change is the noteworthy disparity of average weather environments becoming warmer, wetter or drier over several decades on the other hand, Climate change is referred as the difference in the earth's global climate over a long period of time. Usually, climate change is marked as anthropogenic climate change and it means that change in the atmosphere causing by human activities in all aspects. Climate change holds with deviation from normal cooling, normal temperature, normal atmospheric pressure, balanced atmospheric carbon level and so on to abnormal and unpredictable nature of all above without time alarms with respect to the causes done by humans' different actions.

Main Natural Reasons behind the Climate Change on the Earth

- **Solar Energy/Effect:** The intensity of heat emitted by the Sun is not constant and it is continuously changing depending upon the various reactions and interactions in the solar

system. Hence, the result of climate change on the earth is changing or varying accordingly without any prediction.

- **Orbital Revolution of Earth:** It is well-known that the orbit of the earth is an ellipse, consequently the distance between the sun and the earth is not constant throughout the revolution of the earth around the sun. Hence, the varying distances will cause the varying atmospheric temperatures of the earth and thus it leads the climate change drastically along with other artificial causes.
- **Axis of Earth's Rotation:** We know that the earth rotates around an axis and it leans at an angle. It is noticed that it moves with a greater angle, the summer becomes warmer and the winter becomes colder. Consequently, it reflects its impact on climate change on the earth.
- **Greenhouse Gases in the Atmosphere of Earth:** If the magnitude of greenhouse gases – Water Vapour (H₂O), Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), Chlorofluorocarbons (CFCs) are increased, the level of temperatures in the earth's atmosphere also will increase abruptly.
- **Ocean's Carbon-Dioxide Content:** It is well-known fact that oceans contain more carbon dioxide than the atmosphere and thus they are absorbing carbon dioxide from the atmosphere to some extent. Ultimately, it reflects on the level of temperatures in the Earth's atmosphere and it causes climate change on the earth.
- **Plate Tectonics Causes:** Ultimately, plate tectonic processes are being caused continents to move to different positions on the globe. The plate's movements induce the volcanoes to come out vigorously. Undoubtedly, it makes great climate change on the earth.
- **Ocean Currents:** The Ocean current is produced by sea wind, breaking waves, varying temperatures and salinity differences, gravity changes and earthquakes in the oceans. If variations and differences in ocean currents occur, climate change on the earth is unavoidable happenings.
- **Intensive Plants on the Land:** Plants on the earth are important in many aspects. In addition to food and other supports of living organisms, it is natural elements to make living meaningfully. It is evident that plants absorb carbon dioxide and emit oxygen to a greater extent for the survival of living organisms. The amount of carbon dioxide absorption is one of the prominent indicators in making the atmospheric temperature expectedly. Hence, the nature of plants on the earth plays a challenging role in the change in the climate of the earth.

Climate Change due to Human Activities

- **Awareness Inadequacy:** The realization is the first step to solving any problem in an effective manner. It is well-known fact that the awareness level towards climate change is not up to the expected level among the people and they may not think of the next generation's health and environment.
- **Usage of non-cyclic plastics:** The prediction of any usage and further usage of any material should be planned prior to its production. There is an increase in the usage of plastic materials to a great extent and its nature of disposal is not planned so as to make the environment convenient and make it breathe naturally. The deposition and covering of these materials on the land cause land pollution and consequently it reflects its effects in many dimensions of atmospheric conditions and human health silently.
- **Usage of Home Appliances enormously:** In this techno-society, all types of technologically high-end materials and gadgets are part of human lives today. The thinking of their physical waste and their emitting gases/waves is absent or simply vanished from the vision of users and the producers. In addition, the recycling of e-waste is not properly practiced still and thus they may produce a huge impact on environmental changes or simply climate change.
- **Huge Scale of Deforestation:** In prior, deforestation was done for human lives and their development; but at present, it is happening for human sophistication and additional facilities. If more will be deforestation, there should be unbalanced ecological systems and a rise in the warmer climate in all the weather conditions throughout. Deforestation is not only diminishing the density of nature and also the density of wild animals and thus it leads to having unbalanced ecological situation.
- **Different types of Pollution:** In present systems, we are coming across much specific pollution beyond the noted or named pollution like water pollution, air pollution, land pollution, and sound pollution. At present, we are striving to eradicate visible pollution to some extent which is caused by many reactions and activities in society.
- **Improper Rainwater Harvesting Practices:** There is a good vision in the plan for rainwater harvesting in our country specifically. But we people could not reach the success level in the execution of such a plan productively. It is an urgent need that reality and need of such an

excellent plan and should be executed meaningfully in order to avoid decrease in groundwater level and to make the climate to some extent meaningful.

In addition to the above common doings and happening, one of the important causes of climatic change is bomb explosion either at war place or at its experimentation level. This cause could not be stopped due to defensive or safety purposes, but the climate may affect it to some greater degree unavoidably. Also, the process of waste destruction from the explosion whether they are from natural disaster radiation or experimental explosive radiation will enormously pollute the air and leads to a rise in atmospheric temperature if the proper mechanism is not followed to great extent.

Report of International Panel on Climate Change (2014)

The International Panel on Climate Change Report in the year 2014, the Synthesis Report is based on the reports of the Three Working groups of the Intergovernmental Panel on Climate Change (IPCC), including relevant Special Reports. It provides an integrated view of Climate Change as the final part of the IPCC's Fifth Assessment Report. In the fifth assessment report on Climate change, there is a more than 95% probability that human activities over the past 50 years have warmed our planet. Further, it revealed that the industrial activities that our modern civilization depends upon have raised atmospheric carbon dioxide levels from 280 parts per million to 400 million in the last 150 years. It is better than a 95% probability that humans produced greenhouse gases such as carbon dioxide, methane and nitrous oxide and these have caused much of the observed increase in Earth's temperature over the past 50 years.

New World Bank Report (2018)

Rising temperatures and changing monsoon rainfall patterns from climate change could cost India 2.8% of its GDP and depress the living standards of nearly half the country's population by 2050. India's average annual temperatures are expected to rise by 1 degree Celsius to 2 degree Celsius even if preventive measures are taken along the line of those recommended by the Paris Climate Change Agreement of 2015. If no measures are taken average temperatures in India are predicted to increase by 1.5 degree Celsius to 3 degree Celsius. The weather changes will result in lower per capita consumption levels that could further increase poverty and inequality in one of the poorest regions of the world. The reports noticed that development is indeed the best adaptation strategy since it is associated with improved infrastructure, market-oriented reforms, enhanced human

capabilities, and a stronger institutional capacity to respond to the increasing threat of climate change and natural disasters.

Major Environment policies and legislations in India

The Ministry of Environment & Forests is the nodal agency in the administrative structure of the Central Government, for the planning, promotion, coordination and overseeing the implementation of environmental and forestry programmes. The Ministry is also the Nodal agency in the country for the United Nations Environment Programme (UNEP). The principal activities undertaken by the Ministry of Environment & Forests consist of the conservation & survey of flora, fauna, forests and Wildlife, prevention & control of pollution, afforestation & regeneration of degraded areas and protection of the environment, in the framework of legislation. The main tools utilized for this include surveys, impact assessment, control of pollution, regeneration programs, support to organizations, research to solve solutions and training to augment the requisite manpower, collection and dissemination of environmental information and creation of environmental awareness among all sectors of the country's population

The Central Pollution Control Board statutory organization was constituted in September 1974 under the Water (Prevention and Control of Pollution) Act, 1974. Further, CPCB was entrusted with the powers and functions under the Air – Prevention and Control of Pollution, Act in the year 1981. It serves as a field formation and also provides technical services to the Ministry of Environment and Forests of the provisions of the Environment (Protection) Act, 1986. Principal Functions of the CPCB, as spelled out in the Water (Prevention and Control of Pollution) Act, 1974, and the Air (Prevention and Control of Pollution) Act, 1981 i. to promote the cleanliness of streams and wells in different areas of the States by prevention, control and reduction of water pollution and, ii. to improve the quality of air and to prevent, control, or abate air pollution in the country.

Policies and Recommendations for Eradicating Different Types of Pollution in India

India made its contributions to protect nature and the environment by means of passing and executing Act and policies to protect the environment. The following are some of the Acts and Policies:

- **Environment Protection Act, 1986**– (Protection): It is an Act to provide for to protection and improvement of the environment and for matters connected therewith.

- ***National Conservation Strategy and Policy Statement on Environment and Development, 1992:*** It is in response to the need for laying down the guidelines that will help to weave environmental considerations into the fabric of our national life and of our development process; it is an expression of our commitment for reorienting policies and action in unison with the environmental perspective.
- ***Policy Statement for the Abatement of Pollution, 1992:*** These policy elements seek to shift emphasis from defining objectives for each problem area towards actual implementation, but the focus is on the long term because pollution particularly affects the poor. The complexities are considerable given the number of industries, organizations and government bodies involved. To achieve the objectives maximum use will be made of a mix of instruments in the form of legislation and regulation, fiscal incentives, voluntary agreements, educational programmes and information campaigns. The emphasis will be on the increased use of regulations and an increase in the development and application of financial incentives
- ***National Environment Policy, 2006:*** The National Environment Policy (NEP), 2006 was an effort towards India's commitment to a clean environment and making a positive contribution to international efforts. The NEP builds on the various earlier policies which had addressed the challenges of the environment and the need for sustainable development prior to this policy.

Impact of Lockdown on Air Quality during COVID-19 Pandemic

The variation in concentration of key air pollutants such as PM_{2.5}, PM₁₀, NO₂, SO₂ and O₃ during the pre-lockdown and post-lockdown phases has been investigated. In addition, the monthly concentration of air pollutants in March, April and May of 2020 is also compared with that of 2019 to unfold the effect of restricted emissions under similar atmospheric conditions. To evaluate the global impact of COVID-19 on air quality, ground-based data from 162 monitoring stations from 12 cities across the globe are analyzed for the first time. The concentration of PM_{2.5}, PM₁₀ and NO₂ were reduced by 20–34%, 24–47% and 32–64%, respectively, due to restrictions on anthropogenic emission sources during the lockdown. However, a lower reduction in SO₂ was observed due to functional power plants. O₃ concentration was found to be increased due to the declined emission of NO. Nevertheless, the achieved improvements were temporary as the pollution level has gone up again in cities where the lockdown was lifted. The study

might assist the environmentalist, government and policymakers to limit air pollution in the future by implementing the planned lockdowns at the pollution hotspots with minimal economic loss.

Conclusion

Every individual needs to have great aware of climate change and its consequences. The statistical output of any research and report probably given in numerical figures and it could be realized and interacted with the experts and scientists in higher level to solve the problems scientifically. But, the real objective in solving the problems associated with the climate change and environmental issues, it should be starts from the lower level in terms of making the common people in their realizations and changing strategies from their homes as initiation. In the next step, it has to given by the teachers from the lower level. Hence, teacher is the pivot role in imparting the knowledge and understanding of climate and its effects among their students. It is more important that teacher education programmes should have great contribution in practicing their students to make their role effective in educating the causes and effects of climate change through Environment Education at their course of study so as to meet its real objective in integrating such components in their curriculum productively. In present context, after the continual revising and reforming in curriculum in different level in India, there is a productive components and concepts like Environment Education being taught from the lower level to higher education. But there should be a meaningful awareness taught and practiced compulsorily with respect to the climate change and its causes with its remedial measures during their course of study itself so as to make our each of our contribution effectively.

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WOMEN'S INVOLVEMENT IN ENVIRONMENTAL PRESERVATION

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ABSTRACT

On the contrary, on the other hand, women are a more valuable half of society. Environment is the natural world and the surroundings in which all plants, animals, people, and other living and non-living things exist. Women's health and the environment are intimately related. They are in charge of managing the family's resources and procure water and fuel straight from the environment. Women are essential to the preservation and conservation of the environment. Women's contributions to environmental protection and preservation were highlighted in Ester Boserup's 1970 book "Women's Role in Economic Growth". Women are now trying to protect the environment for future generations because they realise how environmental degradation affects society. For the preservation of the environment, there were several women's movements, including the Chipko movement in India, the Narmada Bachao Andolon, the Green Belt movement in Kenya, and others. Jane Goodall, Greta Thunberg, Malaika Vaz, Katherine Hayhoe, Julia Lorraine Hill, Rachel Carson, Vandana Shiva, Sunita Narraine, Sumaira Abdulali, Kinkari Devi, Medha Patkar, Menaka Gandhi, and a host of other environmentalist activists are just a few of the prominent figures who are actively working to protect the environment. The Indian constitution established a basic obligation to preserve and develop the environment in its 42nd Amendment Act of 1976. When males in society stand with the women by holding hands, the women's roles in protection will become more active and fruitful.

Keywords: *Women, environment, surrounding, movement, nature, economic, development.*

Introduction

The French term "Environ," which meaning "around," is where the word "environment" originated. The natural world and surroundings are where all plants, animals, people, and other living things exist and function. It is the interactions between the three elements of land, water, and air as well as with all other living and non-living things. Nature or the environment and our human society

are inextricably linked. The way people live, dress, eat, speak, and celebrate differs significantly depending on the environment since society developed in response to that environment. Those who live in hilly places, for instance, have different cultures and lifestyles than those who live in plain areas. The two categories of environment are man-made environment and natural environment.

The prominence of women in preserving the environment

According to the UN Chronicle Journal, the usage of the pesticide DDT and its derivative DDE has made women's involvement in agricultural activities a cause of breast cancer. According to a World Health Organization study, women who are exposed to pesticides had a greater probability of having an abortion. Women feel more responsible for the environment as a result of these health problems. Along with the men in the community, women helped to raise the environmental preservation movement. These included:

- a) **Bishnoi Movement, 1700**-The protest was started in Khejarli, in Rajasthan's Marwar region, when the local Maharaj ordered his soldiers to cut down some of the villager's sacred trees. Amrita Devi and the other Bishnoi villager hugged the trees in an effort to preserve them and inspire others to do the same. In this march, 363 Bishnoi villager deaths occurred. The Bishnoi state was subsequently designated as a protected area.
- b) **Chipko Movement, 1973**-Sundorlal Bahuguna, Gaura Devi, Sudhesha Devi, Bachini Devi, Chandni Prasad Bhatt, and several others spearheaded a struggle in the Uttarakhand districts of Chamoli and Tehri-Garhwal to defend the trees on the Himalayan slopes from the axes of forest contractors. The Chipko movement was started by the ladies of Advani village, who tied the trees and hugged them.
- c) **Silent Valley Movement, 1978**-In Kerala's Palakkad district sits the evergreen tropical forest known as Quiet Valley. Sugutha Kumari led a group of people to defend the Quiet Valley from the Kerala State Electricity Board's hydroelectric power project in order to prevent its destruction.
- d) **Jungle Bachao Andolon, 1982**-When the government decided to replace Sal forest with Teak, tribal members in Bihar's Singbhum area began to protest. Greed Game Political Populism is another name for this demonstration.

- e) **Appiko Movement, 1983**-The southern equivalent of the Chipko movement is the Appiko movement. Locally, the Appiko movement was called Appiko Chaluvali. In opposition to the contractors, the locals supported the trees.

Indian law's environmental protection provisions:

In accordance with the Indian Constitution, men and women have equal rights and are treated equally in court. The conservation and preservation of the environment is specifically mentioned in the Indian constitution. The Indian constitution established a basic obligation to preserve and develop the environment in its 42nd Amendment Act of 1976. Article 51(a) states that it is the responsibility of every Indian citizen to preserve and enhance the natural environment, including forests, lakes, rivers, and wild life, as well as to show compassion for all living things. The right to life, a life with dignity, and the prevention of disease and infection are all protected by Article 21 of the Indian Constitution. There are other other directive principles that have been highlighted for environmental conservation.

There are also a number of unique laws created to safeguard the environment, including the following: The Indian Forest Act of 1927, The Wildlife (Protection) Act of 1972, The Water (Prevention and Control of Pollution) Act of 1974, The Forest (Conservation) Act of 1980 and Comprehensive Legislation, The Air (Prevention and Control of Pollution) Act of 1981, and The Environmental Protection Act of 1986 are some examples of laws that address environmental protection.

Recommendations

Women and the environment are intimately related, so it is crucial that all women in society have the chance to learn about environmental issues and how to save and enhance their surroundings for future generations. By providing some aid assistants, the government can also promote the involvement of women in environmental protection and preservation. Giving women in society an equal standing will encourage more women to work in environmental preservation. more women being employed by the forest service and other environmental government entities.

Conclusion

Since ancient times, a woman's contribution to environmental conservation has been noted as being particularly noteworthy. Throughout the beginning of time, women have played a significant role in environmental protection. Because females perform home and societal tasks that are more

closely related to the environment than men, women are more involved in the protection of the environment than men. Women working at the national or worldwide level to improve the environment through various movements, strikes, protests, etc. Women who are committed to protecting the environment include Greta Thunberg, Jane Goodall, Medha Patkar, Kinkari Devi, Vandhana Shiva, and many more. When other members of society stand with the ladies by walking hand in hand with them, it has been discovered that women work more actively and productively.

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**PRACTICES AND POLICY PERSPECTIVE FOR ELECTRONIC WASTE
MANAGEMENT IN INDIA**

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ABSTRACT

The electrical and electronic waste is one of the fastest growing waste streams in the world. As per statistics available in public domain, India is the third largest generator of e-waste after China and USA. Environmental issues and trade associated with e-waste at local, national and international level has driven many countries to introduce interventions. In India Formal and Informal sectors are involved in handling e-waste disposal. The Ministry of Environment, Forests, and Climate Change is primarily responsible for regulations regarding electronic waste. Additionally, the Central Pollution Control Board and State Pollution Control Board produce implementation procedures to ensure proper management of rules. The regulations include specific guidelines for extended producer responsibility, channelization, collection centers, storage, transportation, environmentally sound dismantling and recycling of e-waste.

Key words: *e-waste, detrimental, Hazardous Substances, dismantlers, refurbishment*

Introduction

The electrical and electronic waste is one of the fastest growing waste streams in the world. As per statistics available in public domain, India is the third largest generator of e-waste after China and USA. In India, the amount of e-waste generated differs by state. The three states that produce the most e-waste are as follows: Maharashtra, Tamil Nadu and Andhra Pradesh. Other states that produce significant e-waste are Uttar Pradesh, West Bengal, Delhi, Karnataka, Gujarat, Madhya Pradesh and Punjab. Additionally, e-waste is disproportionately generated in urban areas—65 Indian cities generate more than 60% of India's total e-waste. Mumbai is the top e-waste producer followed by Delhi, Bengaluru, Chennai, and Kolkata.

Environmental issues and trade associated with e-waste at local, national and international level has driven many countries to introduce interventions. In accordance with the National Environmental

Policy (NEP) and to address sustainable development concerns, there is a need to facilitate the recovery and reuse of useful material. Realizing the need for sustainable management, Indian government put forth implementation procedures to ensure proper management of rules set forth by the Ministry of Environment, Forest and Climate Change.

e- waste Disposal Techniques

The current e-waste disposal techniques in India have operated mostly in an informal manner due to the lack of enforcement laws and regulations. This has created a new area of economic gain for the country, especially among the urban and rural poor. Though it helps many make a living, those that are disposing of e-waste are usually not aware of the risks and health hazards that result from certain disposal techniques. There are two sectors that handle e-waste disposal and they can be divided into Informal or Formal Sectors.

Formal sector- The formal sector includes two facilities authorized to deconstruct electronics for the entire country of India and are at capacity with five tons being disposed each day. These facilities primarily receive electronic waste from the producers of "service centers or take-back schemes" or companies that follow the environmental policies on disposing electronic waste. These facilities, though reaching capacity daily, are not the mainstream method of disposal. The formal sector only follows procedure of dismantling and segregating parts. They do not physically dispose of the electronic waste. The informal sector has made it difficult to compete.

Informal sector- The informal sector handles electronic waste by recycling or final disposal. Much of electronics that reach India are out of date to more developed countries. Then, within India, these electronics are passed around until no longer of use. There is a whole economic market for electronic waste because the parts can be dismantled and the scrap metals can be recycled. There are recycling techniques that are not following any type of environmental or health standards. Some of the methods used are acid baths, burning cables, and disposing in nature which can be detrimental to the health of those participating in these disposal techniques.

Regulations for e-waste management

The Ministry of Environment, Forests, and Climate Change (MoEFCC) is primarily responsible for regulations regarding electronic waste. Additionally, the Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB) produce implementation procedures to

ensure proper management of rules set forth by the Ministry of Environment, Forest and Climate Change.

Guidelines for environmentally sound management of e-waste, 2008

Based on the assessment conducted by Central Pollution Control Board on the management and handling of e-waste, ensure the preparation of a guideline document for recycling of e-waste on March, 2008. That provided guidance, broad outline and minimum practice required for management of e-waste. These guidelines were applied to all those who handle e-waste including the generators, collectors, transporters, dismantlers, recyclers and stakeholders. The guidelines include classification and definition of e-waste, Reduction of Hazardous Substances (RoHS) in electrical and electronic equipments, extended producer responsibility (EPR), treatment technology for e-waste, establishment of integrated e-waste recycling and treatment facility.

E-Waste Management and Handling Rules, 2011

An addition to the Environmental Protection Act of 1986, the E-Waste (Management and Handling) Rules of 2011 came into effect in May 2012. The rules stated that all manufacturers and importers of electronic goods were required to come up with a plan to manage their electronic waste. Producers or importers had to establish e-waste collection centers or employ take back systems. These rules also mandated that sellers of electronic goods must provide consumers with information on how to properly dispose of the electronics in order to prevent people from dumping their electronics with domestic waste. Further, companies that produce electronics which have the potential to become e-waste must make the consumer aware of the hazardous materials in their product. These rules established and placed specific responsibilities for each party involved in the production, disposal, and management of electronic waste. Specific responsibilities were given to the producer, collection centers, consumer or bulk consumer, dismantlers, and recyclers. These rules also mandated that commercial consumers and government departments must keep records of their electronic waste and make them available to state and federal Pollution Control Boards.

E-Waste Management Rules, 2016

E- Waste (Management & Handling) Rules, 2011 were notified in 2011 and had come into force since 1st May, 2012. In order to ensure effective implementation of E-Waste Rules and to clearly delineated the role of producers in EPR, MoEF & CC, Government of India in supersession of E-Waste (Management and Handling) Rules, 2011 has notified the E-Waste (Management) Rules,

2016 vide G.S.R. 338(E) dated 23.03.2016 which will be effective from 01-10-2016. These rules are applicable to every producer, consumer or bulk consumer, collection centre, dismantler and recycler of e-waste involved in the manufacture, sale and purchase and processing of electrical and electronic equipment or components specified in schedule – I of these Rules. Two categories of electrical and electronic equipment namely, IT and Telecommunication Equipment and Consumer Electricals and Electronics such as TVs, Washing Machines, Refrigerators, Air Conditioners including fluorescent and other mercury containing lamps are covered under these Rules. The main feature, of these rules, is Extended Producer Responsibility (EPR). Target based approach for implementation of EPR has been adopted in the E-Waste (Management) Rules, 2016, which stipulate phase wise collection target to producers for the collection of e-waste, either in number or weight, which shall be 30% of the estimated quantity of waste generation during first two year of implementation of rules followed by 40% during third and fourth years, 50% during fifth and sixth years and 70% during seventh year onwards. The E-Waste (Management) Rules, 2016 mandate CPCB to prepare guidelines on implementation of E-Waste Rules, which includes specific guidelines for extended producer responsibility, channelization, collection centers, storage, transportation, environmentally sound dismantling and recycling, refurbishment, and random sampling of EEE for testing of RoHS parameters.

Amendment to the E-Waste Management Rules, 2018

This amendment relaxes certain aspects of the strict E- Waste (Management Rules of 2016). Specifically, the amendment focusses on the e-waste collection targets by 10% during 2017–2018, 20% during 2018–2019, 30% during 2019–2020, and so on. This amendment also gives the Central Pollution Control Board power to randomly select electronic equipment on the market to test for compliance of rules. The financial cost associated with this testing shall be the responsibility of the government, whereas previously, this responsibility was of the producer.

E-Waste Management Rules 2022

2022 Rules will come into force on 1 April 2023 and has introduced recycling targets in the extended producer responsibility (‘EPR’) plan of the producers of e-waste. EPR is a policy-based approach wherein responsibility is casted over the producers of specific category of waste for the treatment and safe disposal of such waste. EPR mechanism under the 2016 Rules focused more on the producer’s responsibility to collect back the e-waste introduced in the market and provided

collection targets, whereas the EPR regime under 2022 Rules provides an annual e-waste recycling targets to the producers. This will help in proper recycling and safe disposal of e-waste. Applicability of 2022 Rules has been restricted to manufacturer, producer, refurbishers, dismantlers and recycler of e-waste ('MPRDR'), unlike 2016 Rules wherein dealer, consumer, bulk consumer and collection centers were also covered.

Conclusion

Expanding the definition of e-waste and electronic equipment, specifying the recycling target with proper implementation mechanism and clearly specifying the penalties for violation of Rule 2022 will assist in better implementation of the collection, processing and recycling of e-waste. It is the collective responsibility of involved in e- waste management in some way. Though in India, much number of electronic waste recycling companies is functioning effectively, we need awareness and training for the proper management of electronic waste and thereby enable sustainable development.

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MARINE BIODIVERSITY: IMPORTANCE AND THREATS

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ABSTRACT

The evolution of life on Earth appears to be in temporary equilibrium to exist within the prevailing ecosystem as nature is ever changing. The time frame in which the nature works is measured in centuries and millennia, while the human planning horizon is measured in years and decades. Therefore human behaviour, affecting nature's ability to sustain life is difficult to determine. Researchers has found out that human activities are increasingly cutting further into nature's abilities to respond to external changes by reducing diversity of living organisms. The concept of biodiversity is well recognized and accepted by the environment protection groups which plays an important role in restoration and protection of nature. The ocean is one of the main repositories of the world's biodiversity. It constitutes over 90 percent of habitable space on the planet and contains more than 250,000 known species with at least two thirds of the worlds marine still unidentified. The ocean and the life therein plays critical role in healthy functioning of our planet. Marine biodiversity and ecosystems are intrinsically connected to a wide range of services that are essential for sustainable development. This paper reveals the importance of marine biodiversity, its challenges and solutions to protect it from the understanding of the authors.

Key words: *marine biodiversity, sustainable development, ecosystems*

Introduction

The quality of the survival of living beings on Earth depends on the prevailing ecological system. The evident growth in population, industrialization and economic growth, decline of biodiversity and natural resources accelerates climate change which in turn adversely impact our ecosystem. The descriptions or assessment of the conditions of a single or groups of organisms of

varied genetic codes categorized as species, populations, communities and ecosystems could be referred by biodiversity. The major constituents of our ecosystem like terrestrial ecosystem and aquatic ecosystem ameliorates sustainable environment. Since the surface of Earth is covered with 71 percentage of water, aquatic eco system leads terrestrial ecosystem and hence importance should be given to the conservation of aquatic eco system which could be categorized into marine and freshwater eco system. The Marine biodiversity includes the variety of life in our ocean. It influences the development of physical, social and environmental factors for the continued existence of organisms.

Importance of Marine Biodiversity

The environmental changes in nature of our ocean are greatly influenced in the aspects of productivity, resilience and adaptability by marine biodiversity. It can prevent one species' extinction from causing wider negative impacts on marine ecosystem. The ecological system is considered to be resilient if it keeps on functioning even when the population of a species declines or a species becomes extinct. The productive ecosystem means the natural processes are working effectively by providing goods and services to humans like storage of carbon or filtering of water. Each species in the ocean has a particular role to play hence the existence of every species becomes vital for the endurance of living beings on Earth. The paradigm perception could be understood from the verve of marine worms converting organic material into carbon dioxide for marine plants to photosynthesis. It is evident that if one species becomes extinct, another will be able to carry out the same function of the extinct species.

Threats to Marine biodiversity

The marine biodiversity is considered to be the boundless reservoir of productivity with unlimited capacity to assimilate wastes. Hence it must be used with caution so as to remain sustainable. Any decrease in marine biodiversity will have the greatest impact on countries economic and protein sources. The resources of the ocean have been over-harvested by humans thereby threatening marine biodiversity. The following identified components constitute threats to marine biodiversity.

Climate change

The increasing alarm of global warming directly impact the rise of sea level. As a result higher temperature decreases the ability of water to dissolve oxygen. The concentration of carbon dioxide in the atmosphere is higher than they have been in the past 42 years. Due to high temperatures, Loggerhead turtles in Florida produce 90% females and there would be no males of the same if the condition adds on to even 1% more. Coral reefs would be bleached away if the particular temperature for their existence does not prevail. Coastal power plants use sea water for cooling and discharge the warmed water at the coast. This process disturbs the ecological balance of marine communities especially if it already a low oxygen environment. Warm temperature is not favorable for polar communities, walruses and other Arctic species. The thinning of packed ice in Arctic regions impact intense heat waves accelerating induced warming and the ice-albedo feedback cycle.

Over Exploitation

Over exploitation leads to resource depletion and threatened and endangered species at risks for extinction. A greater variety of species at a higher tropic level is exploited in the sea than on land. Apart from the human exploitation of 400 sea species for food by human, growing population demands over exploitation of marine living resources. The use of modern techniques to facilitate harvesting, transport and storage facilitates depletion and collapse of fish stocks. Overfishing is not only a threat to endangered or vulnerable species but to common species of seafood.

Pollution

The change in the rate of plant growth, change in their reproduction pattern and reasons for their state of collapse or extinction are due to pollution. Particularly in marine ecosystem, coral reefs are damaged by pollutants which cause the algae to compete on coral reefs. Human sewage can add nutrition like nitrogen and phosphorus to water and can cause eutrophication. Industrial waste enter the sea due to deliberate dumping of specific toxic, acidic and alkaline in the form of solid, liquid and inert substance which results in high mortality rate of organisms in ocean. Sources of oil pollution like tanker disaster, ballast water and washings in factories leads to hypothermia and can cause internal damage to marine creatures. Clams, Mussels and oysters may quickly accumulate toxins which can kill animals and can easily pass on to food cycle.

Invasive Species

The introduction of harmful aquatic organisms to new marine environments is believed to be one of the greatest threats to the world's oceans. The invasive species is one that has been intentionally or accidentally released or transported into an environment outside of its historic geographical range. Invasive species may be ecologically harmful which can dramatically change the structure and function of marine ecosystem by changing biodiversity and eliminating vital components of food chain. These species could be identified as competitors, predators and parasites for spreading diseases. Many types of seaweed like red alga, zebra mussel, lion fish etc have been introduced as planktonic larvae in ballast water which mariners unintentionally discharge it in new areas while taking cargo to another port. The arrival of jellyfish like organism, Mnemiopsis Leidy, led to major ecological "regime change" in the Black sea which contributed to the collapse of commercial fishing in the region.

Habitat Destruction

Habitat destruction and fragmentation is a process that describes the emergence of discontinuities or the loss of the environment inhabited by an organism. Approximately 20 % of the world's coral reefs were lost and an additional 20% degraded and 35% of mangrove forest was lost in the last several decades of this century. When a species goes extinct, all the genetic Informations carried by individuals of that species are lost forever. Extinction is a waste of life and a loss of potential solutions to future problems such as possible cures to disease and solutions for survival in a changing world. Declining biodiversity worldwide is a major and ongoing environmental dilemma. Rising temperatures, rising sea levels and other trends will have an effect on target species in oceans. Destruction of mangrove forests impacts enormously on biodiversity. Healthy mangrove forests provide a critical habitat for many species in intertidal and estuarine areas and are key to healthy marine environment. A combination of melting ice caps and thermal expansion of water in the ocean leads to submerge of low lying islands.

Conclusion

The threats to marine diversity require stronger inclusion of science on ocean governance in a globalised context as it is related with national boundaries which in turn influences international economic, social and legal ascendancy. It is high time to move on to the next phase of global change

and check the synergistic effects of multiple stressors of marine biodiversity. Importance should be given to the stakeholders such as general public, scientific community, policy makers, politicians and decision makers establish close relationships among one another to attain the common objective of environmental policy, reinforcement and awareness. Gaining, appreciating and conveying the knowledge of marine biodiversity to future generation add on to the conservation of nature.

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CREATING A SUSTAINABLE FUTURE: CONTRIBUTION OF IOT TO MOTHER NATURE

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ABSTRACT

Nature is a cornerstone of our existence, but it can also teach us many lessons about the harm we are inflicting on ourselves. Global warming, pollution are the major environmental and economic issues faced by the planet today. Air quality, water pollution, and radiation pollution are major factors that pose genuine challenges in the environment. Suitable monitoring is necessary so that the world can achieve sustainable growth, by maintaining a healthy society. With the growing years, rapid changes are seen in both technology and the environment. This environmental and technological shift has been driven by a wide range of immersive technologies such as robotics, artificial intelligence (AI) and, most importantly, the Internet of things (IoT). All these technologies have the potential to transform commercial and industrial processes and make them more environmentally friendly. IoT is a prevalent technology that plays a significant role in developing a more sustainable future for coming generations. This paper aims at providing an insight into Internet of Things (IoT) and its contribution in combating mother nature.

Keywords: *Environment; pollution; Internet of things (IoT)*

Introduction

Sustainable growth of the whole world depends on several factors such as economy, quality education, agriculture, industries, and many others, but environment is one of the factors that plays the most important role. Health and hygiene are key components of the sustainability of mankind and progress of any country, which comes from a clean, pollution free and hazardous free environment. Thus, its monitoring becomes essential to ensure that the citizens of any nation can lead a healthy life. IoT plays an instrumental role in building a more sustainable future. This advanced technology allows for data-driven decision-making. The Internet of Things (IoT) can significantly benefit the global economy by converting data into valuable information for executives

and engineers to make better decisions. AI and IoT both play a big part in finding new solutions to environmental problems. IoT helps increase our understanding of what's happening to the world's natural resources, which allows us to solve issues and find answers.

Why Build a Sustainable Future?

Environmental sustainability is important to preserve resources like clean air, water and wildlife for future generations. According to the U.S. Environmental Protection Agency (EPA), sustainability is based on human survival and well-being, indirectly or directly, on the state of our natural environment. It is crucial to use resources mindfully to make them last longer. It is the responsibility of governments, businesses, and individuals to adopt sustainable practices and energy management solutions to continue benefiting from what our planet has to offer. Advanced technology like IoT is indispensable to combat climate change and ensures an easy transition to renewable sources of energy. Achieving sustainable development becomes possible with the implementation of the Internet of Things (IoT) in facilities.

Internet of things technology

Internet of Things (IoT) technology looks to be the major application which might pose a technological approach towards solving the environmental issues happening these days. Internet of things is network of physical devices connected to each other for exchange of data and information through sensors and actuators. These actuators and sensors are embedded on to these devices which allow them to exchange data with each other. The 'things' here refer to internet of things devices like chips, cameras, sensors, or such other physical devices. The embedded devices will provide advanced automation in almost every area ranging from homes to cities. These devices gather important information and then transfer this information to other devices.

IoT lifecycle is based on the following phases:

- Create –The physical devices(sensors/actuators) gather information from its surroundings which can be used for insights.
- Communicate –The collected data is transferred to the desired location through the network.
- Aggregate –The devices aggregate the collected data.
- Analyse –The aggregated data is analysed to generate some patterns.
- Act – Here, based on the information, suitable actions are performed.

Contribution of IoT to mother Nature

Saving the environment and its resources are the main idea behind every technological innovation across the globe. Imbibing IoT will make this achieve easily with good results. IoT has range of applications across domains like environment, industry, retail, agriculture, energy, logistics, and so on. The following are the key IoT applications that are having a positive impact on the environment and helping to make our planet greener.

1. *IoT in Air quality monitoring*

Air pollution is one of the growing global problems. According to a report by the World Health Organization, 7 billion people worldwide die prematurely as a result of indoor and outdoor air pollution. Pollutants in the air are also deadly to human health. Poor air quality has significant impacts on food and vegetation, renewable energy, weather, and water. Both indoors and outdoors, IoT can be used to prevent major health issues by continuously monitoring air quality and finding the presence of pollutants in the air. IoT devices can also detect carbon monoxide, ozone, methane, volatile organic compounds and other pollutants. This provides decision-makers with prompt actionable data. In this way, the cause of air pollution can be tracked in real time. Municipalities can take action to reduce air pollution.

2. *IoT in Smart agriculture*

The availability of natural resources such as arable land and fresh water is steadily decreasing due to the growing world population. The situation is exacerbated by the low annual yields of staple foods. The solution to meeting the world's food needs lies in the concept of sustainable food production with smart agriculture, which can also reduce the environmental footprint and waste of resources. Smart agriculture systems based on IoT technologies can help achieve environmental sustainability. Using sensors, IoT collect data on factors such as soil conditions, etc., that contribute to crop growth. Analysis of the collected data provides useful information about various agricultural practices, such as fumigation, fertilization, irrigation, and seeding. This data-driven information helps farmers avoid conditions that could affect crop health. In addition, smart farming reduces error-prone and inefficient human intervention and minimizes the use of water, chemicals and other resources. This ultimately leads to a smaller environmental footprint and higher production rates.

3. *IoT in Deforestation*

IoT technology is also helping prevent deforestation. The Amazon rainforest is under threat from unauthorized logging and other illegal activity, threatening wildlife and risking climatic change. As a result, it is crucial we find a way to prevent unsanctioned logging from taking place. Luckily, the IoT is providing innovative tracking solutions. Clandestine Invisible Track devices, which are planted in trees vulnerable to unauthorized harvesting, officials can receive alarms, enabling them to respond quickly and prevent the illegal sale of wood.

4. *IoT in Intelligent waste management*

As the world's population grows, so does the amount of waste produced by humans are increased. The Internet of Things (IoT), with its network of wireless sensors, can solve waste and trash management problems by giving building managers access to real-time data about trash receptacles. Building managers can decide which waste garbage cans to empty first when they know the current fill level. With this information, waste management companies can optimize their collection schedules and reduce environmental impact.

5. *IoT in Intelligent energy management*

Customers today are placing more emphasis on sustainable technologies. IoT devices support the management of a wide range of supply chains. These include electric utilities, their energy consumption, and supply through distributors and consumers. These smart energy management systems not only help reduce energy costs, but also minimize carbon emissions. To monitor energy use, wireless electricity meters provide energy consumption data from buildings, individuals, and industrial facilities. This data-driven knowledge helps businesses and individuals monitor and optimize their energy use to become more sustainable.

6. *IoT in Detection of water leaks and water shortages*

Nearly 20% to 30% of potable water is wasted due to leaking pipes. Installing IoT sensors for leak detection in facilities or buildings enables water leak detection, water quality control and level monitoring. The smart system can alert facility managers immediately when a sign of a water

leak is detected so that timely countermeasures can be taken. If installed on a larger scale, these IoT systems can reduce water waste and save the country from a growing water crisis.

7. IoT in Extreme weather monitoring

IoT predicts natural calamities long before their occurrence in order to prepare the government and the city before the arrival. Long distance communication protocols transfer data over a long range. Weather sensors on the ground sense changes in the temperature and alert the authorities. Sensors and drones monitor the changes in the environment and record the data.

8. IoT in Vehicle Tracking

The number of vehicles on the roads worldwide contributes to rising greenhouse gas emissions, causing global temperatures to increase. This is a critical driver of climate change. IoT is a system of interrelated devices connected via the internet that constantly collect and share information of the surrounding. This feature can help drivers find the best route to hither destination, find parking spots easily and so on. The lesser time it takes to find a parking spot means the lesser CO emissions from vehicles. Thus, IoT is offering a better solution to curb environmental pollution.

9. IoT in Marine Conservation

The IoT can also help improve conditions in marine environments. IoT is helpful in forecasting future weather patterns and confronting human problems such as overfishing. This is another environmental issue that must be addressed to support sustainable development. This Fish, an IoT-powered tracking network, can alert authorities to detect and stop illegal fishing, which causes harsh effects on marine life species and populations.

Conclusion

In the past, technology might have impacted the environment negatively, but now it has been diverted towards making the planet greener. The IoT technologies are enabling government, companies, and individuals to adopt energy-efficient practices, organize processes and use resources responsibly to achieve long-term environmental sustainability.

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CONSERVATION OF FOREST RESOURCES

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ABSTRACT

Conservation of forest is the practice of planting more trees and maintaining the forest areas for the sustainability for future generations. Forest conservation involves the upkeep of the natural resources within a forest that are beneficial to both humans and the environment. Forests are vital for human life as they provide oxygen, food, shelter, fuel, and means of livelihood for the tribal people living in and around the area. Forests are renewable resources and have contributed substantially to the economic development of the country by providing goods and service. Forest also have major role in enhancing the quality of environment. Thus, there is need of conservation of forest. This paper offers various strategies for the conservation of forest & the acts related to forest conservation.

Keywords: *conservation, environment, wildlife*

Introduction

Forest resources play an important role in the economy of any country. It is highly complex, changing environment made up of a living and non-living things. Living things include trees, shrubs, wildlife etc. And non-living things includes water, nutrition, rocks, sunlight and air. Forests are important global resources that provide a wide range of environmental, economic and social benefits. They provide a variety of valuable products, such as timber, fuelwood, fibre and other wood and non-wood forest products, and contribute to the livelihoods of rural communities. In India forest cover 752.9 lakh hectares of area. About 19 percent of the total geographical area is under forest cease.” Forest conservation” as the name suggests is the preservation and protection of forest resources. It also involves the reversal of deforestation and environmental pollution. The preservation of all forests resources is absolutely essential for the balance of our eco system.

Importance of Forest Resources

- ❖ Forests resources serves as a source of fishing, hunting animal sand provides fruits from plants to the people.

- ❖ They got fodder for their cattle, firewood etc.
- ❖ Different species and variety of plants are available, some of which are having medicinal properties and are acting as potential source of modern drugs.
- ❖ Forests are used for sericulture and apiculture.
- ❖ It provides raw material to industries like paper, plywood, rayon etc.
- ❖ They provide employment opportunities to people.
- ❖ Forest resource became a source of foreign exchange in our country.
- ❖ They play an important role in reducing atmospheric pollution.
- ❖ It provides protection to wild life.
- ❖ It helps in regulating gaseous cycle of the atmosphere and the earth's temperature.

Advantages of Forest Resources

- ❖ They help maintain oxygen levels in the atmosphere, facilitating the breathing of humans and other animals.
- ❖ Forests help to regulate the climate.
- ❖ They help the ground absorb during floods, reducing soil loss and property damage by slowing the flow.
- ❖ Forests are of vital economic importance to humans.

Economic Importance of Forest

- ❖ **Timber:** wood used for commercial purposes like for making furniture and other items like boats, bridges, and other day to day use.
- ❖ **Fuel wood:** Wood is used as fuel for cooking and other purposes by poor people.
- ❖ **Raw material for wood based industries:** forest provide raw material for various wood based industries like paper and pulp, sports goods, furniture, match box etc.

Uses of Forest Resources

Fuelwood: For the rural population, wood is an important source of energy for cooking and heating.

Fodder: Fodder from the forest forms an important source for cattle and other grazing animals in the hilly and the arid regions and during a drought. Wind breaks and shelter belts.

Conservation and management of forest

Conservation and management of forest is aimed at reducing the effects of deforestation. It is done by the following methods:

- ❖ Regulating grazing of animal in forest lands.
- ❖ Protection of forests from pests and pathogens.
- ❖ Protecting forests from wild fires by effective control measures.
- ❖ Economic use of timber and fuel wood to avoid the wastage of forest resources.
- ❖ Forest conservation by implementing laws
- ❖ Adopting reforestation and afforestation programmes.
- ❖ Encouraging agro-forestry.
- ❖ Educating people about hazards of deforestation by spreading awareness.

Ministry of Forest and Environment

In the year 1972 different departments and scientists collectively worked for the study of various environmental problems and their solutions for the protection of environment, in 1980, a committee was formed which works for proper management and handling of the laws. This committee was popularly known as the Tiwari committee and on the recommendations of this committee, department of environment was set up in the same year, as the focal agency in administrative structure of the central Government for planning, promotion and coordination of environmental programs. This department was later in 1985, converted into ministry of forests and environment.

Environment Conservation Act, 1980 (Amended in 1988)

Environment conservation act, 1980, amended in 1988 to laws to prevent the conversion of forest lands to any other impose purposes. According to this law:

- ❖ Natural forests on the earth cannot be changed into other kind of plantation without prior permission of the Government.
- ❖ If anyone converted forest area for development project, the same area is to be planted by him.
- ❖ Forest planning and management should be stressed. 4. No area should be deforested with the purpose of reforesting it.

- ❖ Forest planning and management should be stressed.
- ❖ No area should be deforested with the purpose of reforesting it.
- ❖ There should be controlled grazing.
- ❖ Afforestation near the hills and slopes of the hills.
- ❖ Encouragement to the tribal community.
- ❖ Penalties for any disobedience of laws.

Forest (Conservation) Act, 1980 (Amended in 1988)-National Forest Policy 1952 enunciated that one third of the geographic area of the country should be under forests. However, there had been continuous deforestation in the country for various reasons, some of the forest lands were officially diverted to non-forest purposes. With a view to conserve forests, government of India could enact the Forest (Conservation) Act, 1980. The main recommendations of the act are:

- ❖ To check indiscriminate deservation and diversions of forest land to non-forest purpose.
- ❖ Under this Act prior approval of central government is required before any reserved forest is declared as de reserved, or forest land is diverted to non-forest purposes.
- ❖ If diversion is permitted, compensatory afforestation is insisted upon and other suitable conditions are imposed.
- ❖ Where non-forest lands are available, compensatory afforestation is raised over equivalent area of non-forest lands.
- ❖ Where non-forest lands are not available, compensatory plantation is raised over degraded forests twice in extent the area being diverted.
- ❖ A control should be exerted over shifting cultivation and encroachments.
- ❖ Grazing problems of the area should be studied and appropriate measures be adopted.
- ❖ All forest working plans should stress conservation and ha multi-disciplinary approach.
- ❖ All critical areas in the hills, catchment areas, slopes and other parts under erosion must be protected and quickly afforested.

Important Amendments

The Forest (Conservation) Act, 1980 was amended in 1988 so incorporate stricter panel provisions against violators. Important amendments are as follows:

- ❖ No state government or other authority may direct that any forest land may be assigned by way of lease or otherwise to any person, corporation or agency/ organization (not owned by the government) without prior approval of the central government.
- ❖ No forest land or any portion thereof may be cleared of trees which have grown naturally in that land or portion, for the purpose of using it for reforestation without prior approval of central government.

- ❖ Scope of existing "non-forest purpose" has been extended to other areas as cultivation of tea, coffee, spices, rubber, palms and medical plants etc.
- ❖ Admissible punishment to the offender of the provision of Section 2 of the Act.

Regional Offices

Six regional offices have been set up for monitoring the conditions and safeguards of forest and to find out the steps for their conservation. These offices are located at Bangalore, Bhopal, Bhubaneswar, Lucknow, Shillong and Chandigarh.

Conclusion

Earth is the only plane on which life is possible. Population of earth is also increasing at an alarming rate. Basically there are two main reasons for the exploitation of environment and its resources. One is poverty and the other is the rich people. Although development is necessary for man but it should be sustainable and should not destroy the resources but conserve their development. To safeguard the forest resources from the onslaught of continuous degradation as we cannot stop development, protection measures are very much necessary. Hence, the necessity to protect forests as a valuable heritage and preserve its innumerable resources to the present as well as future generations may be undisputed.

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THE IMPORTANCE OF GREEN SPACES IN IMPROVING PUBLIC HEALTH AND REDUCING ENVIRONMENTAL POLLUTION

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ABSTRACT

Modern urban life style is associated with chronic stress, insufficient physical activity and exposure to anthropogenic environmental hazards. Urban green spaces, such as parks, playgrounds and residential greenery, can promote mental and physical health and reduce morbidity and mortality in urban residents by providing psychological relaxation and stress alleviation, stimulating social cohesion, supporting physical activity and reducing exposure to air pollutants, noise and excessive heat. An increasing number of epidemiological studies have demonstrated various positive health effects of maintaining urban green spaces, including improved mental health and reduced depression; improved pregnancy outcomes; and lower rates of cardiovascular morbidity and mortality, obesity and diabetes. Increasing the number and quality of green spaces has the potential to mitigate short-lived climate pollutants that produce a strong global warming effect and contribute significantly to more than 7 million premature air-pollution related deaths annually. Urban fountains, ponds, lakes and roof gardens also moderate temperature extremes and reduce the Urban Heat Island effect, resulting in energy savings and improved climate quality in cities. Parks and green spaces provide people with the opportunity to walk and cycle more often and engage in leisure-time physical activity. Therefore, investments in city parks, green spaces, and waterways are an effective and economical way to both promote health and mitigate climate change.

Keywords: *Mental health, Morbidity, Pollutants, Climate change*

Introduction

Green spaces can be defined in many ways, from narrow (e.g., forested areas) to broad (e.g., any landscape that includes some natural elements, like a backyard or even street trees). Green space as a term includes both natural ecosystems and key components of the built environment such as public

parks, greenways, gardens and forests, as well as private yards and other natural areas. While city living has its share of conveniences, stressors like traffic congestion, pollution, and weakened social ties threaten the health and well-being of many urban dwellers. Such factors can lead to a range of mental and physical health concerns. For example, stress is linked to negative impacts on immune functioning. Green space is associated with a large number of health benefits, including lower premature mortality, longer life expectancy, fewer mental health problems, less cardiovascular disease, better cognitive functioning in children and the elderly, and healthier babies. It also helps to mitigate air pollution, heat and noise levels, and provides opportunities for physical exercise and social interaction.

Promotion of public health

The past few years have seen an explosion of research finding concrete links between increased exposure to nature and not just improved physical health, but better mental health, too. Mental health issues are estimated to account for as much as a third of all years lived with disability, and account for around 13 per cent of disability-adjusted life-years (DALYs) lost, similar to the toll of cardiovascular disease and circulatory disorders. The evidence of positive effects from nature includes studies on specific psychological conditions such as depression, anxiety and mood disorder. Access to nature has also been found to improve sleep and reduce stress, increase happiness and reduce negative emotions, promote positive social interactions and even help generate a sense of meaning to life. Being in green environments boosts various aspects of thinking, including attention, memory and creativity, in people both with and without depression. Besides mental health benefits, we know that healthy natural spaces provide us with a whole range of essential “ecosystem services” for free, from clean air and water to nutrient recycling, flood defence and pollination.

Increased Physical Activity or Exercise

There is a growing body of evidence indicating that physical activity levels may be influenced by the urban environment. Studies have found associations between availability of urban green space and physical activity levels. The provision of urban green spaces such as parks provides an important place for people to be active. A significant proportion of vigorous physical activity in childhood takes place in urban parks. Urban green space is therefore particularly important in urban areas where access to the open countryside is limited. Indeed, accessibility of green spaces influences not just the likelihood of physical activity being undertaken but also its frequency. It is also linked to a lower

likelihood of being overweight or obese. Green spaces therefore may help facilitate active lifestyles in the urban setting. In addition, they may be used as therapeutic spaces for rehabilitative exercise, such as for persons with coronary artery disease and have been associated with lower rates of diseases such as type 2 diabetes mellitus.

Improves Mental health and well being

Urban green space may provide residents with opportunities for contact with the natural environment. Such contact has positive restorative effects on mental health and wellbeing and may also help to provide a buffer against stressful life events. The benefits of green space on mental health and wellbeing may also arise from participation in activities occurring in these spaces, such as social interaction or physical exercise. These benefits include alleviation of stress and anxiety, and improved mood and attention.

Enhances Social Contact

Urban green spaces also provide opportunities for social interactions to take place. This in turn could help reduce social isolation, generate social capital and lead to greater personal resilience and well-being. This seems to be particularly important for elderly population groups. Interestingly, in a few studies, social factors had a greater influence on the frequency of use of urban parks than the physical features of the parks.

Green spaces and climate change

Urban green space such as street trees, parks, green roofs can help achieve reductions in temperature and air pollution in urban areas while simultaneously delivering diverse additional benefits such as bio-diverse habitats and enhanced living and recreation areas. Urban heat islands can increase urban temperatures by up to 12 °C compared to non-urban areas. This can exacerbate heat stress in city dwellers. Trees can provide shade and reduce the demand for air conditioning during warm periods, thus reducing energy demand and promoting sustainability.

Decreased Urban Heat Island Effects

Urban heat islands are areas with higher air temperature compared with surrounding areas. The higher temperature is a result of heat absorption by asphalt and urban structures. Urban trees and green spaces help reduce urban heat island effects of manmade infrastructure, keep more carbon from

being released, reduce flood risk, improve water and soil quality, and support wildlife diversity. Manmade structures such as buildings and roads absorb and re-emit heat more easily than natural landscape, therefore, it causes urban areas with limited greenery to become “islands” of higher temperatures compared to outlying areas. Small green spaces reduce air temperature by up to 3°C and can provide perceivable effects up to 100 m away.

Increased Carbon Sequestration

Trees carry out a biological function called sequestration, the process that captures and stores atmospheric carbon dioxide, a gas responsible for significant global climate change. The vegetation and soil of a green space can sequester carbon, contributing directly to a reduction in atmospheric CO₂ concentration. They can also affect the carbon balance indirectly, through their effects on the urban energy balance and thus on CO₂ emissions related to energy use (for example by reducing urban air temperatures and therefore building energy use). Urban green space tree growth simulations predict atmospheric carbon removal up to 20 times greater than the initial carbon costs to install and maintain the green space over 50 years. Since 2000, U.S. tree cover has been reduced by 15%, equivalent to a loss of 16.3 Giga tons of carbon sequestration.

Reduces Flood Risk and Improves Water Quality

Variable rainfall due to climate change and increasing population pressures has made urban water management a hot topic in national and international policy discussions. In cities, increasing impervious surface reduces infiltration of water and increases surface runoff. This one physical change creates so many multifaceted problems that greatly impact the quality of life in a city. Adequate urban tree cover might help control storm water by preventing high rates of rainwater falling through canopy. Some tree species efficiently manage high volumes of water and can effectively store storm water run-off, reducing costs to build engineered storm water management systems.

Improves Soil Quality

Trees absorb and remove contaminants from the soil that have the potential to cause harm to humans and wildlife. Local municipalities must tightly control nitrogen and phosphorous levels to provide safe drinking water for communities. Urban storm water run-off high in nitrogen and phosphorous has the potential to jeopardize water supplies. Adequate intact forested areas reduce

nitrogen leaching into soil by 74% to 81% compared with just grass. Certain tree types reduce soil phosphorous levels by 55% to 81%.

Supports Wildlife Biodiversity

Urban green spaces can serve as wildlife reservoirs to maintain endangered species. The additional wildlife can also encourage residents to participate in outdoor leisure activity. The amount and quality of urban green spaces in a city influences the biodiversity of the plants and animals living there. Urban green areas provide bees and other insects, with the living space and food sources they need to survive. One of the great things about an urban park or garden is the ability for us as humans, to create the ideal environment for fertilisation to take place. Habitat fragmentation, a process that causes a large selection of animals to divide into smaller, more isolated groups, is extremely dangerous for wildlife. By splitting populations into smaller groups, their overall population is likely to decrease. This is particularly dangerous to species that are currently endangered. In order to prevent this from happening, urban green spaces are being used as habitat corridors to encourage wildlife to reach other habitable areas. Various species can use urban greenery as a pathway to reach more of their own kind and, in doing so, improve their chances of increasing their population.

Conclusion

Public green spaces that are accessible for walking, cycling, playing and other outdoor activities can improve safe mobility and access to basic services for women, older adults and children, as well as low-income population groups, thus improving health equity. Incorporating public health priorities into public-space development provides such a co-benefit approach for urban areas. Taking a health-sensitive approach to green public-space planning offers the potential to achieve the greatest number of co-benefits. A broad multidisciplinary collaboration and a combination of actions are needed to improve the use of green space and for this to have a long-lasting effect. Creating well-designed green spaces and encouraging people to use it can provide a triple win, by improving environmental sustainability, improving health and improving health equity.

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ENVIRONMENTAL DEGRADATION AND WOMEN'S HEALTH

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ABSTRACT

The environmental degradation is the deterioration of the environment through depletion of resources which includes all the biotic and abiotic element that form our surrounding that is air, water, soil, plant animals, and all other living and non-living element of the planet of earth. The major factor of environmental degradation is human (modern urbanization, industrialization, over population growth, deforestation, etc.) and natural (flood, typhoons, droughts, rising temperatures, fires, etc.) cause. Furthermore, because of the unequal distribution of resources and their socioeconomic standing, lower-income countries and disadvantaged populations—including low-income and communities of color—are disproportionately affected by the negative effects of climate change. The risk balance for women's sexual and reproductive health and rights, as well as newborn and child health, is being tipped negatively by the climate crisis. Obstetricians and gynaecologists have a special opportunity to advocate for mitigation measures to stop climate change that is hurting our patients and their families.

Keywords: *Environmental degradation, Manmade impacts, Mitigation, Pollution, Issues*

Introduction

Many variables, such as sex, gender, racial or ethnic background, culture, social standing, and environment, have an impact on health during the course of a person's lifespan. The NIEHS research agenda priorities studies on women's health. To avoid or lessen the likelihood that women will develop health issues, researchers look into environmental, dietary, and behavioral factors. Women are more vulnerable to certain illnesses and ailments, including uterine fibroids and endometriosis.

Reproductive health outcomes and climate change

Direct or indirect health effects of extreme climate-related occurrences are categorized. The physiological effects of heat or cold, as well as cellular and organismal reactions to pollution, water

pollutants, or service disruptions, are all examples of direct effects. Indirect effects concern infections and vectors, whose spread or occurrence is ultimately a result of climate change. Climate events can have a direct or indirect impact on migration and social unrest. The direct effects of climate change on fertility, prenatal outcomes, mental health, sexual health, reproductive rights, and survival are supported by epidemiologic data. Communities have seen post-traumatic stress disorder, suicides, and unfavourable pregnancy outcomes depending on the tragedy. The vulnerability of women to these indirect changes in vector prevalence and distribution has also been demonstrated by epidemiologic study. Access to sufficient healthcare, particularly reproductive health necessities like contraception and abortions, or pre-pregnancy, prenatal, and maternity care, is already lacking in under-resourced nations, and any crisis that restricts access would worsen outcomes. Disasters may affect prenatal outcomes and maternal mental health, according to a systematic review by Hartville et al. In the parts that follow, we examine a number of specific issues, including air pollution, heat, the interactions between the two, and flooding.

Life cycle of women & health issues

- ❖ Infancy and childhood (0-9 years): Sex selection , Genital mutilation ,Discriminating nutrition ,Discriminating Health care
- ❖ Adolescence (10-15 years): Early child bearing and abortion,STD & HIV Infection,Under nutrition and Anemia,Increase substance abuse
- ❖ Reproductive age (20-44 years): Unwanted / Unplanned pregnancies, Abortions STI & AIDS ,Pregnancy Complications ,Anemia
- ❖ Post reproductive (45 years & above): Gynecological Malignancies ,Cardiovascular diseases Osteoporosis,Osteoarthritis,Diabetes Mellitus LIFE TIME, Gender Violence ,Enviornmental and occupational hazards, Depression
- ❖ Childhood: Sex selective abortion , Female mutilation,Nutrition problems, Neglect, Cannot benefit from the services
- ❖ Adolescent/adult: Unwanted pregnancies, STDs, Sexual harassment/abuse ,Turnpike sex ,Smoking and substance abuse
- ❖ Olders: Increase in morbidity /problems on quality of life ,Violence ,Social pressure , Increase in morbidity
- ❖ Dimensions of Wellness: Occupational, Spiritual, Emotional, Physical, Intellectual, environmental, Social

- ❖ Women's health a major development task for us an unfinished agenda in our country Challenges include reducing Maternal mortality Unwanted fertility Infertility Sexually transmitted infection (HIV, AIDS,HPV) Cancers Female feticide & Violence against women.

Community justice Sexual and reproductive health and rights

All citizens, but particularly women, are vulnerable to climate change in low- and middle-income nations like India due to significant social, geographic, political, and environmental concerns. In addition, by embracing sustainable development principles, India has a fantastic potential to influence the global trajectory of climate change. Despite the growing inclusion of gender in global climate policy, India's efforts to address gender-based health inequities and include women in the mitigation, adaptation, and management of disaster risk have made only incremental progress. Local solutions are a good place to start for implementation, but scaling them up is necessary for them to have a substantial impact on potential future climate scenarios.

Conclusion

Significant social, physical, political, and environmental aspects of low- and middle-income nations, like India, make all residents, but particularly women, vulnerable to climate change. India has a fantastic potential to influence the global trajectory of climate change at the same time by implementing sustainable development principles. While gender is becoming more and more important in international climate policy, India's efforts to minimize gender-based health inequities and include women in the mitigation, adaptation, and management of disaster risk are still making poor progress. Although scaling up local solutions is necessary for them to have a substantial impact on potential future climate scenarios, local solutions are a good place to start for implementation.

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**A RATIONAL REVIEW OF ENVIRONMENTAL POLLUTION
CONSEQUENCES ON PUBLIC HEALTH**

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ABSTRACT

The greatest threat to world health is environmental degradation. Yet, the issue of pollution (air, water, soil, trash, and noise) is getting worse every day in emerging nations as a result of the expansion of industrialisation and the use of motor vehicles. In addition to having a negative impact on human health (asthma, cardiovascular disease, and respiratory conditions, for example), pollution also has an adverse effect on plants and animals. Hence, it is important to understand the many types of pollution, their causes, effects, and corrective measures in order to prevent from all health-related difficulties. So, the purpose of this review paper is to give a detailed overview of the many types of pollution so that their impact might be reduced.

Key words *Environment Pollution, Types of Pollution, Causes, Effect, Remedies.*

Introduction

Environmental pollution is now a major issue on a global scale. Energy consumption and trash disposal have both increased as a result of urbanisation. The global environment is viewed as a source of worldwide public health issues that should be researched from a variety of angles, including social, economic, legal, and ecosystem engineering. Humans are affected by environmental contaminants in a variety of ways, including increased stress, respiratory problems, cardiovascular problems, allergies, mental disorders, and other adverse impacts. In the present day, there is a significant chance that pollution will have an impact on human physiology. Deforestation, urbanisation, and industrial growth are some of the main causes of environmental pollution. Humans must be vigilant to protect the environment because it has a significant negative impact on human health. The four basic categories of pollution are water, land, air, and noise pollution. All forms of pollution have a negative impact on the environment, wildlife, and people's health and wellbeing.

A Range of Pollution

The different types of pollution are explained below:

- Air Pollution
- Water Pollution
- Noise Pollution
- Land Pollution

Air Pollution

One of India's largest challenges is air pollution. It arises when there are significant concentrations of fumes, gases, smells, and dust in the air. In essence, air pollution is a form of pollution that damages bodily components that are exposed to air (such as our respiratory system). The atmosphere is made up of a variety of gases, dust particles, water molecules, and other elements. When a person breathes in this air, it has a very negative impact on their bodies and may even harm their breathing tubes. It is the cause of things like lung cancer, heart disease, stroke, and respiratory infections. There are various factors that contribute to poor air quality. These factors are particularly hazardous to human health since they can lead to diseases like vascular or respiratory system defects and other illnesses.

Water Pollution

Water pollution is essentially pollution caused by contaminated or polluted water sources, such as the ocean, river, etc. As we can see, the countries have many enterprises and nuclear power plants put up at this moment. As a result, when these enterprises emit polluted water, it enters into ponds and rivers before entering human bodies. Because people use this type of water for drinking, bathing, washing clothes, and a variety of other activities on a daily basis, it is dangerous when it mixes with the water in metropolitan areas. Several harmful diseases, including some that are water borne, and many detrimental deaths are caused by water contamination. The main causes of water pollution are nuclear waste and oil pollution. These pollutants typically form in water bodies and produce pollution.

They can make water unsafe to drink and lower oxygen levels, which weaken and kill aquatic life.

Noise Pollution:

In addition to causing annoyance and rage, noise pollution can also have physiological impacts such as reduced hearing, elevated blood pressure and pulse rate. Unwanted noise is a stressor and an irritation. Noise-producing devices include pneumatic and electric drills, saws, machinery, factory equipment, industrial and construction activities, and generators. Decibels are used to measure noise (dB). In many developing countries, noise pollution from home electricity generators is a growing environmental problem. The obtained average noise level of 97.60 dB was higher above the WHO limit of 50 dB for residential zones. According to research, neighbourhoods with a high concentration of people of colour and low income have the most noise pollution. The several categories of noise pollution, its causes, effects, and corrective measures.

Land Pollution

Due to crop destruction and increased land contamination, chemical use in gardening should be avoided. We may limit the usage of plastic bags, which are extremely detrimental because they are nonbiodegradable, and increase the use of biodegradable clothing bags. In order to limit the use of pesticides and insecticides, which is crucial, we can utilise organic gardening supplies.

Conclusion

According to the report, various types of pollution are to blame for a large number of people's illnesses. It appears that environmental pollution is a global problem. Hence, everyone has a responsibility to keep our environment safe because doing otherwise has a negative impact on human health. Hence, strategies, government policies, and the involvement of the general public or industry are required to ensure the safety of the environment. The government must take strict action against businesses who dump their industrial trash in public areas or rivers. In addition to avoiding the toxic chemicals used in agriculture, we may lessen pollution to some extent while still sustaining our way of life. Because everyone needs access to public lands, clean water, and clean air to breathe.

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AIR POLLUTION AND ITS EFFECT ON PUBLIC HEALTH

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ABSTRACT

All living organism depends on earth's supply of air. When the atmospheric resources are polluted the life of all the living beings is endangered. Pollution is a global problem, globalization and population has resulted in industrial, technological and urbanization which become a major threat for all living organism. Population growth has resulted in increased vehicles, factories which lead to pollution through the discharge of wastes in the water bodies' air and soil. Air is a special type of chemical that supports various actions and helps to maintain life on Earth. Rapid urbanisation is serious threat to clean air and a healthy lifestyle. The pollutants are degrading the human health and hygiene and making them prone to diseases. This paper tries to bring forward the reason behind air pollution, its effect on the human being and ways to overcome.

Key words: *Pollution, Air pollution, Automobile pollution Industrial pollution*

Introduction:

Atmosphere is an intricate and dynamic natural gases system that is indispensable to support life on earth. Human beings are blessed as they are getting whatever they need for their living from the atmosphere but human is exchange giving back pollutants and poison as reward. Both Human being and environment are interrelated. They have a strong relationship as if one is effected this will affect their counterpart. With the increase in population the need of the people has also increased which lead to industrial growth. When the interference of human exceeds certain limit it creates a sign of danger for all living organisms. Human activities have a hostile effect on the environment by polluting the environment. The supreme pollution which is negatively polluting the atmosphere is air pollution.

Pollution

As the population is increasing the need of the people are also increasing. Human for their greed are exploiting the atmosphere which results in pollution. Pollution is the involvement of unwanted pollutant above the required percentage in the atmosphere (Mackenzie & Turrentine, 2021). Pollution is the upsurge of harmful materials in the form of solid material, air, gases and particles into the environment.

Air pollution

Air becomes polluted when the level of pollutants exceeds the permissible level either by natural or manmade activities. The contamination of air with some smoke, liquid droplets dust and harmful organic and inorganic gases are called as air pollution (Krishnamacharaulu & Reddy, 2009; Roddannavar, 2009). According to the World Health Organization (WHO), “Each year air pollution is responsible for nearly seven million deaths around the globe. Nine out of ten human beings currently breathe air that exceeds the WHO’s guideline limits for pollutants, with those living in low- and middle-income countries suffering the most” (Mackenzie & Turrentine, 2021).

Sources of pollution

The rising number of air pollutants has made breathing fresh, clean air next to impossible. Environmental pollution is classified in to two sources (i) Natural source and (ii) man-made source.

- **Natural source:** atmosphere is polluted frequently by natural calamities like volcanic eruption forest fire, earth quake, flood, cyclone and drought, which emit harmful gases in the atmosphere and air gets polluted (Joshi, 2012).
- **Man-made source:** the major contributor of air pollution is human being. Through his regular intrude he is contaminating the air by means of industries, factories, automobiles, smokes and harmful gases. Some of the ways of mam-made pollution are listed below:
- **Automobile pollution:** In the modern era human wants to live a comfortable and luxurious life for accomplishing that the need and aspirations has also increased. Everyone has the desire to own a vehicle which increased the demand for automobiles. Increase in population has given ways to manufacture more vehicles which has increased the emission of gases in the atmosphere and the air is getting polluted (Mackenzie & Turrentine, 2021). Motor vehicle

emissions are the chief sources of poor air quality. The recent example for air pollution due to road emissions is Delhi [Outlook].

- **Industrial pollution:** air pollution, particularly in emerging nations, is becoming a major environmental concern. The interaction between the dispersion and emission of toxic pollutants from industries is what causes the air pollution (Mackenzie & Turrentine, 2021). The amount of air pollution brought on by the release of gases, smoke, and particulate particles into the atmosphere is excessive. Some of the major contributor of carbon dioxide, nitrogen and sulfur dioxide in air is through industries. They use fossil fuel like coal, natural gas and petroleum to produce electricity. On the other hand untreated gas and improper disposal of radioactive material are polluting land and air (Joshi, 2012). According to Walke, The sources of smog and soot are similar types of air pollution. “Both come from cars and trucks, factories, power plants, incinerators, engines, generally anything that combusts fossil fuels such as coal, gas, or natural gas,” (Mackenzie & Turrentine, 2021).
- **Other air pollutions:** other man-made air pollutions are through burning of wood and cow dung cake for fuel, burning of agricultural wastes, toxic gases released from refrigerators, air conditioners generators and dust particles from construction sites (Munsif, Zubair, Aziz& Zafar, 2020). Burning of agriculture wastes also damage crops and trees, reduced crop yields, reduced growth and survivability of tree seedlings and pollute air. people in their regular activities also pollute the air by using kerosene, burning garbage and wood which in the form of ash and smoke stick to walls, food, and clothing and make people sick.

Effect of air pollution

Air pollution has caused negative effect not only on environment but also on human beings.

- **Health issues:** by inhaling polluted air people get sick and face health problems like heart disease, lung cancer, skin problems and respiratory diseases such as emphysema, fatigue, headaches and anxiety. Pollution increases irritation in the eyes, nose and throat. It sometimes causes nervous system damage and damage to reproductive organs.
- **Environmental problems:** air pollution is the major reason behind ozone depletion and global warming which gave rise to melting of glaciers and result in climate change. Deforestation has a foremost role in air pollution, since cutting of trees has increased the carbon dioxide level in the atmosphere. The poisonous gas deposited in the atmosphere paves way to acid rains and smog effect (Joshi, 2012). Due to the increase in carbon dioxide in the greenhouse gas traps the heat in the earth’s atmosphere. The greenhouse gases lead to warmer

temperatures, which in turn lead climate change: rising sea levels, more extreme weather, heat-related deaths, and the increased transmission of infectious diseases (Mackenzie & Turrentine, 2021).

Ways to overcome air pollution

Conserving the energy is the first step toward a better future with clean air to breathe. People can grow more and more trees, since trees has the ability to absorb carbon dioxide and release oxygen in the air. It maintains a proper balance between oxygen and carbon dioxide in the atmosphere. It improves the quality of air. It is also helpful in dealing with global warming. To decrease air pollution recent productive technologies like CO₂ sequestration, industrial energy efficiency, improving vehicle engine combustion, and reducing gas production from agricultural cultivations, mitigations are required to lessen the danger of air pollution. Keep your automobile in a good condition (Mackenzie & Turrentine, 2021). While waiting for the traffic signals turn off the engine. Avoid using and burning plastic items. Grow at least one tree. Use recycled products. Keep air-purifying indoor plants.

Conclusion

Air pollution is an unavoidable byproduct of the current industrial economy that cannot be entirely removed, but stern measures can reduce it. Both collective and individual efforts can help to decrease air pollution. Human being is self-centered they exploit the environment for satisfying their greed. People should be made aware of the air pollution, its consequences and was to overcome it. It is everyone's duty to keep our atmosphere clean and healthy not only for ourselves but also for our future generation.

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CLIMATE CHANGE – A THREAT TO ALREADY MARGINALIZED

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ABSTRACT

Climate changes enhance gender inequality and confides the potentiality of woman to be financially independent. In addition to that the silent sufferers of the LGBTQ community are forced to live in places that are not suitable for living due to discriminations which could destroy their physical and mental health. So this paper aims to give some limelight and awareness to the unnoticed hardships that are being faced by the marginalized communities

Keywords: *Climate change , discrimination , marginalized community, women , LGBTQ.*

Introduction

UNO states climatic change as an “long- term shifts in temperatures and weather patterns”. The change in patterns have been natural process until 1800, The industrial revolution and the progress in scientific technologies lead to the interventions of human activities to collapse the natural patterns. Human activities such as burning fossil fuels like coal, oil and gas generate greenhouse gases that becomes a layer trapping the sun's heat and increasing temperatures. Greenhouse gases like carbon dioxide and methane are emitted through automobiles, refrigerators, air conditioners etc. Deforestation increases amount of carbon dioxide surfacing on the atmosphere as trees are the main sources of filtering harmful components such carbon dioxide in the atmosphere. Incomparable amount of methane is emitted through landfills and automobiles. As a result the earth is 1.1 C warmer than it was 1.1 late 1800s. Most of the populations living in small island nations and other developing countries are already vulnerable to climate impacts. Increase in sea level and saltwater intrusion have climbed to a point where communities have had to relocate which stimulates a rapid growth of climate refugees. Though climate change has been under severe discussions for years since the awareness of global warming, It's impacts on health in particularly upon the vulnerable marginalized groups is under the shadow. Women who is considered as the weaker section of the community and members of LGBTQ undergo different degrees of difficulties according to the severity of the climate change. According to VNDP, “women and children are 14 time more likely than men to die in a

disaster”. Research indicates that extreme heat increases incidence of stillbirth. Vector borne diseases like malaria, dengue fever and Zika virus would worsen maternal and neonatal outcomes.

Natural Disaster

The natural disasters wages women with more hardships and burdens their responsibilities. Women who are primarily incharge of collecting water and firewood have to walk distant territories in the pursuit of finding out their target resources. During the time of calamities women and girls face increased risk of gender based violence at refugee camps. Weather is interconnected with the livelihood of people. Hence bad weather could knock down the livelihoods and add on poverty which could motivate poor families to marry off their daughters at a very young age. The parents would think that they are improving their daughters future by handing her to a man could feed her. But it only pushes her to contribute to the illiteracy rate of the country. Especially, in poor countries it increases the illiteracy rate and paves way for economical decline. An investigation into still births and deaths in infancy has found out that increase in temperature during the week coming before delivery has resulted in the birth of the infants that has died in the womb. Rise in temperature helps in lengthening suitable seasons for the breeding of vectors. Vector borne diseases like malaria and dengue have great influence on miscarriage, premature birth and anaemia, Zika virus in pregnant women can cause severe birth defects like incomplete brain development. Mansoon failures and failed crops cause food insecurity and high levels of malnutrition in women. Women living in refugee camps live under insecurity and psychological issues as they are confined to their camps. Loss of livelihoods increases frustration and domestic violence against women. Climate changes affect the population that are more dependent on natural resources for the livelihood and do not have the capacity to respond to the natural calamities. Women are more likely to live in economical crisis since they have less access to resources and ownership to properties. Women are less equipped to adopt to climate crisis as they are not given equal rights in decision making and choosing their livelihood.

Environmental Injustice

Environmental injustice disproportionately affects LGBTQ people. LGBTQ people are subjected to wide range of pollution compared to heterosexual people due to housing policies that discriminate communities. Hence these people live in inappropriate places where the amount of

hazardous air is high compared with other inhabitant areas. Hence members of LGBTQ are at greater risk of homelessness. They find shelter far away from the discriminative eyes and so end up in places which are not suitable for living. As a result, members of LGBTQ become vulnerable to diseases like hypothermia, hyperthermia, respiratory distress from wildfire smoke, and infectious diseases from floods, among other conditions. The discrimination of aid distribution make it hard for LGBTQ community to access resources unequal distribution of resources may lead to several malicious diseases. The harassments and discrimination they face to access medical care make them receive little to no treatment for health conditions and climate changes. They have poor access to clean air, clean water and a livable climate. There is no proper representation of their struggles and survival stories in social media hence they are less noticeable in society.

Conclusion

Policy makers should view women's justice, health justice, LGBTQ justice and environmental justice as interdependent factors while framing policies. Diversity should be celebrated and humankind should be treated as one irrespective of differences. Switching energy systems from fossil fuels to renewable resources like solar or wind will reduce the emissions driving climate changes.

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WILDLIFE TOURISM – INTERVENTION TO CONSERVE ECO SYSTEM

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ABSTRACT

The thematic paper expresses the concern for intervention to conserve eco system in tourism activities. It discusses the impacts of tourism on wildlife and intervention to protect the wildlife thereafter the environment. The paper suggests the things to avoid and things to try to conserve the wildlife for better future.

Keywords: *Wildlife tourism, Environmental Impacts*

Introduction

Wildlife tourism is travel industry centred on observation and interaction with local animal and plant life in their natural habitats. Wildlife tourism in its simplest sense is interacting with wildlife in their natural habitat classified into two categories one actively taking part in hunting or collecting another one is passively watching and photographing. The tourism on natural environment and on to the wildlife habitats are always threat to eco system and leads to number of challenges against sustainability. Humans leave carbon footprints and cause of nature destruction due to tourist activities. In order to reduce the carbon footprints the tourist organisers and the tourists needs to understand the importance of the places of ecologically valued and raise awareness among travellers to be Eco-friendly. Sustainable tourism has more benefits than negative impacts, especially relating to the environment, the economy and communities.

Environmental Impacts of Tourism

A study published in 2018 by Nature Climate Change suggested that tourism accounts for 8% of global greenhouse gas emissions, which is a very large percentage. Local land use for tourist purposes in places of biodiversity leads to soil erosion, increased pollution, natural habitat loss, and more pressure on endangered species. Depletion of natural resources due to tourism development will effect, when it increases consumption in areas where resources are already scarce. The places of wildlife and natural attractions are targeted by tourist industries. It leads to lot of problems such as all aspects of pollution such as air emissions, noise, solid waste and littering and the waste disposal

is a serious problem and improper disposal also harm to the natural environment - rivers, scenic areas, and roadsides. Hence habitat can be degraded by tourism activities.

Impact of wildlife tourism

Watching animals is an inspiring experience. People are excited by seeing whales or turtles, spectacular bird life, elephants or gorillas. As tourism continues to grow and expand, more pressures on the environment and wildlife are inevitable (Richard Tapper, 2006). Wildlife watching tourism can have adverse effects on wildlife in three main ways – by causing changes in their behaviour, to their physiology, or damage to their habitats. The wild animals' behaviour changes rapidly due to the stress they come across when tourists come too close to them. It can impact the behaviour, health, location and mating of some species. Safaris and wildlife watching activities not only deplete wildlife habitat but also turmoil created by tourists as they chase wild animals (Tourism.com), in their trucks and aircraft (Malika Bhavnani, 2019). These exploiting activities put high pressure on animal habits and behaviours and tend to bring about behavioural changes. Wildlife species are often particularly vulnerable to the effects of disturbance during their breeding periods, and during their juvenile stages. Any disruption of courtship and mating behaviours, or later on, of care for offspring, reduces overall breeding success, and therefore is a serious threat to population maintenance and survival.

Intervention to Protect Wildlife from Tourists

First step in this process will be to induct tourism industry about the immense value of nature for the wellbeing of the environment and the rate of destruction caused due to uncontrolled tourist activities in the past. It is highly necessary to limit the number of tourists allowed in an area can help maintain the integrity and vitality of the site. Truly sustainable and responsible tourism protect the environment, natural resources, and wildlife. Likewise educating tourists about nature and the environment to voluntarily take part in conservation of forest and wildlife is equally important. The tourists intervention causes great disturbances in the life of wild animals, it may prevent species from their regular breeding and feeding activities. To avoid this, tourism activities are often restricted in breeding time of some species (Green,2015). Eravikulam National Park is an important habitat of the Nilgiri tahrs in the Western Ghats (Manorama,2021). In Rajamala, the tourism zone in the Eravikulam National Park, in breeding season of Nilgiri tahr, Tourists are barred from entering the sanctuary for two months from February every year.

Social behaviour patterns of wildlife are greatly changed as a consequence of artificial feeding of by tourists that resulted in a complete loss of normal feeding behaviours. There are also important health implications arising from artificial food sources where injury and disease have resulted (Mark Orams, 2002). The monkeys on the road side of tourist places over fed by tourists were so extreme that, when stopped, some animals were unable to locate their natural food sources.

Wildlife tourism also causes disruption to intra-specific relationships. The presence of tourists affects the wild animals' maternal attendance to their pups and specially the female harp seals spend significantly lesser time in nursing of their pups and more time watching the tourists. There is also a risk of the young not being recognized, and being more exposed to predator attacks. The viewing of certain species by wildlife tourists makes the species more vulnerable to predators. Evidence of this phenomenon has been recorded in birds, reptiles and mammals. Problems have occurred in breeding colonies of pelicans (Dilys Roe & etal,1999)

Vanity hunts (also called canned hunts) and Poaching and illegal wildlife trafficking affect the genetic health of the wildlife population. Some limes lead to genetic drift, depletion of wildlife population and may not play their role within the eco system(https://www.wikiwand.com/en/Wildlife_tourism). While all animals deserve to live in the wild, unfortunately, thousands of wild animals are captured, taken from their natural habitats or bred in captivity, suffering a lifetime of cruelty and abuse. Some are beaten into submission, deprived of food and water or trapped in concrete cages – all for the tourist dollar (Sandra, 2018). Plastic use at the animal habitat should be banned and the waste disposal management process of any organization should be monitored and reported.

Things to avoid

- ❖ Do not get a selfie with a wild animal. Never 'cuddle' a lion or a tiger cub.
- ❖ Do not play music, honk or speak loudly. Silence can help you hear wildlife
- ❖ Do not litter the place with polythene bags, tetra packs and other such materials. They not only spoil the beauty of the place, but also may harm the animals.
- ❖ Do not wear perfumes or any other strong smelling substances. The animals are sensitive to smell and it may arouse their curiosity
- ❖ Do not collect any plants or animals. They belong to the forest and not in your gardens

- ❖ Animals are generally shy and tend to hide when they see a human being. Please do not attempt to lure them out by throwing stones or other objects. Leave them in peace
- ❖ Do not support attractions that force wild animals to perform tricks and shows. Do not visit dolphin shows and walk away from street shows involving dancing monkeys.
- ❖ Do not book an elephant ride or visit an elephant show.
- ❖ Do not pay for fights between animals, such as bullfights, cockfights and crocodile wrestling. Paying for these cruel performances continues a lifetime of abuse and injury.
- ❖ Do not buy souvenirs which are made from wild animals, such as a bag made of crocodile leather, a bracelet made of ivory or jewellery made of coral.
- ❖ Say no thanks to local dishes which are preceded by extreme animal cruelty, such as shark fin soup, bush meat, frog legs, foie gras or tiger wine.

Things to try

- ❖ See animals in the wild ensuring you are always far enough away from the animals. Take part in active eco tours where nature and wildlife are not disturbed.
- ❖ Visit a genuine wildlife reserve or sanctuary, making sure there isn't direct contact between visitors and animals and animals are rescued not bred in captivity.
- ❖ Visit a nature conservation project or volunteer at one. By planting trees for example, you help contributing to the conservation of elephant and orangutan habitats.
- ❖ Complain when something does not feel right! If you see animal cruelty, please report this to the (local) authorities or a local animal welfare organization.
- ❖ Respect the wild animals and maintain a safe distance from them. Remember, you are in their home and they get first priority. You should not deviate from the allotted routes or leave the road and drive cross- country, enter without proper tickets, enter before sunrise or stay after sunset.

Conclusion

Recent reports have shown that the percentage of flora and fauna in the wildlife decreases rapidly. Therefore humankind must focus on conserving wildlife and work towards it. There are several ways a person can contribute individually to this cause and help to create a good and sustainable environment for generations to come. The attitude of human beings must change. Let's all see the forest and other habitats of wild not as tourist spot but as natural site. We should conserve

wildlife habitats. Provide water to wildlife. Volunteering is the best way of conservation. Cleaning beaches, woodland and hedgerows, help to rescue wild animals and wildlife counting for better conservation and protection. Wildlife conservation and tree planting are always interdependent. Hence, humans should be more responsible for wildlife conservation to create a greater future for the future generation.

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BIODIVERSITY CONSERVATION THROUGH THE INTEGRATED FARMING SYSTEM & COASTAL ECOSYSTEM MANAGEMENT

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ABSTRACT

Earth is a home for all living organisms including us homo sapiens. God made our blue planet to be prosper by indefinite natural resources. Earth is divided into world of water & Land. In both world we have different living species dependent on each other. Excess Population makes our planet weak. The Food chain is best example for sustainable balancing in the ecosystem. One of the most classic languages in the World is Tamil, In the Tamil Literature Pathitrupathu, scholars differentiate 5 types of ecosystem knowns as Kurunji (Mountains), Mullai (Forest), Marutham (Agriculture Land), Neithal (Sea) and Pallai (Desert). Each ecosystem has different species and food producers. The integrated farming system plays a major role in sustainable development goals in Indian Environment. The integrated farming system comprises of 0% waste. Nowadays, the integrated farming system is increasing due to conserving the natural resources. The Government of India under the Ministry of Environment, Forest and Climate change has implemented many valuable schemes for the protection of Environment and its resources. The scheme would address the human wildlife conflict effectively. Tamil Nadu Pollution Control Board in Tamil Nadu plays a major role in controlling the pollution and keep us away from harm.

Keywords: *Ecosystem, Farming, Pathitrupathu, Pollution.*

Introduction

Earth is a home for all living organisms including us homo sapiens. God made our blue planet to be prosper by indefinite natural resources. Earth is divided into world of water & Land. In both world we have different living species dependent on each other. Excess Population makes our planet weak. The Food chain is best example for sustainable balancing in the ecosystem. Each ecosystem has individual living organisms where some living being can live on both water & terrestrial. Biodiversity defines the number and types of flora and fauna that exist in particular environment area. We should protect our mother nature given by our God for us. We all dependent on each other. For example, Humans need oxygen (O₂) to live, this oxygen was exchanged for Carbon dioxide

(CO₂) released by Plants and Trees. Humans were always dependent on nature from birth to death. It is our fundamental duty to protect the mother nature where the Constitution of India clearly defines in the Article 51A sub clause (g) - to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures.

The Integrated farming system comprises of “from waste to form new life”. There are various factors affecting our blue planet. Most affecting factors were man made. The use of chemical Fertilizers, pesticide & herbicide is utmost harm to food rather than natural Fertilizers, pesticide & herbicide. Even in Coastal areas the usage of plastic and other non-bio degradable materials were causing harm to water ecosystem. Many endangered species were currently in edge of extinction. In the times of Covid-19, people realized that basic amenities are important for their life to live rather than luxury life. We, the People of Earth should keep in mind that Earth is not only for us it is made for all the living creature and should give some space for others to live their life.

Indian Environment

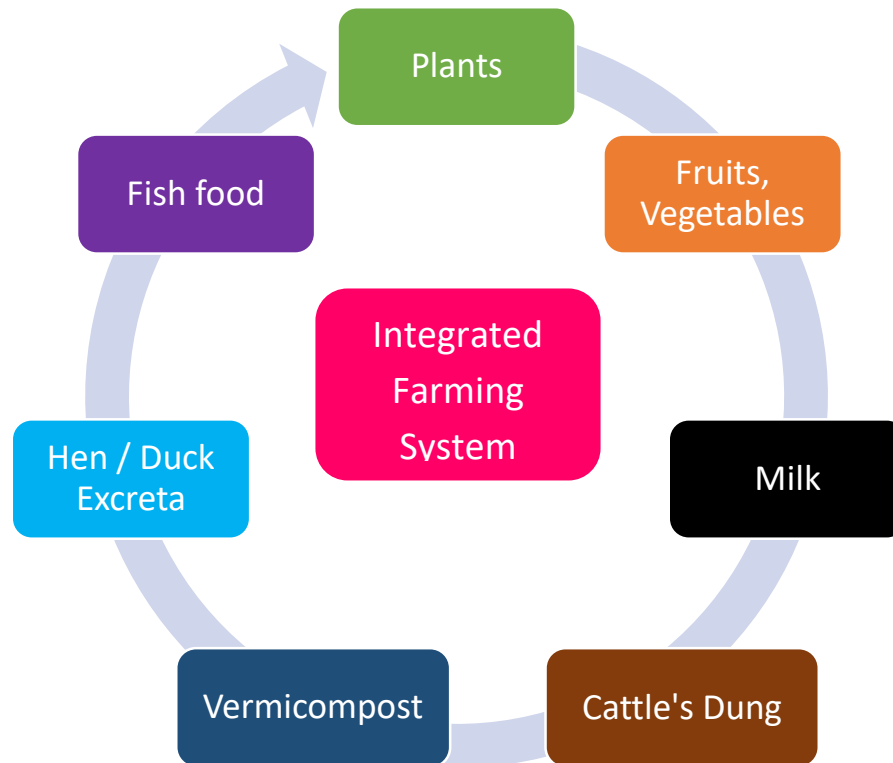
The word Environment is derived from the latin word Environ which means “Surrounding” Here the surrounding includes water, air and land and the inter- relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property. World wildlife day is celebrating every year on 3rd March. The Theme of the year 2023 is “Partnerships for Wildlife Conservation” One of the most classic language in the World is Tamil, In the Tamil Literature Pathitrupathu, scholars differentiate 5 types of ecosystem knowns as Kurunji (Mountains), Mullai (Forest), Marutham (Agriculture Land), Neithal (Sea) and Pallai (Desert). Each ecosystem has different species and food producers. The river ganga one of the Sacred and perennial river in India. There Dolphins in River Ganga were affected by pollutant caused by humans. The dead bodies were dumped here which is the most cause for pollution in river ganga. In the times of Covid-19, the pollution was massively decreased due to the non - use of vehicle in rural as well urban.

Integrated Farming System

The word integrated means collection of parts, in many countries different types of farming system were used according to their need and demand. In United states of America, Grass cultivation is one of the main sources of economy which is used as a food for Herbivorous animals such as Cow, Horse and other milch. Individual farming without exchange of Bio-degradable materials needs more money to maintain the cattle and birds. The integrated farming system plays a major role in

sustainable development goals in Indian Environment. The integrated farming system comprises of 0% waste. Which clearly states the recycling of life form from microorganisms to food. For example,

1. Sowing seeds for cultivating food such as Rice, Vegetables, Fruits and Wheat.
2. Parts of the plants used as food for cattle and birds. Such as straw, fruit, leaves.
3. Cow dung is used as a fertilizer for plants, plants later used as a food for Cow.
4. Vermicompost is used as a fertilizer too.
5. Pond water is used for feeding and bathing animals.
6. Duck and Hen's Excreta were used as food for Fish



The Integrated farming takes only less space to accommodate animals and birds which results in producing a lot of resources for both human and animals. Cow dung also used as a natural fuel for cooking replacing sticks and woods which prevents deforestation.

Coastal Ecosystem Management

The total length of the coast line of the India is 7,516.6 km. Here Marina Beach is the 2nd longest beach in the world. Many countries have banned the dumping of garbage in the sea. The dumping of garbage leads to the extinction from tiny living organisms to largest mammal Whale. The plastics used by us is not properly recycled for reuse. In some extreme the plastic straw was stuck in the nostril of many sea turtles and many poachers were hunting the sea turtle for illegal

purposes. In Northern region of world, Sharks were hunted for the fins. Many of them believe that shark fins have medicinal purposes. The Government of Tamil Nadu have banned fishing with purse seine net and at the same time they will announce Annual fishing bans - 45 days every year between October and December for the reproduction of fish and other living organisms in the coastal ecosystem. Over time, steady progress is being made, and the hole is getting smaller,” said Paul Newman, chief scientist for Earth sciences at NASA’s Goddard Space Flight Center in Greenbelt, Maryland (NASA, 2022).

Healthy marine and coastal ecosystems provide many valuable services - from food security, resources for economic growth and recreation alongside tourism and coastline protection. They are also recognized as crucial reservoirs of biodiversity at a time when the loss of species on both land and in the sea is an increasing cause for concern (UNEP, 2011). The flooding of rivers & lakes put the livelihood in danger. The overall erosion of the coastal area swept the sediment from the shores. Placing of additional sediment in nearby shores is a remedy for sediment reduction. To stop the loss of sediment the government should use Berms. We may call this in other name as Sand Engine or Sand Motor. Building Construction inside the sea will eradicate the living organisms and make a threat to humans those who were dependent their whole life on Sea. The coastal area is home for sea lion, turtles and other living beings. The arrival of 6.37 lakhs Olive Ridley turtle from 23rd February to 2nd March for rookery at Odisha’s Beach created a new record of mass nesting. Coral reefs is important for coastal habitat which acts as a food for many species.

Environmental Governing Bodies

There are various governing bodies to protect our environment which were successfully doing their job without any hesitation.

UN Environment Programme

The United Nations Environment Programme (UNEP) has been the global authority that sets the environmental agenda, serves as an authoritative advocate for the global environment. The mission is to provide leadership and encourage partnership in caring for the environment and peoples to improve their quality of life without harming nature (UNEP, n.d.).

Schemes of GOI

The Government of India under the Ministry of Environment, Forest and Climate change has implemented many valuable schemes for the protection of Environment and its resources. These schemes were enforced in each and every state in India. The following schemes were

The Wildlife Crime Control Bureau

Wildlife Crime Control Bureau by the GOI under the Ministry of Environment and Forests, to combat organized wildlife crime in the country to collect and collate intelligence related to organized wildlife crime activities and to disseminate the same to State and other enforcement agencies for immediate action so as to apprehend the criminals (WCCB, n.d.).

Conclusion

We should think earth as our home. If we are too conscious about our health and safety, we should give the same to other living organisms in the earth. Human should keep in mind that we should hand over our planet in good health to our future generations. Government was implementing different schemes for the welfare of nation, as a citizen of India, we should take an initiative by protecting the endangered species and make them to live in a comfort situation. Humans always dependent on Nature. Nature is not dependent on us. The innovative ideas should be promoted to combat the pollution and other crisis.

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ENVIRONMENTAL LEGISLATION AND POLICY

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ABSTRACT

The goal of this paper is to create apprise about our environmental legislation and policy .All the critter and individual in this planet are exploited in many aspects through this paper every creature in this world will become aware of their own rights .Especially the Indian Environmental legislation gives hope and solution for all the problems in this society Our duty is to protect and follow the rules and regulations in this society is the main aim of this paper.

Keywords: *environmental legislation, policy, environmental factors.*

Introduction

Environmental legislation is a collection of laws and regulations related to the quality of water, air, endangered wildlife, and several other environmental factors. Environmental legislation covers many laws and regulations but they have a common goal which is to reduce the threats to the environment and improve public health.

Needs

The origin of different National legislation lies in environmental issues. we should have powerful legislation to protect our environment otherwise it will create destruction. The development of a nation is only possible because of the development of industries, automobile companies, etc. No country in the world has developed without causing damage to the environment. Development in the name of a rise in living standards has badly degraded the environment and the survival of mankind itself has become increasingly difficult.

Indian Environmental Laws are divided into four types:

1. General
2. Forest and Wildlife
3. Water
4. Air

1986 - The Environment (Protection) Act

The EPA empowers the Centre to “take all such measures as it deems necessary” in the domain of environmental protection. Under the law, it can coordinate and execute nationwide programs and plans to further environmental protection. This law can impose restrictions on the location of industries. The law gives the government the power of entry for examination, testing of

equipment, and other purposes and the power to analyze the sample of air, water, soil, or any other substance from any place.

1989 - The Hazardous Waste Management handling rules:

This act applies to the whole of India and the rules apply to the management of hazardous and other wastes as specified in the Schedules to these rules. The "Occupier" of the Act is about any factory or premises and means a person who has control over the affairs of the factory or the premises and includes any substances, the person in possession of the substance shall perform the responsibilities for the management of hazardous and other wastes by taking steps as follows:- Prevention, Minimization, Reuse, Recycling, Recovery, utilization including co-processing, Safe disposal. The occupier is responsible for the safe and environmentally sound management of hazardous and other wastes. The hazardous and other wastes generated in the establishment of an occupier shall be sent or sold to an authorized actual user or shall be disposed of in an authorized disposal facility.

1991 - The public Liability Insurance Act:

The 1991 Public Liability Act aims to provide direct assistance to people affected by accidents related to handling hazardous materials and other coerced and related matters. Coverage insurance is claimed when someone is injured at the place of business. For poor people, this Liability act will be very much useful because they depend on their wages to run their families. In case a person dies while handling machines the affected family can apply for claims. They should have clear proof against the owner and the company.

The Biomedical Waste (Management and Handling) Rules, 1998

Take all necessary steps to ensure that bio-medical waste is handled without any adverse effect on human health. Make a provision within the premises for a safe, ventilated, and secured location for storage of segregated Biomedical Waste. Pre-treat the laboratory waste, microbiological waste, blood samples, and blood bags through disinfection or sterilization on-site.

The Municipal Solid Wastes (Management and Handling) Rules, 2000

Municipal Solid Waste Management rules tell us that it is the responsibility of the Municipal authority to the collection, segregate, store, transport, process, and disposal of municipal solids. If we find anything difficult in managing solid waste in society we can file a petition and the main reason for this problem is the lack of funds and technology.

The Wildlife Protection Act, 1972

As per this act, the central government of India takes responsibility under the chairmanship of our Prime Minister. They constitute the National Board for Wildlife. It serves as an apex body for the review of all wildlife-related matters and the approval of projects in and around national parks and sanctuaries. We also have a state board for wildlife. It is taken care of by the Chief Minister of

the specific state. 51A Amendment Actual says that every human being is accountable to protect, improve and safeguard the forest, wildlife, and natural environment.

The Forest (Conservation) Act, 1980

Forests are important because every nation regulates and impacts the local climate and temperature. Indian Forests have been declining for several reasons over the past few decades. One of the main reasons is the fast economic development that has been taking place since colonial rule. This act extends to the whole of India except the States of Jammu and Kashmir. It shall be deemed to have come into force on the 25th day of October 1980. Forest is treated as a national asset. Therefore, the state governments have to seek the central government's approval if it plans to use the forest area for: **1. Reforestation. 2. Non-forestry purposes such as mining.**

There are provisions under this Act that were drafted with the intent to reduce the rate of Deforestation. It causes an imbalance in nature and ecology. This, in turn, leads to the degradation of environmental quality.

The Water (Prevention and Control of Pollution) Act, 1974

Sewage waste should not be disposed of in the Water because it will contaminate the water and cause bad effects. Boards take responsibility to stop such activity. The Act prohibits the disposal of any poisonous, noxious, or polluting matter to the flow of water in a stream. If anything is against the law it is considered an offense like imprisonment. Many fishes are affected because of the collaboration of sewage water with sea or lake water. According to Section 19 of the Act, the state board has the power to limit the territorial jurisdiction of any order passed by it in matters relating to prevention and controlling water pollution. According to Section 20 of the Act, the state government can inspect the land, and survey an area to prevent the pollution of water.

The National Green Tribunal 2010

The National Green Tribunal (NGT) developed as an important body for regulation of the environment and passing strict orders based on issues related to pollution, deforestation, waste management, etc. National Green Tribunal provides reliefs and compensations for any damages caused to persons and properties.

Under this act only they have resolved various civil cases:

1. Water Act (Prevention and Control of Pollution), 1974.
2. Forest Act (Conservation), 1980
3. Air Act (Prevention and Control of Pollution), 1981
4. Environment (Protection) Act, 1986
5. Public Liability Insurance Act, 1991

The Air (prevention and control of pollution) Act, 1981

This is the first action taken by the government of India to reduce combat air pollution. Many journals prove that air pollution affects pregnant women and babies. In India, we have the top most polluted states like Delhi, Kolkata, and Mumbai. Air pollution can lead to global warming, smog, respiratory problems, and change in climate and affect the overall biodiversity and ecosystem.

Environmental Policy

The term policy is derived from the Greek and Latin word *politeia* means citizenship. Environmental policy is a commitment of the organization to the laws and regulations concerning environmental issues. These issues include Wildlife protection, the Air and Water Protection Act, waste management, protection of natural resources, etc. The policy can be defined as the course of action proposed by the government. Environmental policy focus on the problems created by humans and its main aim is to achieve good health and Green Environment.

Environmental POLICY approach to check Environmental degradation:

Environmental Protection is inherited from the concept of Sustainable goals. Sustainable development includes various policy measures to check Environmental degradation and reduce the cost of Economic Growth:

- ❖ **Reducing Poverty-** Poverty is something that affects children's generation. To solve this problem we have to live ourselves in this society
- ❖ **Quality education-**Quality education allows people to break the cycle of poverty; it helps to reduce inequalities and reaches gender equality; it enables people to lead a healthier and more sustainable life and it is essential to foster tolerance and peaceful societies.
- ❖ **Access to Health care-** The public hospital system is essentially free and it is very much useful for poor families and economically backward people. They should have access to health insurance is the main objective of this scheme.
- ❖ **Water & Sanitation-** Water and sanitation are also essential for every child's survival. Clean water is a basic need for a person to live on this planet. Due to improper infrastructure of the factory, the clean water is being polluted. Proper sanitation Safe sanitation is essential to a healthy and sustainable future for developing economies.
- ❖ **Child participation-**The child should know their rights in this society and participate actively in all social activities. This will make the child make decisions of their own and lead a respectable life.
- ❖ **Clarifying and extending property rights-** Property rights refer to a bundle of entitlements defining an owner's rights, privileges, and limitations to the use of a resource.
- ❖ An efficient structure of property rights is said to have three characteristics:
 - Exclusivity (all the costs and benefits from owning a resource should accrue to the owner),
 - Transferability (all property rights should be transferable from one owner to another in a voluntary exchange) and

- Enforceability (property rights should be securing from seizure or encroachment by others).
- ❖ **Removing Subsidies-** To reduce environmental degradation at no net financial cost to the government, subsidies for resource use by the private and public sectors should be removed. Subsidies on the use of electricity, fertilizers, pesticides, diesel, petrol, gas, irrigation water, etc. lead to their wasteful use and environmental problems.
- ❖ **Regulatory policies-**The role of government is to make positive functions in society. It will also control the growing use of regulation and monitoring to direct the state.
- ❖ **Commercial or Trade policy-**Trade policy is the set of agreements, regulations, and practices by a government that affects trade with foreign countries. Trade policy is related to the import and export of goods. Trade policies that reduce tariffs, quotas, and other barriers to imports generally lead to lower prices for the consumer.

Conclusion

Rural communities in developing countries have relied on natural resources to support daily livelihoods, so to make it a valuable and useful resource we should follow our Environmental legislation and Policy. The Environmental Protection act has created an eminent change in this society. The policy passed by the Indian government paved the way for a pleasant and green environment. Green, Natural, and Environmental friendly Ecosystems were achieved due to this Environmental legislation and policy.

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ENVIRONMENTAL LEGISLATION AND ENVIRONMENTAL PROTECTION

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ABSTRACT

Effective legislation is needed in order to prevent misuse and degradation of the environment. To curb the destructive practices of unscrupulous people, forest mafia groups, poachers, polluters and over exploitation of environmental resources, effective legislation is necessary. Environmental legislation is a collection of laws and regulations related to water quality, air quality, endangered wildlife, and several other environmental factors. As we can imagine, environmental legislation is broad, mainly because the natural environment encompasses several aspects. All this means that environmental law must take into account everything from the air we breathe, to the natural resources we depend on, to the flora and fauna that share this world with us.

Key words: *Legislation, Acts, Protection, Resources, Exploitation, Degradation.*

Introduction

Pollution is an important factor, ignoring political territory and legislative jurisdiction. Therefore, environmental problems are global in nature. To prevent such problems, it is not only necessary to enact environmental laws at the national level but also the international level. Pollution is not just a health issue; it is a broader social issue, as pollution has the potential to destroy families and communities. According to Article 48 (A) of the Indian Constitution, the state shall try to protect and improve the environment. It should also endeavor to safeguard forests and wildlife of the country. According to Article 51(A) (g) of the Indian Constitution, every citizen of India has a fundamental duty to protect and improve the natural environment including forest, lakes, rivers, and wildlife and should have compassion for living creatures.

Environment Laws in India-The Public Liability Insurance Act and Rules 1991 and Amendment, 1992-The Public Liability Insurance Act and Rules, 1991 and Amendment, 1992 were introduced to provide public liability insurance to persons in accidents impacted unintentionally while taking care of any perilous substance.

- **The National Environmental Tribunal Act, 1995, Amendment, 2010**-The Act seeks to provide compensation for damages to persons, property damage, and environmental damages caused by activities involving hazardous substances.
- **The National Environment Appellate Authority Act, 1997**-The National Environmental Appellate Authority Act, 1997 was created to hear appeals related to restrictions of areas in which classes of industry, etc., are prescribed certain safeguards under the Environmental Protection Act.
- **The Biomedical Waste (Management and Handling) Rules, 1998**-Biomedical waste refers to any waste, including the categories listed in the Rules, generated during the diagnosis, treatment, or immunisation of humans or animals, related research activities, or the production or testing of biological waste. The Biomedical Waste (Management and Handling) Rules, 1998 simplify the process of handling hospital waste, such as a disposal, collection, and sorting.
- **The Environment (Siting for Industrial Projects) Rules, 1999**-The Environment (Siting for Industrial Projects) Rules, 1999 set out detailed provisions on the areas to be avoided for the establishment of industrial plants, the precautions to be taken in site selection, and the environmental protection aspects to be considered while implementing industrial development projects.
- **The Municipal Solid Wastes (Management and Handling) Rules, 2000**-These Rules apply to each municipal authority. They must ensure that solid waste generated by the city/municipality is handled in accordance with rules and regulations for collection, separation, storage, transportation, processing, and disposal.
- **The Batteries (Management and Handling) Rules, 2001**-The Central Government considers battery waste management more important than battery production. The Act applies to battery management under the Environment (Protection) Act 1986 and extends throughout India. As the issue of battery waste disposal has become a global issue, it is only the right step for India to prevent it from damaging our air, water, or soil.
- **The Noise Pollution (Regulation and Control) (Amendment) Rules, 2010**-These rules stipulate the necessary conditions to reduce noise pollution and allow the use of loudspeakers or public address systems during cultural or religious celebrations at night.

- **The Air (prevention and control of pollution) Act, 1981**-The Act aims to control and prevent air pollution in India. The objectives are: Prevent, control, and reduce air pollution. To provide for the establishment of boards to enforce the law at the federal and state levels. Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB) were given the responsibility.
- **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA).**
- The Act recognizes and grants the forest rights and occupation in forest lands to Forest Dwelling Scheduled Tribes (FDSTs).
- The Act is chaired by the Department of Tribal Affairs. It aims to correct the colonial injustice of the FDST and OTFD, which are critical to the survival and sustainability of forest ecosystems.
- **The Forest (Conservation) Act, 1980**- Forests are an essential resource endowed by nature to human beings. Therefore, protecting the forest ecosystem is the responsibility of every citizen. But rapid deforestation disrupts the cycle of nature itself. The main objective of the Act is to protect forests and their flora, fauna, and other diverse ecological components while preserving the integrity and territory of the forests.
- **The Wildlife Protection Act, 1972**-The Act protects the nation's wildlife, bird and plant species to ensure environmental safety. Among other things, the law imposes restrictions on hunting many animal species. In India, the Wildlife (Protection) Act 1972 safeguards and protects wild animals.
- **The Water (Prevention and Control of Pollution) Act, 1974**-The Water (Prevention and Control of Pollution) Act, 1974 was enacted to prevent and control water pollution and maintain or restore water health in the country. The Water (Prevention and Control of Pollution) Cess Act was enacted in 1977 to provide for the levy of taxes on water used by persons engaged in certain types of industrial activities.
- **The Ozone-Depleting Substances (Regulation And Control) Rules, 2000**-The Ozone-Depleting Substances (Regulation And Control) Rules, 2000 sets deadlines for phasing out various ozone-depleting substances (ODS) and regulating the production, commercial import, and export of products containing ODS.

- **Coastal Regulation Zone Notification, 2018**-It was notified on the recommendation of the Shailesh Nayak Committee. This regulation promotes sustainable development and also focuses on natural disasters such as sea-level rise due to global warming and promotes sustainable development.
- **The Energy Conservation Act, 2001**-The Energy Conservation Act, 2001 was ratified as a step toward revamping energy efficiency and reducing waste. It deals with energy consumption standards for equipment and appliances.
- **The National Green Tribunal Act, 2010**- The National Green Tribunal Act, 2010 was established to provide judicial and administrative remedies for victims of pollution and other environmental damage. The National Green Tribunal (NGT) was established in 2010, which is a specialised judicial body with expertise dedicated to adjudicating environmental cases in the country.
- **The Wildlife (Protection) Act, 1972**- The Act provides for the protection of wild animals, plants, and birds.
- **The Wildlife (Protection) Amendment Bill, 2021**- The Wild Life (Protection) Amendment Bill, 2021 was introduced in Lok Sabha by the Ministry of Environment, Forest and Climate Change. The Bill aims to increase the number of species protected under the law and implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Conclusion

The laws in India are not very strict; however, water and air pollution is a major problem as harmful substances are dumped into water bodies, and harmful emissions are largely unabated in India. The laws governing these activities have not been updated since they were first enacted in the mid-1970s and 1980s. These laws provide for water/groundwater use permits/permits, compliance with wastewater and discharge standards, and prohibition of polluting water resources.

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FOSTERING SOCIAL RESPONSIBILITY IN HIGHER EDUCATION

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ABSTRACT

Under the Unnat Bharat Abhiyan (UBA), the UGC established a Subject Expert Group on educational institutions' social responsibility in 2018, which worked to prepare a report on "Fostering Social Responsibility & Community Engagement in Higher Education Institutions (HEIs) in India." The paper emphasises the significance of socially relevant courses that will enable all students to comprehend India's rural society, as well as the government's rural development initiatives, and to contribute to their improvement. HEIs may play a vital role in achieving New India's socioeconomic development goals by actively engaging with the society. This strategy would also help to improve the quality of teaching and research in India's higher education institutions. Institutional procedures must also be built to take a holistic and functional approach to community participation, including the three purposes of higher education institutions—teaching, research, and service.). The 5th World Report on Higher Education, published by GUNI, brings together global perspectives on the theme "Knowledge, Engagement, and Higher Education: Contributing to Social Change" (2014). There have been a number of additional initiatives around the world that show how community engagement and social responsibility are becoming more common in higher education. Principles For Community Involvement are Mutual learning and respect, b) University-wide, in each faculty and discipline, Credit-based for students, Providing credit to Teachers for Engagement activities and Linkages with local institutions. And the Forms Of Community Engagement are Linking learning with community service, Linking research with community knowledge, Knowledge sharing and knowledge mobilization, Devising new curriculum and courses, Including practitioners as teachers and Social innovations by students. Higher education institutions can improve the relevance and quality of their research by collaborating with local communities and other organisations. Local governments, district administrations, local businesses, and non-governmental organisations can all profit from research conducted by HEI students and professors if it is done in collaboration with them. As a result, students feel good about their study since it contributes to society through community participation.

Keywords: *Unnat Bharat Abhiyan, Social innovations, Higher Education*

Introduction

Through active community participation, higher educational institutions (HEIs) can play a vital role in achieving the socioeconomic development goals of New India. This strategy will also

help to improve the quality of both teaching and research in HEIs by allowing students to get a deeper knowledge of the issues that face society. As a result, it would be beneficial if HEIs included social responsibility and community in their vision and mission statements.

Under the Unnat Bharat Abhiyan (UBA), the UGC established a Subject Expert Group on educational institutions' social responsibility in 2018, which worked to prepare a report on "Fostering Social Responsibility & Community Engagement in Higher Education Institutions (HEIs) in India." The paper emphasises the significance of socially relevant courses that will enable all students to comprehend India's rural society, as well as the government's rural development initiatives, and to contribute to their improvement.

The Ministry of Human Resource Development (MHRD) launched Unnat Bharat Ahiyaan (UBA) 2.0, which aims to bring a transformative change in rural development through the active participation of higher education institutes with rural communities and the reorientation of communities through research and development. It was launched in February 2018 by the Indian government. In June 2018, the University Grants Commission (UGC) established a Subject Expert Group (SEG) on Curricular Reforms and Educational Institutions Social Responsibility to help UBA 2.0 achieve its goals.

Social Responsibility of HEI in India

HEIs may play a vital role in achieving New India's socioeconomic development goals by actively engaging with the society. This strategy would also help to improve the quality of teaching and research in India's higher education institutions. HEIs, as a rapidly rising and important sector in the country, must incorporate social responsibility and community into their vision and goal. Institutional procedures must also be built to take a holistic and functional approach to community participation, including the three purposes of higher education institutions—teaching, research, and service.

The Big Picture Over the last decade, HEIs all over the world have been urged to include social responsibility and community participation into their teaching and research operations. 'Higher education has the social obligation to increase our awareness of diverse issues...and our ability to respond to them,' according to the declaration from the second UNESCO Conference on Higher Education, held in Paris in July 2009. It should lead society in developing global knowledge to meet

global concerns such as food security, climate change, water management, intercultural communication, renewable energy, and public health through its primary missions of teaching, research, and service.'

India's Community Engagement a Committee of Experts (established by the former Planning Commission) performed a nationwide study in 2011 to examine the aims, principles, and forms of social responsibility and community engagement that are appropriate to our situation. Its recommendations to the Ministry of Human Resource Development in India on "fostering social responsibility and community participation of HEIs" include several key areas for the new policy.

Involvement of HEI in social responsibility in global scenario

In 1999, UNESCO backed the creation of a new worldwide network, the Global University Network for Innovations (GUNI), following the first international conference on higher education (www.guninetwork.org). The 5th World Report on Higher Education, published by GUNI, brings together global perspectives on the theme "Knowledge, Engagement, and Higher Education: Contributing to Social Change" (2014). "Community University Engagement (CUE) is critical to the development of a new citizenry... This report advocates incorporating CUE as a style of thinking and behaving into all institutional, teaching, and research activities." 2nd (GUNI, 2012).

There have been a number of additional initiatives around the world that show how community engagement and social responsibility are becoming more common in higher education.

Over the last decade, PASCAL International Observatory (www.pascalobservatory.org) in Europe has concentrated on establishing university relationships with regional and municipal governments. The Talloires Network on Civic Roles and Social Responsibilities of Higher Education (www.tufts.edu/talloiresnetwork) was founded in 2005 and now has over 400 members from all over the world. Its mission is to promote university engagement in communities in order to strengthen democratic citizenship among youth.

Over the last decade, the UK government has backed HEIs in creating a National Centre for Coordinating Public Engagement (www.nccpe.org), which encourages social responsibility and community engagement. The theme of GUNI's 6th World Report on Higher Education (2017) is "Towards A Socially Responsible University: Balancing the Global & the Local." — and it calls on

HEIs: "As centres of training, knowledge production, and transfer, HEIs are well positioned to connect the local and the global."

The goals of "fostering social responsibility in HEIs

The goals of "fostering social responsibility and community engagement in higher education institutions" might include a variety of things.

- ❖ By bridging the gap between theory and practise through community participation, HEIs can improve the quality of their teaching and learning.
- ❖ Promoting stronger relationships between higher educational institutions and local communities in order to identify and solve real-world problems that communities experience in a mutually beneficial manner;
- ❖ fostering collaborations between local communities and higher education institutions so that students and faculty can benefit from local knowledge and wisdom;
- ❖ Engaging higher education institutions with local communities to improve curriculum, courses, and pedagogies in order to achieve national development goals;
- ❖ Encourage, nourish, and harness the innate idealism of youth through catalysing the acquisition of values of public service and active citizenship among students and youth alike;
- ❖ Using community-based research methods to carry out research initiatives in collaboration with the local community.

Principles for community involvement

The following fundamental ideas will guide HEIs' community participation in light of the current global and national approaches:

- a) Mutual learning and respect-**Rural communities' and HEIs' mutually agreed-upon interests and requirements should be communicated and honoured. Community interaction does not achieve the objective of HEI social responsibility unless it ensures mutual benefit. While the community benefits from the information and experiences of students and professors who interact with them, students and teachers should benefit from the knowledge and experiences of the community as well.

b) University-wide, in each faculty and discipline-Engagement with the community should not be limited to a few social science subjects. It should be done in all subjects and faculties of higher education institutions. Natural science and engineering faculties can also encourage community participation in teaching and research. This will aid in the education of local populations about new technological advancements, as well as informing students and professors about how to utilise local technology and knowledge.

c) Credit-based for students-Students should receive credit for participating in community participation and research projects and learning activities. As a result, community engagement should be incorporated into their graduation requirements as well as their examinations.

d) Providing credit to Teachers for Engagement activities-Teachers, researchers, and administrators in HEIs should be evaluated on their involvement and contributions to community engagement in teaching and research as part of their performance evaluations. Teacher and researcher community engagement criteria and weighting should be expressly incorporated in evaluations for recruiting, regularisation, and promotion (by modifying existing API and other faculty evaluation mechanisms).

e) Linkages with local institutions- HEIs should create organic and long-term ties with local institutions in order to sustain regular community engagement programmes. Local governments, district administrations, local entrepreneurs, businesses, and non-governmental organisations (NGOs) are among them.

Forms of community engagement

When HEIs put the aforementioned principles into effect, they can use any combination of the following forms:

a) Linking learning with community service-Students and teachers use their knowledge and abilities to enhance the lives of people in a specific community under this approach. This can be accomplished via the 'service-learning' approach (an internationally recognised best practise), which allows students from various disciplines and courses to apply their knowledge to address the difficulties faced by a given community. For example, chemistry students can undertake water and soil testing in their communities and share the results with the community.

b) Linking research with community knowledge-Various HEI colleges and programmes design cooperative research initiatives in collaboration with communities and local agencies in this method. The community's own expertise is incorporated into the research's design and execution. Students' new research aids them in completing their academic obligations while also systematising the community's knowledge. In this sense, community-based participatory research (CBPR) methods are gaining popularity. Engineering students, for example, can do research on solid and liquid waste disposal in collaboration with the community.

c) Knowledge sharing and knowledge mobilization -The local community can use the information that students and teachers in various disciplines have to fulfil their developmental goals, secure their entitlements, and receive advantages from numerous agencies and programmes. Enumerations, surveys, awareness camps and campaigns, trainings, learning manuals/films, maps, study reports, public hearings, policy briefs, cleanliness and hygiene teachings, legal assistance clinics, and so on are examples of these kind of activities. Students can, for example, conduct a 'swachhta survekshana' and/or a nutrition survey for mothers and children, educating them about hygiene and nutrition.

d) Devising new curriculum and courses-Many colleges and universities create new curriculum for existing courses as well as new courses to engage with the community. This adds to the curriculum of existing courses by including regionally relevant subject matter. It also develops innovative, regionally relevant educational programmes that appeal to a new generation of pupils. New courses on financial inclusion, entrepreneurship development, and the nutritional worth of local produce, for example, can boost students' understanding and business potential.

e) Including practitioners as teachers-Local elders, women leaders, tribals, entrepreneurs, and civil society practitioners have extensive practical knowledge on a wide range of topics, including agriculture, forestry, child rearing, micro-planning, water harvesting, and project management. Invite such practitioners to co-teach courses in the classroom and in the field to tap into their expertise. For their practical expertise and knowledge, such instructors should be properly recognised, compensated, and respected.

f) Social innovations by students-Students can be encouraged and supported by HEIs to start learning projects with a social impact. Students' incubation of such social innovation initiatives

might also be linked to existing curriculum and courses. Some higher education institutions host social innovation competitions, which should be incorporated into the curriculum.

Undertaking research in partnership with local community

Community university research collaborations may become supportive of new information and its utilisation if a mutually advantageous partnership is created with local communities and institutions—business, government, and civil society.

Conclusion

Many students and faculty members conduct field research. Currently, however, such study is carried out only to further the research interests of students and teachers. Research topics can be framed in collaboration with the local community, resulting in new information that can help solve local problems. Higher education institutions can improve the relevance and quality of their research by collaborating with local communities and other organisations. Local governments, district administrations, local businesses, and non-governmental organisations can all profit from research conducted by HEI students and professors if it is done in collaboration with them. As a result, students feel good about their study since it contributes to society through community participation.

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EFFECTIVE INDUSTRIAL WASTE MANAGEMENT STRATEGIES FOR POLLUTION PREVENTION

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ABSTRACT

In addition to minimizing land and air contamination, integrating pollution prevention into the industrial waste management system is crucial for reducing waste management's costs, liabilities, and organizational risks. Facility managers, state regulators, and members of the public sometimes need to gain knowledge about efficient waste management for environmental protection. They are searching for ways to enhance their plans while reducing expenses and enhancing worker safety. More than ever, pollution prevention is paramount to industrial waste management systems. Doing so helps organizations avoid contaminating ecosystems, hindering air quality and reducing the financial burden and liabilities of toxic exposures. Even though we are working with industrial trash appropriately, the knowledge about the effective waste disposal is very less. This article discusses the need for pollution prevention and effective waste management strategies that incorporates pollution prevention.

Keywords: *Industrial Waste Management, Environmental Protection, Waste Disposal, Pollution Prevention*

Introduction

Industrial corporations are responsible for conducting robust waste management initiatives to prevent environmental and public health crises. They strive to enhance their tactics while reducing costs and enhancing worker safety (Maczulak & Anne Elizabeth, 2010). The use of methods, techniques, resources, or energy that reduce the production of trash and pollutants is referred to as pollution prevention by the Federal Government of Canada in order to lessen the overall risk to the environment or to human health. Implementing preventive measures to avert industrial pollution helps protect communities and the living environment from toxic debris. Better mitigation and

readiness are guaranteed by organisations that evaluate their industrial waste management procedures and use cutting-edge technology to optimise their approach. In view of this, management of hazardous wastes including their disposal in environment friendly and economically viable way is very important and therefore suggestions are made for developing better strategies (Virendra Misra & Pandey, S.D., 2005).

Industrial Waste Management

Industrial waste management includes segregation, land application (composting), landfill and recycling of waste. To ensure proper disposal, waste must be segregated based on the kind. When garbage is biodegraded and then applied to the soil by composting, the ground is improved by adding more organic material. The least favoured waste management technique, landfilling, involves burying rubbish that cannot be recycled or composted and causes a direct discharge of waste into the environment. Recycling involves recycling or repurposing trash to cut down on waste production. Also, each of these procedures uses different waste management technology that may be found in waste management facilities (Lawrence K. Wang, 1992).

Waste classification

Methods of managing waste vary from industry to industry. Metcalf and Eddy (1991) noted that different industries employ different waste management strategies. Waste characterization is necessary to evaluate every sort of garbage that the industries generate, its degree of production and the best way to handle it. The characterization procedure involves consulting professionals like a sample team member, a quality assurance representative and an engineer with extensive process understanding. These experts and other experts have in-depth knowledge of the products, procedures, and inventory at the industry. For successful characterization, they can offer precise waste tracking. Then a solid waste management strategy can be created and optimized for Pollution Prevention (P2) after the garbage has been characterized. (Kundai Mufara, 2020).

Issues with Industrial Waste

Environmental and health problems are associated with industrial waste. If it is not correctly disposed of, it may contaminate the soil, the air, and the water. This may also harm health of people, including the well-being of the staff working at the industry (LaGrega et al., 1994). In 1998, it was discovered that workers at an electronics firm had consumed water from the firm that contained a chemical known to cause cancer. The chemical trichloroethylene (TCE) was employed in the industry's paint shop for degreasing. Due to inappropriate disposal, it was discovered in very high

amounts, much over the authorized threshold. Drums of degreasing trash from the paint shop were thrown on the ground, soaking into the building's water supply well. When it was identified, the factory was shut down for a clean up.

Waste disposal via dumping was still standard in many industries because it was still unregulated. The corporation needed access to the most up-to-date waste management knowledge and was unaware of the consequences of dumping rubbish on its plant. Events like this can be prevented, employees can be protected, shut down of plants can be avoided by learning more about efficient waste management procedures (David Wooley Q.C., 2000).

Prevention of Pollution

According to Freeman (1995), the federal government's definition of pollution prevention is the use of procedures, methods, supplies, or energy that reduce the production of waste and pollutants to lessen the overall danger to the environment or human health. The Pollution Prevention Act of 1990 listed source reduction, recycling, and combusting for energy recovery, treatment, and ecologically safe release of chemical waste into the environment as the P2 techniques, with source reduction being the most favoured and environmental disposal the least (David Hughes, 1996). P2 techniques are worthwhile to pursue and can significantly advance the sector in the following ways:

- Evaluation of present procedures and identifying areas that can be strengthened
- Utilizing industry and regulatory best practices

Industrial Waste Management and Pollution Prevention

Source reduction, recycling, and waste treatment are the three P2 components of industrial waste management, according to Harry M. Freeman (1990). To ensure as much shift from disposal as feasible, there are different levels of pollution prevention in preference order. For P2, source reduction serves as the initial line of defence. Before recycling, treatment, or disposal, it seeks to limit waste production and public health risks. When considering source reduction, ensure that the solution will not affect waste creation in any other industrial processes. Several manufacturing companies use many source reduction techniques to improve their waste management strategy:

- Equipment upgrades are one beneficial technological change for reduction.
- Having a clean, organized and efficient inventory control also works well. For instance, a paint manufacturing company changed its four-tank cartridge filler with one that entirely empties the source tanks to prevent industrial waste disposal of the "bottom of tank" materials.

- Industries are reformulating and redesigning the necessary materials. Some aircraft manufacturing industries switch from single-walled vertical tanks to double-walled horizontal tanks, which considerably lowers accidents from chemical spills and, as a result, lowers the waste generated by the industry.

For example, one strategy to guarantee that less trash is produced is to use alternative materials with lower-risk waste. For instance, in the production of PCBs, several producers of medical instruments have replaced lead with non-leaded chemicals. Even if it cannot be done, it is crucial to consider manufacturing processes where these adjustments can be implemented without impacting waste output at other stages. Other strategies include good housekeeping practices, remaking dyes and paints, maintenance, inspections, inventory control, minimizing on-site inventories, and efficient waste segregation. Finding a strategy that works for a particular industry is crucial (Nemerow & Dasgupta, 1991).

Recycling is the second most effective P2 strategy that is used for managing industrial waste. This covers in-process recycling techniques like using reclaimed water, discovering new uses for recycled materials, and maximizing the usage of raw resources at different stages. Even though waste treatment is the least recommended method of preventing pollution, it is nevertheless quite helpful. Changing the characteristics of industrial hazardous waste to render it less dangerous is what this procedure entails (Haas & Vamos, 1995). Physical, chemical, and biological treatment are all included in this.

- Physical treatment modifies the waste's physical characteristics (size, form, or status) but does not impact its chemical characteristics.
- Chemical treatment modifies the waste's chemical composition by subjecting it to various chemical processes.
- Biological treatment is when garbage is exposed to organisms that can break down organic materials into simpler organic compounds and biomass.

The waste generated differs from industry to industry. The techniques used will depend on the kind and amount of waste generated in the industry (Gustavson Karl et al., 2007).

Strategies to Prevent Industrial Waste Pollution

To develop an efficient waste management strategy that includes pollution avoidance may seem overwhelming, but the advantages make it worthwhile. Thinking about adopting automation solutions to help with efficient tracking to ensure the operations are effectively increasing safety and reducing chemical emissions (Goel, 2006).

Organizations can implement the following strategies for an industrial waste management system (G.N., 2022).

- **Audit Waste Streams:** Waste characterization can be made by the managers for pollution reduction and recycling initiatives. The electronic waste used by the staff can be donated to a non-profit partner.
- **Update Current Waste Management Procedures :** To determine where adjustments are most needed, it is crucial to reevaluate present management techniques. The new processes could provide guidance for effective waste segregation as well as a more accurate means to gauge the success of upcoming risk assessment and remediation initiatives.
- **Improve Hazardous Waste Management :** Toxic pollutants and inorganic compounds contaminate groundwater and the remediation process is costly. The hazardous wastes listed by The Environmental Protection Agency (EPA) has to be shifted with extra care.
- **Integrate Waste Management technologies :** Streamlined solutions for pollution prevention is being delivered by technological advancements. Artificial Intelligence (AI) solutions for sorting and recycling helps faster separation of waste materials in a shorter time frame.
- **Set measures for Site Remediation :** To successfully remove their organization's hazardous waste from the environment, facility managers must incorporate efficient site remediation techniques into their industrial waste management programmes. To safeguard people and wildlife, doing this might require interim rules and continuous contaminated soil or water treatments.
- **Decontaminate Equipment :** Proper removal of hazardous contaminants is vital for pollution prevention and hence the managers must set clear rules for equipment decontamination and regular cleaning.
- **Create a Waste Minimization Plan :** Any industrial waste management plan should include a reduction in waste generation. Facility managers lower the danger of contaminating the environment and compromising human health by optimising their pollution prevention techniques to minimise waste.

What to Do Next to Prevent Pollution

The Environmental Protection Agency (EPA) offers a quick starting checklist. Regardless of whether it is the beginning to enhance the industrial waste management or if it had already

developed a set of processes and are trying to take them to the next stage (Ghasemi, 1989), promoting it as a beneficial set of steps:

- Look into the choices like: source reduction, recycling, reuse, treatment, and disposal
- Examine the advantages of using them and the cost reductions for facility
- Create a waste reduction strategy
- Evaluate opportunities for pollution prevention
- Study P2 tactics
- Talk with organizations that offer solutions and assistance for industrial waste management
- Plan and Implement

Conclusion

Waste materials might be regarded as useless to manufacturers or consumers. However, the creation and buildup of waste result from human activity. Wastes are produced mainly by industrial, agricultural, and home sources (Peavy & Rowe, 1995). The wastes mainly consist of inorganic, organic, and hazardous chemical substances, depending on their sources. Managing these wastes disposal, which involves both conventional and biological approaches, is crucial to consider the effects on the ecosystem. As biological processes are naturally eco-friendly, they are often advised.

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ENVIRONMENTAL MANAGEMENT

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ABSTRACT

An Environmental management is a component of a mining management system that creates a framework for the procedures, responsibilities, and processes required to prevent adverse environmental, economic, and social impacts and allows for continuous improvement. Resource management is the process of pre-planning, scheduling, and allocating your resources to maximize efficiency. Energy is also needed to treat wastewater so it can be safely returned to the environment. Environmental resource management is the management of the interaction and impact of human societies on the environment. Waste generation is the disposal and reduction of waste with four types of waste generation. Carbon emissions through the industries, and vehicles to control through the alternative things of carbon footprint.

Keywords: *Carbon emissions , Environmental resource management,*

Introduction

Fossil fuels (oil, natural gas & coal) supply the vast majority of the world's energy demands and will continue to do so for the foreseeable future. But the problems associated with fossil fuels are many. Overall, drinking water and wastewater systems account for approximately 2 percent of energy use in the United States, adding over 45 million tons of greenhouse gases annually. As much as 40 percent of operating costs for drinking water systems can be for energy. Waste is produced by human activity, for example, the extraction and processing of raw materials. Waste management is intended to reduce adverse effects of waste on human health, the environment, planetary resources and aesthetics. Waste generation includes all materials discarded, whether or not they are later recycled or disposed in a landfill. carbon compound (such as carbon dioxide) released into the atmosphere, often through human activity such as the burning of fossil fuels such as coal or gas. Greenhouse gas emissions from human activities strengthen the greenhouse effect, contributing to climate change. Most is carbon dioxide from burning fossil fuels: coal, oil, and natural gas. The largest emitters include coal in China and large oil and gas companies.

Management of resource use and efficiency

Resource management is the process of pre-planning, scheduling, and allocating your resources to maximize efficiency. In this article, we will define resource management, provide a few contextual examples, discuss its importance, and describe common techniques. Environmental resource management is the management of the interaction and impact of human societies on the environment. Environmental resources management aims to ensure that ecosystem services are protected and maintained for future human generations, and also maintain ecosystem integrity through considering ethical, economic, and scientific (ecological) variables

The environment also involves the relationships of the human environment, such as the social, cultural and economic environment, with the biophysical environment. The essential aspects of environmental resource management are ethical, economical, social, and technological. Environmental resource management as a practice and discourse (across these areas) is also the object of study in the social sciences. Environmental resource management strategies are intrinsically driven by conceptions of human-nature relationships. Ethical aspects involve the cultural and social issues relating to the environment, and dealing with changes to it. "All human activities take place in the context of certain types of relationships between society and the bio-physical world (the rest of nature)," and so, there is a great significance in understanding the ethical values of different groups around the world.

Energy and water use:

Controlling and reducing water usage and being energy efficient- Water is used in all phases of energy production, and energy is required to extract, pump, and move water for human consumption. Energy is also needed to treat wastewater so it can be safely returned to the environment. Save money on your power bills by using less energy to heat and pump water. Delay or prevent expansion of costly water and wastewater treatment plants in your community which can save money on taxes. Reduce water shortage frequency and impacts.

Bathrooms- Never use your toilet as a waste basket. Do not let the water run while shaving or brushing teeth. Take short showers instead of tub baths. Turn off the water flow while soaping or shampooing.

Kitchen and Laundry-Keep drinking water in the refrigerator instead of letting the faucet run until the water is cool.Wash fruits and vegetables in a basin. Use a vegetable brush.Do not use water to defrost frozen foods, thaw in the refrigerator overnight.

Waste generation

- ❖ **Waste Disposal**-Garbage accumulation has never been much of a concern in the past, but due to globalization and industrialization, there is a need for a more efficient waste disposal method.
- ❖ **Landfill**-The waste that cannot be reused or recycled are separated out and spread as a thin layer in low-lying areas across a city. A layer of soil is added after each layer of garbage. the waste that cannot be reused or recycled are separated out and spread as a thin layer in low-lying areas across a city. A layer of soil is added after each layer of garbage.
- ❖ **Incineration**-Incineration is the process of controlled combustion of garbage to reduce it to incombustible matter such as ash and waste gas. This process reduces the volume of waste by 90 per cent and is considered as one of the most hygienic methods of waste disposal. In some cases, the heat generated is used to produce electricity.

Waste Compaction-The waste materials such as cans and plastic bottles are compacted into blocks and sent for recycling. This process prevents the oxidation of metals and reduces airspace need, thus making transportation and positioning easy.

Biogas Generation-Biodegradable waste, such as food items, animal waste or organic industrial waste from food packaging industries are sent to bio-degradation plants. Biogas is generated as a result of this process, which is used as fuel, and the residue is used as manure.



Composting-All organic materials decompose with time. Food scraps, yard waste, etc., make up for one of the major organic wastes we throw every day. enriching the soil, composting also increases the water retention capacity. In agriculture, it is the best alternative to chemical fertilizers.

Vermicomposting-Vermicomposting is the process of using worms for the degradation of organic matter into nutrient-rich manure. It is also far more effective than traditional composting.

Reduction- Waste reduction is anything that reduces waste by using less material in the first place. Reducing waste can be as simple as using both sides of a sheet of paper, using ceramic mugs instead of disposable cups, or buying in bulk rather than individually packaged items.

Reuseability-Reusing is better than recycling because it saves the energy that comes with having to dismantle and re-manufacture products. It also significantly reduces waste and pollution because it reduces the need for raw materials, saving both forests and water supplies. By reducing the amount of waste you create, you help prevent pollution and protect the environment. You also limit the amount of waste going to landfill, preserve natural resources and save money.

Prevention of waste-Recycling saves energy, helps keep materials out of landfills and incinerators, and provides raw materials for the production of new products. When waste cannot be prevented, recycling is the next best option. Benefits of waste reduction includes:

decreasing the demand of landfill space, conserving energy and resources, reducing pollution, and making production processes more efficient

Carbon emission- Many of our daily activities cause emissions of greenhouse gases. For example, we produce greenhouse gas emissions from burning gasoline when we drive, burning oil or gas for home heating, or using electricity generated from coal, natural gas, and oil. People, products and



entire industries have carbon footprints. Your personal footprint includes emissions from a variety of sources. your daily commute, the food you eat, the clothes you buy, everything you throw away

- ❖ **Switch it Off**-Turn off the lights when natural light is sufficient and when you leave the room. It's that simple!
- ❖ **Climate Control**-Keep your temperature system on a moderate setting while you're in the room.
- ❖ **Conserve Paper**-Print and copy on two sides, save single-sided pages for notes, and print only what you need.
- ❖ **Recycle**-Take a few steps to a recycling center in your building to deposit aluminum cans, plastics, glass, office paper, newspaper, cardboard.

Conclusion

All of us must take a pledge to save the environment so that our kids can live a healthy and peaceful life in the future. Taking these kinds of initiatives is helpful in favour of the long-term life of humans on this planet. An Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. The use of environmental management tools allows institutions to anticipate and to avoid problems in a proactive rather than reactive way. They assist with analysis and reporting of performance and with day-to-day management, which requires timely feedback to make appropriate adjustments.

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**REVIEW OF DISEASES IN GIANT FRESHWATER PRAWN, MACROBRACHIUM
ROSENBERGII (DE MAN 1879)**

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ABSTRACT

In India, 23 species of shrimp were reported, among them 11 species of shrimp have been found to be suitable for culture in ponds. Macrobrachium rosenbergii is one of the major contributing species in the Indian economy of the aquaculture industry followed by Litopenaeus vannamei, and Penaeus monodon. The global production of this M. rosenbergii in 2018 was 237,124 tonnes worth 1.93 billion USD. This review has enumerated the severe threat in form of biological interference that causes diseases. Macrobrachium hepatopancreatic parvovirus, Macrobrachium nipponensis Reovirus, Bacterial Necrosis Infectious hypodermal and haematopoietic necrosis viruses were noted as the deadly pathogens in mass culture of M. rosenbergii. Bacterial species, producing extracellular lipases or proteases such as Aeromonas sp., Pseudomonas sp., Vibrio sp., and Benekea sp., have been implicated in shell disease along with epibiont fouling in cultured prawns. In conclusion, Research in seed and feed production areas needs to be given attention to considering existing technology, the transfer, adaption, and development of new technology for the massive production of M. rosenbergii.

Keywords: *Bacterial Necrosis Infectious hypodermal and haematopoietic necrosis*

Introduction

Aquaculture, the practice of growing freshwater and marine plants and animals like finfish and shellfish under human-controlled conditions is not a new concept. The term 'Aquatic' refers to a variety of water environments such as freshwater, brackish water and marine. Freshwater culture is the raising of aquatic organisms in freshwater environments, such as ponds, rivers, lakes, canals, reservoirs, and groundwater when the salinity is low and does not normally exceed 0.55%. Many crustacean species are cultivated in India, the predominant commercial species being brackish water shrimps, freshwater prawns, and freshwater and brackish water crabs. The giant freshwater prawn

scientifically known as *Macrobrachium rosenbergii* (popularly known as ‘scampi’) is one of the major cultivable aquatic animals contributing to the Indian aquaculture system. It was the developed works of Shao Wen Ling (1961) and Tukuji Fijumura (1972) that made possible commercial development of freshwater prawn culture (New, 2000) and hence they are considered fathers of freshwater prawn farming. In India, farming of *M. rosenbergii* was felt as an alternative to the tiger shrimp, *Litopenaeus vannamei*, *P. monodon* the farming of which had been severely affected due to viral and bacterial infections (Sahul Hameed *et al.*, 2000). This study reviews the current production status of freshwater prawn, bacterial and viral diseases and its diagnostic methods and potential drugs available to treat the prawn diseases.

Diseases of *Macrobrachium rosenbergii* (DE MAN 1879)

The incidence of diseases has increased in parallel with the culture of scampi. Although the etiology of the majority of scampi diseases is recognized, some of the illnesses are still unidentified and are therefore classified as idiopathic diseases. Scampi has been found to include almost all of the major pathogen categories, including viruses, bacteria, fungi, yeast, and protists.. Scampi has been found to include almost all of the major pathogen categories, including viruses, bacteria, fungi, yeast, and protists. (Pillai and Bonami 2012). The white tail disease of *M. rosenbergii* is the most significant and extensively researched illness of freshwater prawns to date.

Viral diseases

Macrobrachium Hepatopancreatic Parvovirus, white tail disease and *Macrobrachium nippiness* Reovirus are viral diseases with freshwater prawns as the principal host. Other viral diseases, such as Infectious Hypodermal Haematopoietic Necrosis Virus, White Spot Syndrome Virus and Monodon Baculo Virus infecting Penaeid shrimp have been reported in Scampi. However, except for WTD, no other viral disease has made a serious impact on scampi production.

***Macrobrachium rosenbergii* Nodavirus and Extra Small Virus (MrNV/XSV)**

The white tail disease causes immense economic loss due to high mortality of the post-larvae in hatcheries and nurseries (Arcier *et al.*, 1999). The disease was first noted in the French West Indies (Arcier *et al.*, 1999), later in China (Qian *et al.*, 2003), India (Sahul Hameed *et al.*, 2004), Chinese, Thailand (Yoganandhan *et al.*, 2006), Taipei (Wang and Chang 2006), and Malaysia (Saedi *et al.*, 2012), Australia (Owens *et al.*, 2009). The occurrence of WTD is still being reported in all prawn-growing countries. Causative organisms for the White tail disease were found to be two viral

pathogens namely *M. rosenbergii* small virus and extra nodavirus. The acute mortality that occurs in hatcheries and nursery ponds is brought on by these viral pathogens.

White Spot Syndrome Virus (WSSV)

WSSV is highly pathogenic not only to penaeid shrimp but also to, freshwater prawns, and marine crabs and crabs (Cai *et al.*, 1995; Chen *et al.*, 2000). The size of the virions is 80–120 X 250–380 nm and that of nucleocapsid is 58–67 X 230–350 nm. Density is 1.18–1.25 g mL⁻¹. The nucleic acid is made up of 305 kilo bases of double-stranded, circular, supercoiled DNA. There are 181 functional proteins with about 531 ORFs. Analysis of WSSV's transcription and translation from organs of WSSV-injected *M. rosenbergii* by reverse transcriptase polymerase chain reaction and Western blot assays revealed transient expression of the VP28 gene up to 4 days post infection but from 5 d.p.i onwards the gene was invisible (Yoganandhan and Sahul Hameed 2007). Hypertrophied Feulgen-positive nuclei in the target tissues can be seen in histology to identify it. Molecular diagnostic techniques include PCR, including regular, nested PCR, direct or indirect in situ PCR, hybridization, dot blot, or in situ employing cloned genomic probes. (Pillai and Bonami 2012).

Bacterial Diseases

In *M. rosenbergii* a wide range of bacteria has been isolated from rearing water, eggs, larvae, post larvae and adults. Most of these genera are part of the normal microflora of cultured crustaceans. These bacteria are common in water and grow-out ponds. Opportunistic bacteria such as *Vibrio* spp., *Aeromonas* spp. and *Pseudomonas* spp. may cause major infections in freshwater prawns, *M. rosenbergii* just as penaeid. Shell disease is known by several names such as brown spot, black spot, or burn spot. The cause of this disease is considered to be a multifactorial complex of epicuticle-cuticle damage or abnormality from mechanical, nutritional, chemical or other factors, followed by a secondary bacterial or fungal infection. Infected prawns show progressive necrosis, inflammation and subsequent melanization on the body and appendages. A variety of bacterial species, producing extracellular lipases or proteases such as *Aeromonas* sp., *Pseudomonas* sp., *Vibrio* sp., and *Benekea* sp., have been implicated in shell disease. Shell disease including epibiont fouling is the most common disease in prawn culture. (Sandifer and Smith 1985). Poor water quality and high organic load are associated with shell lesion-inducing bacteria (Cook and Lofton 1973). Early and late larval stages of *M. rosenbergii* is highly affected by Exuvia entrapment disease, known as metamorphosis moult mortality syndrome. In this case, the larvae are unable to free exuvia from appendages and eyes were entrapped. Luminescence disease caused by *Vibrio harveyi* is very common in the breeding

of both fresh and marine shrimps. The clinical sign of *V. harveyi* is luminescence, which is observed during nighttime. Infected larvae also show fouling, opacity, slow swimming, and aggregation and may reach 100% mortalities. Clinical signs of bacterial necrosis are a bluish colour or discolouration, an empty stomach, weak larvae falling to the bottom of the tank, and brown spots on antennae and newly formed appendages.

Fungal Diseases

Lagenedium and *Fusarium* has been reported to cause mortalities in post-larval stages of *M. rosenbergii* in hatcheries (New, 2002). Invaded mycelia cause clearly visible mycelial network under the cuticle of the larvae. The fungi *Fusarium solani* cause secondary infection in adults (Burns, *et al.*, 1979). *Debaryomyces hansenii* and *Metschnikovia bicuspidata* were the yeast that causes infections in juveniles of freshwater prawn *M. rosenbergii* that may form yellow, grey or blue-shaded muscles in juveniles (Sung *et al.*, 1998). Larvae are more susceptible than adults to infestation with protozoa, therefore the water quality should be improved in the encounter of protozoa in culture tanks/ponds. *Peritrichous ciliates* including *Corthunia* sp., *Vorticella* sp. and *Epistylis* sp were the most common in cultured prawns (Hall, 1979). The infestation sites are the eye stalk, antenna, body, uropods and egg. *Zoothamnium* prefers the gills (Johnson, 1978). Prior to molting and heavy fouling, they have an increased oxygen demand can be associated with mortality due to anoxia (Fisher, 1977).

Conclusion

The practice of prawn farming has offered the opportunity to increase incomes for farmers. A range of public and private sector investments are needed to realize the potential for growth and expanding economic output in the prawn farming sector. Further research is needed in prawn production technology, hatchery operations and strict maintenance standard operating procedures. Disease-free brood stock is required for the successful operation of prawn hatcheries. Research in seed and feed production areas needs to be given due attention, considering existing technology, the transfer, adaption and development of new technology.

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ENVIRONMENTAL POLLUTION

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ABSTRACT

Global environmental problems should be of great concern not only because of nature's intrinsic value or because of ethical concerns for future generations. They also matter because environmental problems can harm human health and well-being, impose disruptive costs on national economies, and even fuel political instability and violent conflict by exacerbating inequalities and tensions in resource-poor areas. Environmental degradation is the collateral damage of modern economic growth based on fossil fuel consumption and industrial production.

Keywords: *environmental problems, Environmental degradation*

Introduction

A clean environment is essential for human health and well-being. At the same time, the local environment can also be a source of stressors – for example air pollution, noise, hazardous chemicals – that negatively affect health. The health of the EU population is also adversely affected by climate change, through heatwaves, floods and changes in the distribution of vector-borne diseases. At a broader level, climate change, loss of biodiversity, and land degradation can also impact on human well-being by threatening the delivery of ecosystem services, such as access to freshwater and food production. Human health and well-being are intimately linked to the state of the environment. Good quality natural environments provide basic needs, in terms of clean air and water, fertile land for food production, and energy and material inputs for production. Green infrastructure also serves to regulate climate and prevent flooding. Access to green and blue spaces also provides important opportunities for recreation and supports well-being. At the same time, the environment represents an important pathway for human exposure to polluted air, noise and hazardous chemicals. In their report on preventing disease through healthy environments, the World Health Organization (WHO) estimates that environmental stressors are responsible for 12–18 % of all deaths in the 53 countries of the WHO Europe Region. Improving the quality of the environment in key areas such as air, water and noise can prevent disease and improve human health.

Air pollution is the single largest environmental health risk in Europe, and is associated with heart disease, stroke, lung disease and lung cancer. Exposure to air pollution is estimated to result in over 400 000 premature deaths in the EU each year. Noise exposure from transport sources and industry can lead to annoyance, sleep disturbance and related increases in the risk of hypertension and cardiovascular disease. Lag before reductions in emissions translate into reduced exposure. In addition, the volume and range of chemicals in use today and the ongoing growth in chemical production suggests that human and environmental exposure will continue to increase. This raises concerns about the health effects of exposure to mixtures of chemicals over our lifetime, in particular during vulnerable life stages, such as early childhood, pregnancy and old age.

The Impacts of climate change also pose immediate threats to health, in terms of heat waves and shifts in the patterns of infectious diseases and allergens. In general, bathing water quality is of a high standard across the EU, with the quality of bathing waters consistently improving over time as a result of investment in the sewerage system, better waste water treatment and the reduction of pollution from farms. A growing body of evidence suggests that environmental risks are not evenly distributed across society, but rather disproportionately affect socially disadvantaged and vulnerable population groups. An individual's socioeconomic status influences their exposure to environmental stressors, since poorer people are more likely to live in degraded environments. Socially disadvantaged people may be more sensitive to the impacts of environmental stressors due to pre-existing health conditions, poor nutritional status and specific behaviours, such as smoking or inactivity. They may also face constraints in adapting to and avoiding environmental risks.

Policies

Recognising the intrinsic link between the state of the environment and quality of life, priority objective 4 of the Eighth Environment Action Programme (8th EAP) aims to pursue “a zero-pollution ambition, including for air, water and soil and protecting the health and well-being of Europeans.” The profound dependency of human society on supporting ecosystems lies at the very core of the 8th EAP vision of ensuring wellbeing for all, while staying within the planetary boundaries. A broad range of policies are in place at EU level to address environmental impacts on health. Some examples from the main environmental policy areas include:

- ❖ The Clean Air Policy Package for Europe;
- ❖ The EU climate change adaptation strategy;
- ❖ The Environmental Noise Directive; and

The Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

The European Environment and Health Process, led by WHO Europe, aims to bring together the environment and health sectors, and promote joint solutions, in particular to address the environment-related health goals and targets of the 2030 Sustainable Development Agenda. In the Ostrava Declaration of 2017, ministers and representatives of countries in the WHO European Region set out an intersectoral and inclusive approach towards improving environmental health.

EEA activities on environment and health

The EEA is working with partners at national and international level to build the knowledge base on the linkages between the environment, health and well-being. This includes work to explore how the environment contributes to human well-being, as well as work on exposure to and the health impacts of specific environmental stressors including air pollution, noise, chemicals and climate change. Ultimately, health outcomes result from the combination of exposures to environmental stressors over time, implying that assessments of environmental health should take an integrated approach.

The EEA is also developing a new line of work to explore how social and demographic factors influence the relationship between the environment and health. This includes assessing how an individual's social status and age can affect both their exposure to environmental stressors and the resulting impacts on health. Well-known environmental stressors that affect human health are subject to regulatory control in Europe, with efforts underway to reduce exposure. However, there are also emerging issues for which environmental pathways and effects on health remain poorly understood. These include issues such as anti-microbial resistance, or changes in human exposure to chemicals in products as we shift towards a circular economy and increase recycling. The EEA engages with international networks of experts to identify emerging environmental risks, including the European Commission, the WHO and the European Food Safety Authority. In terms of thematic work, the EEA delivers a range of assessments and indicators on air pollution, noise, chemicals and climate

change adaptation. The EEA is a partner in the HBM4EU initiative. The main aim of the initiative is to coordinate and advance human biomonitoring in Europe. HBM4EU will provide better evidence of the actual exposure of citizens to chemicals and the possible health effects to support policy making. The EEA also contributes to the European Commission's Information Platform for Chemical Monitoring (IPCHEM), which documents occurrence of chemicals and chemical mixtures, in relation to humans and the environment.

Conclusion

Through all the lines mentioned earlier, preventive care is one of those core actions that seems inherent in all living species because it is a survival skill. Anyway it also seems to be learned behavior for humans. With increasing intelligence and cognitive functioning, acting preventively could increase. Personally, socially and politically, preventive measures are shortchanged, even though prevention is a necessity. The simple truth is that growing population, consumerism, urbanization and industrialization cripple current environment efforts in this country. This makes prevention more critical than ever before. Ignoring the preventive care, wait for imminent danger and then react just in time with great technologies fails to achieve victory. In defense of pollution prevention, we and many others say: better to be safe than sorry. We content that changes in the behavior of many progressive people in the marketplace and workplace must occur first. Once enough people have shown their values, preferences and skills, then industries, environmental organizations and governments will follow. Therefore, it is best that we sit together in a round table discussing the circumstances that we could react towards the environmental pollution effect on the national development in order to have the balance in built and natural environment. The effectiveness of environmental education, as a preventive strategy in environmental management, hinges upon careful planning, effective coordination and willingness and commitment among all environment – related agencies and organizations, both in and outside the government.

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AIR POLLUTION AND PUBLIC HEALTH

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ABSTRACT

Environment and health are interlinked. The physical environment, such as drinking water, sanitation, housing, and air, has considerable effects on the health status and wellbeing of people. Environmental change and its attendant health impacts are driven by many factors, including economic growth, population growth and movements. Rapid urbanization and the uncontrolled growth of urban slums are now creating a double environmental health burden for the urban poor. In India, premature death and illness due to major environmental health risks accounts for nearly 20 percent of the total burden of disease in India. Proper environmental management is the key to avoiding the quarter of all preventable illnesses which are directly caused by environmental factors. There is an immediate need to tackle environmental health issues. Problems such as unsafe water, sanitation and hygiene, and air pollution are major contributors to the worldwide disease burden. The only way to tackle this problem is through public awareness coupled with a multidisciplinary approach by scientific experts; national and international organizations must address the emergence of this threat and propose sustainable solutions.

Key words: *Pollution, Pollutants, Air Pollution, Public Health*

Introduction

Pollution is defined as the introduction into the environment of substances harmful to humans and other living organisms. Pollutants are harmful solids, liquids, or gases produced in higher than usual concentrations that reduce the quality of our environment. Human activities have an adverse effect on the environment by polluting the water we drink, the air we breathe, and the soil in which plants grow. Although the industrial revolution was a great success in terms of technology, society, and the provision of multiple services, it also introduced the production of huge quantities of pollutants emitted into the air that are harmful to human health. Without any doubt, the global environmental pollution is considered an international public health issue with multiple facets. Social, economic, and legislative concerns and lifestyle habits are related to this major problem. Air pollution has

various health effects. It affects those living in large urban areas, where road emissions contribute the most to the degradation of air quality. In this paper let us see the link between pollution and Public Health. From contaminating our environment to damaging our health, poor air quality is a major global challenge. No one is immune to the negative effects of air pollution, but many think this shared burden doesn't affect their lives. Clean air is everyone's business and air pollution is preventable. The solutions to this pressing issue are also key to tackling the climate crisis, fostering inclusive societies and improving childhood development. By working together, we have a golden opportunity to transform our approach to one of the great hidden killers.

Pollution- Pollution is the introduction of harmful materials into the environment. These harmful materials are called pollutants. Pollutants can be natural, such as volcanic ash. They can also be created by human activity, such as trash or runoff produced by factories. Pollutants damage the quality of air, water, and land etc.

Air pollution- Air pollution is a result of industrial and certain domestic activity. An ever increasing use of fossil fuels in power plants, industries, transportation, mining, construction of buildings, stone quarries had led to air pollution. Air pollution may be defined as the presence of any solid, liquid or gaseous substance including noise and radioactive radiation in the atmosphere in such concentration that may be directly and indirectly injurious to humans or other living organisms, plants, property or interferes with the normal environmental processes.

- ❖ **Pollutants-**Any substance which causes pollution is called a pollutant. A pollutant may thus include any chemical or geochemical (dust, sediment, grit etc.) substance, biotic component or its product, or physical factor (heat) that is released intentionally by man into the environment in such a concentration that may have adverse harmful or unpleasant effects.
- ❖ **Public health-** Public health is the art and science of preventing disease, prolonging life, and promoting physical and mental health, sanitation, personal hygiene, control of infectious diseases, and organization of health services
- ❖ **Air Pollutants-** Human activities directly or indirectly affect the environment adversely. A stone crusher adds a lot of suspended particulate matter and noise into the atmosphere. Automobiles emit from their tail pipes oxides of nitrogen, sulphur dioxide, carbon dioxide, carbon monoxide and a complex mixture of unburnt hydrocarbons and black soot which pollute the atmosphere. Domestic sewage and run off from agricultural fields, laden with pesticides. The World Health Organization (WHO) reports on six major air pollutants, namely particle pollution, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and

lead. Air pollution can have a disastrous effect on all components of the environment, including groundwater, soil, and air. Additionally, it poses a serious threat to living organisms. In this vein, our interest is mainly to focus on these pollutants, as they are related to more extensive and severe problems in human health and environmental impact. Acid rain, global warming, the greenhouse effect, and climate changes have an important ecological impact on air pollution

- ❖ **Environmental Pollution**-Environmental pollution is the contamination of the biological components of the Earth, which adversely impacts standard ecological processes. Any unnatural and damaging transformations in all the dimensions (like physical, chemical, and biological factors of any constituent of the ecosystem) which can cause dangerous effects on mixed forms of life and belongings are called environmental pollution.
- ❖ **Climate and Air Pollution**-Air pollution and climate change are closely related. Climate is the other side of the same coin that reduces the quality of our Earth Pollutants such as black carbon, methane, tropospheric ozone, and aerosols affect the amount of incoming sunlight. As a result, the temperature of the Earth is increasing, resulting in the melting of ice, icebergs, and glaciers.
- ❖ **Sources of Air Pollution**-Air pollution results from gaseous emission from mainly industry, thermal power stations, automobiles, domestic combustion etc. Industrial chimney wastes: There are a number of industries which are source of air pollution. Petroleum refineries are the major source of gaseous pollutants. Stone crushers and hot mix plants also create a menace. Food and fertilizers industries which emit gaseous pollutants. Chemical manufacturing industries which emit acid vapors in air. Thermal power stations: There are a number of thermal power stations and super thermal power stations in the country. The coal consumption of thermal plants is several million tones. The chief pollutants are fly ash, and other gases and hydrocarbons.
- ❖ **Automobiles:** The toxic vehicular exhausts are a source of considerable air pollution, next only to thermal power plants. The ever increasing vehicular traffic density posed continued threat to the ambient air quality.
- ❖ **Effects of air pollution**-Air pollution is known to have many adverse effects, including those on human health, building facades and other exposed materials, vegetation, agricultural crops, animals, aquatic and terrestrial ecosystems, and the climate of earth as a whole. Dirty air is detrimental to childhoods. Our children, and all future generations, deserve to breathe

air that is free from toxic pollution. 93% of children under 15 are denied their right to grow up in a clean and healthy environment. Many babies breathe polluted air from their first breath, a critical period when the foundations of growth and cognitive development are being established. Air pollution negatively impacts a child's physical health, their right to an education and to play. These factors are detrimental to brain development, and contribute to mental health and behavioral issues.

- ❖ **The most marginalized are hit the hardest**-The worst effects of air pollution are often felt by those least responsible. The poorest and most marginalized communities are most likely to live in congested neighborhoods or work where they are exposed to toxic levels of pollution. The impact on their health prevents them from attending school or work, which further exacerbates poverty and inequity.

- ❖ **Our cities should be liveable and sustainable**-Throughout the world, many cities prioritise the movement of cars over people. By 2050, 68% of the world's population is projected to live in urban areas. However, only half of the world's urban population has convenient access to public transport. How our cities are designed and, consequently, how we travel, determine the quality of air we breathe, as well as our health, safety and wellbeing as city dwellers.

- ❖ **Health effects**-Perhaps the most important effect of air pollution is the harm it causes to human health. Generally, air pollution is most harmful to the very old and the very young. Many elderly people may already suffer from some form of heart or lung disease, and their weakened condition can make them very susceptible to additional harm from air pollution. The sensitive lungs of new born infants are also susceptible to harm from dirty air. But it is not just the elderly or the very young who suffer; healthy people of all ages can be adversely affected by high levels of air pollutants.

- ❖ Major health effects are categorized as being acute, chronic, or temporary. There is much evidence linking lung cancer to air pollution, although the actual cause-and – effect relationship is still unknown. Typical effects of sulfur dioxide, oxides of nitrogen, and ozone include eye and throat irritation, coughing and chest pain. Nitrogen dioxide is known to cause pulmonary edema, an accumulation of excessive fluids in the lungs. Ozone, a highly irritating gas, produces pulmonary congestion; symptoms of ozone exposure may include dry throat,

headache, disorientation, and altered breathing patterns. The major effects of environmental pollution of the air are that it increases the risk of heart disease in humans and causes diseases of the lungs and respiratory systems. It can also lead to asthma and bronchitis. It can also affect the environment as it increases greenhouse gases.

- ❖ **Management of Air Pollution-**For ages man has been dumping wastes into the atmosphere, and these pollutants have disappeared with the wind. We have seen that the main sources of air pollution are (i) motor vehicles, (ii) industries-particularly their chimney wastes, (iii) fossil-fuel (coal) based plants, as thermal power plants. Steps are to be taken to control pollution at source (prevention) as well as after the release so pollutants in the atmosphere. There is an urgent need to prevent the emissions from the above said major sources of air pollution. The control of emissions can be realized in number of ways
- ❖ **Control Measures-** Households and industries should operate with better-design equipment and smokeless fuels to lessen air pollution. Afforestation or planting more trees should be encouraged to maintain a balance in the ecosystem and manage the effect caused by the rising greenhouse gases.
- ❖ The government also took initiatives to control air pollution, including the National ambient air quality standards (NAAQS) and the National air quality monitoring program (NAMP).

Conclusion

Enhancing air quality and securing adequate supplies of safe drinking water is associated with significant benefits for human health and well-being. Key areas in which focus is needed include air pollution, lead poisoning, and chemical pollution. Most countries have done little to deal with this enormous public health problem. The triad of pollution, climate change, and biodiversity loss are the key global environmental issues of our time. These issues are intricately linked and solutions to each will benefit the others. The People should be vigilant and should take measures to address this issue. An estimated 8.79 million people die prematurely from air pollution each year, and the vast majority of these deaths are related to cardiovascular and respiratory diseases such as stroke and heart disease. Air pollution levels vary around the world, with the highest levels recorded in low-income countries. Air pollution has even been shown to harm the reproductive system and adversely affect fetuses. As the impact of air pollution becomes better understood, medical mysteries across fields may someday be attributed to too much exposure to hazardous airborne particles. “The WHO calls it’s a silent epidemic because people don’t realize it.

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AWARENESS OF NOISE-INDUCED HEARING LOSS AMONG GEN-Z LEARNERS

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ABSTRACT

Generation- Z learners are students who were born in the years prior and nearer to 2K. These compeers are distinctive in media feasting of at least, a minimum of 3 hours a day online, habitually using mobile phones. Continuous exposure to noise through headphones has deteriorated their attention span, concentration and has brought about physical and psychological health problems. The alarming issue is the Noise- Induced Hearing Loss (NIHL) caused by this habitual issue. This study is conducted in order to know whether the young generation learners are aware of this impact and if not, measures have to be taken by professionals and educational institutions to create this awareness. The study is based on the data collected using survey technique. 120 students studying in 6 colleges spread over TamilNadu responded to the questionnaire. Based on data analysis, it is concluded that Gen- Z learners have moderate level of awareness about NIHL. Girl students comparatively show low level of awareness about NIHL. Also, there is relationship between awareness about NIHL and usage of social media and technical gadgets.

Keywords: *Noise- Induced Hearing Loss, Noise Pollution, Gen-Z learners, Awareness, Social Media, Technical Gadgets*

Introduction

Each generation is diverse. Certain defining features usually distinguish generations because the period we are born and brought up has a far-reaching impact on the nature of individuals we become. Generation Z is not an exclusion. Many members of Generation Z or Gen Z, have already started their careers, while others will soon begin theirs. Gen Z is a exceptional group with recognizable characters that make them unique. Gen Z learners are born in the age of internet, where technology is progressive to the point where computers, cell phones and social media had become a part of daily life. Technology and the internet have altered the global sphere, bringing us closer and

composed, but changing how we communicate and provide us with added information than ever before. As inclinations of the parallel universe and cryptocurrency pop up, Gen-Z is benighted by technology. A typical member of Gen Z spends 3 to 4 hours a day on social media. Gen Z is extremely activism-oriented. Both millennials and Gen Z are more advanced in environmental sustainability due to the flooding of information easily available at the reach. There are many universal concerns that Gen Z will have to face within their lifespan and these forthcoming issues have shaped Gen Z's perspective about self and life. With a widened knowledge of global happenings and futuristic dreams, it becomes inevitably important to have self-awareness about their physical as well as overall wellness.

Gen-Z Learners

Individuals of this generation are born between 1996 and 2012 (Schwieger and Ladwig, 2018). Like millennials, they were raised with technology. Gen Z learners are digital natives. Some remarkable characteristics identified in them are:

- Gen Z are the first generation 'Digital Natives'
- Gen Z learners are diverse
- They are pragmatic and shrewd
- They experience high rates of depression and anxiety

Gen- Z students are on their mobile phones, a lot and most of them use their phones for normal activities.

Noise Pollution

Noise pollution can cause health problems for people and all other life. Noise pollution is considered to be any unwanted or disturbing sound that affects the health and well-being of humans and other organism. From traffic to rock concerts, loud or unpreventable noise could cause hearing loss, stress and high blood pressure. Noise from ships and human activities in the ocean is harmful to whales and dolphins that depend on echolocation to survive. Noise pollution is an unseen hazard. Sound is measured in decibels. There are many sounds in our surroundings. Sounds that reach 85 decibels or higher can harm a person's ears. Sound sources that exceed this threshold affects lots of people every day, both actively or passively. The most common health problem it causes is Noise Induced Hearing Loss (NIHL).

Noise Induced Hearing Loss

Every day, we experience sound in our environment, such as the sounds from television and radio, household appliances, industries and traffic. Normally, these sounds are at safe levels that don't damage our hearing. But sounds can be harmful when they are too loud, even if it is momentary or when they are both loud and long-lasting. These sounds can damage sensitive organs of the inner ear and result in noise-induced hearing loss (NIHL). NIHL can be instantaneous or it can take a long time to be noticed. It can be temporary or permanent and it can affect either or both ears. Irrespective of how it might affect you, one thing is certain: noise-induced hearing loss is something you can prevent, if you are aware of it. Researchers have also estimated that as many as 17 percentage of teens (ages 12 to 19) have recorded features of hearing loss because of NIHL in one or both ears (Elisabeth Henderson, 2011).

Significance of the Study

Hearing loss caused by exposure to loud sound is preventable. To reduce their risk of noise-induced hearing loss, learners can do the following:

- ❖ Adopt behaviours to protect hearing:
- ❖ Avoid or limit exposure to excessive loud sounds
- ❖ Turn down the volume of music systems
- ❖ Move away from the source of loud sounds whenever it is possible
- ❖ Use hearing protection devices when it is not possible to elude exposure to loud noise or reduce them to a safe level
- ❖ Avoid excessive usage of headphones or ear buds or air pods.
- ❖ Seek hearing evaluation tests done by a licensed audiologist or other qualified professional, especially if there is anxiety about potential hearing loss.

These are possible only if the learners are aware of the basic facts about the symptoms and causes for NIHL.

Objectives

- To examine the level of NIHL awareness among Gen Z learners
- To identify the relationship between awareness of NIHL and usage of social media
- To identify the relationship between awareness of NIHL and usage of technical gadgets

Alternative Hypothesis

- H1: There will be significant gender difference in awareness of NIHL among Gen Z learners
- H2: There will be a significant relationship between awareness of NIHL and usage of social media
- H3: There will be a significant relationship between awareness of NIHL and usage of technical gadgets

Population-Individuals, who are born since 1995 and are pursuing studies in Educational Institutions or online courses.

Sample-For the study, a total of one hundred and twenty (120) learners within the age group of 18 to 25 are chosen, constituting 71 females and 49 males. Simple random sampling technique was used to collect the data required.

Inclusion Criteria

- Participant's age ranges from 18 to 25.
- Participant pursuing UG or PG course in any of the Educational Institution affiliated to Universities within TamilNadu.

Exclusion Criteria

- Participants beyond the age limit.
- Learners who are pursuing courses through Distance Education and Online mode are limited from inclusion in the sample.

Methodology

The investigator adopted Survey method to find out the level of awareness on NIHL and the relationship between awareness on NIHL and usage of social media and technical gadgets respectively.

Tool used

The following tool is used for collection of data:

- RIM – NIHL Awareness Questionnaire

Pilot study was conducted and the tool was validated and circulated among the sample participants. Responses are recorded and analysed.

Relationship between awareness of NIHL and usage of social media

Variables	Awareness of NIHL		Usage of Social Media
Awareness of NIHL	Pearson Correlation	1	0.21**
	Sig. (2-tailed)		0.00
Usage of Social Media	Pearson Correlation	0.21**	1
	Sig. (2-tailed)	0.00	
** . Correlation is significant at the 0.01 level (2-tailed).			

This table shows the correlation between Awareness of NIHL and Usage of Social Media among Gen – Z learners. This table shows that there is a significant relationship between Awareness of NIHL and Usage of Social Media among Gen – Z learners. The correlation value is found to be 0.21** which is significant at the 0.01 level. This reveals that Awareness of NIHL is directly proportional to Usage of Social Media. Social Media Usage is seemingly increasing nowadays with newer technological advances and features being updated and it increases awareness in individuals especially Young Learners.

Relationship between awareness of NIHL and usage of technical gadgets:

Variables		Awareness of NIHL	Usage of technical gadgets
Awareness of NIHL	Pearson Correlation	1	0.13
	Sig. (2-tailed)		0.06
Usage of technical gadgets	Pearson Correlation	0.13	1
	Sig. (2-tailed)	0.06	

This table shows the correlation between Awareness of NIHL and Usage of Technical Gadgets among Gen-Z learners, which was not found to be significant. The findings indicate that there is no significant relationship between awareness of NIHL and usage of technical gadgets among Gen-Z learners. Though it is a basic fact that continuous and unethical excessive usage of technical gadgets induces Noise-Induced Hearing loss, the study shows that there is no significant relationship between its awareness and usage.

Findings of the study

Considering Awareness of NIHL as the independent variable and Usage of Social Media and Usage of Technical Gadgets as dependent variables, it was found that,

- (i) There is significant relationship between Awareness of NIHL and Usage of Social Media among Gen – Z learners.
- (ii) There is no significant relationship between awareness of NIHL and usage of technical gadgets among Gen-Z learners.

Conclusion

The study on AWARENESS OF NOISE-INDUCED HEARING LOSS AMONG GEN-Z LEARNERS was conducted to find the relationship between awareness of young learners and their contemporary techno savvy life-style. It was found out that these learners use technical skills for classroom learning and also for entertainment. Apart from the mentioned needs Analytical learning and Awareness are not much created through extensive usage of Social media and technical gadgets. Generation Z ignore the precious gift of life by being ignorant of physical and psychological hazards of unethical usage of technology. However useful, any innovation should not be our master. Also, this significant study shows that greater than before exposure to recreational noise and negligible use of hearing protection have lead to an increase in NIHL prevalence among adolescents and young adults. The immediate and essential need is to generate possibilities for creating awareness about Noise-Induced Hearing Loss among learners.

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ENVIRONMENT AND SUSTAINABLE FUTURE: A PARADOXICAL VIEW

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ABSTRACT

The world has become increasingly sensitized to environmental issues. The unprecedented population growth and the advanced technology have led to have its effect on the environment and its related issues. It gives a mounting pressure on both environment and resources. The concern for the nature and its resources have been echoed at various parts of our life including preservation and conservation of natural resources to get a sustainable future. This paper highlights the problems that are encountered by the environment to have a sustainability. It strongly defends on the unconscious activities that tends to collapse the neutrality of natural resources. It clearly states the expansion of human nature to connect with and serve for the environmental sustainability. The implications of the paper include the reduction of ignorance and indeterminacy regarding resource management issues and conflict resolution at the cognitive level.

Keywords: *Environmental sustainability, Environmental Policies*

Introduction:

The concern for the natural environment has led to an increasing interest in the way organizations manage environmental issues (Bansal & Bogner, 2002). Nowadays there is an awareness among the public to care for the environment. The knowledge about the environment has made people aware of conservation of natural resources, protection of habitats and control of hazards, spanning the field of environmental management without regard to traditional disciplinary boundaries.

Concept of Environmental 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.

Challenges of environmental sustainability:

The environmental issues that we face today are radically different from those of the previous generation. The growing threats to environmental sustainability are as follows:

Climatic Change

Climate change is the most high-profile challenge faced by our world today. Scientists predicts that if the increase in greenhouse gas emissions continues unabated, temperature will rise by as much as 10 degrees Fahrenheit by the end of this century.

Depleting Natural Resources

Virtually all the economic activity ties into natural resources of a country and its usage. Many environmental activists decry not only the rapid exploitation of various inputs, but also the use of natural resources. For instance, the use of water by one community can threaten the existence of another and even permanently alter nature itself.

Poor Management of E-waste

Waste management is the key point that numerous environmental issues started with. Improperly disposed plastic may cause serious issues to the health. The e-waste can be toxic, is not biodegradable and accumulates in the environment, in the soil, air, water and living things. For example, open-air burning and acid baths being used to recover valuable materials from electronic components release toxic materials leaching into the environment. According to the Global E-waste monitor 2020, the world generated 53.6 Mt of e-waste in 2019, only 9.3 Mt of which was recorded as being collected and recycled. Every device ever produced has a carbon footprint and is contributing to human-made global warming.

Water Pollution and Falling groundwater tables

Water Pollution may cause diseases or act as poisons. Bacteria and parasites in poorly treated sewage may enter drinking water supplies and cause digestive problems such as cholera and diarrhoea. Hazardous chemicals, pesticides, herbicides from industries, farms, homes and golf courses can cause acute toxicity and immediate death, or chronic toxicity that can lead to neurological problems or cancers. Increased discharges of inadequately treated wastewater are contributing to the further

degradation of water quality in surface and groundwater. The water pollution must be controlled in order to avail water, it needs to be properly managed in order to mitigate the impacts of increasing water scarcity.

Deforestation

Deforestation contributes to the global warming phenomenon by releasing 6–17% of global carbon dioxide emissions (Baccini et al., 2012). Failure to stabilize climate is in itself a large threat to biodiversity already at risk from deforestation. Protection, expansion and improved management of the world's forests represent some of the most promising natural solutions to the problem of keeping global warming below 1.5 – 2 degrees (Griscom et al., 2017; Roe et al., 2019). In addition, forests are responsible for much of the carbon removal by terrestrial ecosystems which together remove 29% of annual CO₂ emissions (Friedlingstein et al., 2019).

Bio-diversity loss

Nature loss has its far-reaching consequences in the life of common people. Development brings the animals and man to a close contact with each other which increases the risk of diseases like COVID-19. About 60% of human infection are estimated to have an animal origin. Decline in nature and biodiversity at current trajectories will undetermined progress towards poverty, hunger and health.

Government Policies regarding environmental sustainability

The ISO 14001 environmental policy outlines the overall intentions and direction of how the company relate to its effect on the environment. Elements of the policy are Continual improvement, Prevention of pollution, Comply with legal and other requirements, Framework for objectives and targets.

Protection of the environment has to be central part of any sustainable inclusive growth strategy (Ganesamurthy, 2009). In order to prevent and control water pollution, the Parliament enacted the Water (Prevention and Control of Pollution) Act in the year 1974 and similarly to prevent and control air pollution, the Air (Prevention and Control of Pollution) Act in the year 1981.

The United Nations Conference on Environment and Development (1992) (Rio Conference) specified the policy statement for the abatement of pollution. National Water Policy, 2002 have equally contributed to manage the environment.

Government has encountered a list of recent policies to protect the environment in order to meet a sustainable livelihood nature. The fact is that we are enacting the policies but are we implementing is the question behind it.

Ways to overcome the challenges

Some of the common solutions to overcome the environmental sustainability are:

- Need to transform our food systems to become more sustainable and resilient in order to reverse environmental degradation, restore ecosystems and ensure food and nutritional security.
- Tax structures and subsidies should be reformed to incentivize sustainable production and ensure that environmental degradation no longer pays.
- Government has to rethink in the way, agriculture is subsidized and supported.
- Governments must assign a financial value on the services that nature provides to people so that environmental action can be prioritized in policy and investment decisions.
- Policy makers must adhere the proper implementation of policies and to have a follow up.
- Public should take action to preserve the environment by following recycling, reusing, and composting; making better transport choices; reducing electricity usage and avoiding toxic chemicals.
- Industries and industrialists should exercise control in the usage of natural resources and assure the proper disposal of industrial wastes.

Conclusion

There is need for systematic, reflexive and cyclic process to have a multiple view and follow multiple methods to resolve the conflicts in relation to the environmental management and also to preserve the natural resources that leads to a dynamic and sustainable environment in future. Avail the precious natural resource and limit its wastage. As observed in NEP, 2006 any policy is only as good as its implementation. There are number of new and continuing initiatives for enhancing environmental conservation as outlined in National Environment Policy, 2006. To fulfill, these require the coordinated actions of diverse actors

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GENDER AND ENVIRONMENT: ROLE OF ECOFEMINISM IN SUSTAINABLE NATURAL RESOURCES

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ABSTRACT

Environment is the source of all forms and support system of life (UNESCO&ICSU,1999). There are different types of environment comprises physical, cultural, economic and social. The survival of human and nonhuman creatures depends on the protection of terrestrial eco system and halt biodiversity loss. The gender discrimination and suppression of women and nature gave rise to the emergence of ecofeminist theories. Women have the right to excel in all spheres of activity. However, their roles are mainly restricted due to masculinity bias. The term ecofeminism is used to describe a feministic approach to understand ecology. This article summarizes the history of ecofeminism and its various strands of activism and intellectual inquiry. Through critiques made of ecofeminism, both from those allying themselves with the movement, and from those who wish to disassociate themselves from it, the argument is made that ecofeminism, particularly in its social constructivist form, has been influential in international policy making. As a parallel development alongside feminist political ecology and other environmental feminisms it has developed analytically, infused by renewed interest by a new generation of academics and activists, as well as a new generation of environmental concerns, dominated by climate change. Women play the primary role of natural resource management as they are the major land users. But it has been found that land ownership, access and control of land resources hinder women from proper participation in its management. While women perform much of the productive work on the land, their contribution has largely remained unrecognized. Yet empowerment of women in the management of natural resources has been tightly linked to sustainable development.

Keywords: *Ecofeminism, Environment, Gender, Women*

Introduction

Natural Resource Management is crucial to the economic sustainability of any given community, what with the majority of the world population being dependent on land from where

they derive livelihood mainly from agriculture. Women play the primary role of natural resource management as they are major land users. In most rural settings, they are responsible for growing and collecting food, medicines, fuel, housing materials, provide cash income for schooling, health care and other family needs. Due to the nature of their responsibilities and direct dependence on land based resources, it is important to recognize and promote the role that women have in natural resource management. Empowering women to ensure a better use, management and control of resources is therefore vital for sustainable natural resource development. In order to be effective, women must gain the knowledge about the proper utilization of resources, development planning and their needs to be integrated into decision-making in general. The Beijing Conference of 1995 recognized that unless the contribution of women to environment and natural resource management is recognized and supported, sustainable development would remain elusive.

Gender and Environment

When addressing gender in the context of the environment, it is important to recognize that women and men are not homogeneous groups. Both should be the agents in environmental management, including equal participation in decision making and policy processes. Where women and men live, their age, social class, ethnicity, religion, sexual orientation and other variables, interact in shaping the links between gender and the environment. Especially in the Global context, women provide a livelihood for their families and simultaneously manage the environment. However, due to gender power relations, their knowledge is often overlooked and they are not counted as agents of change. Therefore, a gender analysis of environmental management is necessary, looking at gender aspects of the use of natural resources (water, forests, land, etc.), consumption of services and goods (transport, food, etc.) and experiences of environmental degradation (pollution, chemicals, loss of biodiversity, etc.).

Ecofeminism in India

The word feminism implies the equality of men and women. Feminism is a range of movements that share's a common goal to achieve personal, political, economic and social equality of sexes. Ecofeminism is a blending of ecology and feminism.

The ecofeministic thinkers establishes the relationship between women and nature through popularizing the ancient worshipping concept of Mother goddess. Woman's have an intimate

relationship with nature. She knows everything about nature therefore she uses natural resources efficiently and economically. Vandana Shiva, the pioneer of ecofeministic ideas in India advocates that the close relationship between women and nature help her to understand the impulse of nature in its depth. According to vandana Shiva “Liberation is the best to begin the colonised and end with the coloniser”. Therefore, as a liberation movement ecofeminism needed to resist all types of exploitations. Some major environmental movements for protecting the interest of environment and marginalized sections includes- Bishnoi movement, Chipko movement, Narmada Bacho Andolan, Appiko movement, Silent valley movement, Navdanya movement, Save chaliyar movement, Plachimada struggle, Muthanga struggle etc.

Bishnoi movement: This protest was undertaken by a nonviolent community of nature worshippers of Rajasthan known as Bishnois under the leadership of a sage Sombaji against deforestation.

Chipko movement: The chipko movement in Utharanjal is a tree-hugging campaign to resist tree cutting headed by noted environmentalist Sundarlal Bahuguna in 1970 in order to safeguard the biodiversity of Himalayan Range.

Narmada Bachao Andolan: This movement protested against Narmada River Valley project in order to preserve the interest of minorities under the leadership of Medha Patkar and Baba ***Amthey Appiko movement:*** This movement is started in Karnataka as a forest conservation movement against governmental intervention in to forest for monoculture teak and eucalyptus plantations.

Navdanya movement: It is a NGO established by Vandana Shiva for biodiversity conservation through setting up of 54 community seed banks. ‘Diverse women for Diversity’ is their global campaign for food security and biodiversity.

Silent valley movement: It is a movement to protect Silent Valley (an evergreen tropical forest in Palakkad district of Kerala) in 1973 against Kundramukku project in Kunthippuzha River.

Salu marada movement: In Karnataka a leading environmental movement in Karnataka state was undertaken by Thimmakka. Her life depicts the intimate relationship between women and nature. She along with her husband planted 8000 trees within 65 years.

Muthanga struggle: This struggle was undertaken by the leadership of CK Janu in wayanad district for conserving the rights of Adivasis.

Plachimada struggle: This protest was undertaken to preserve environmental sustainability of Plachimada village of Palakkad against Coca Cola factory under the leadership of Mayilamma.

Ecofeminism in Malayalam Literature

The ecofeministic ideology reached in Kerala recently. Therefore, it is considered as an unexploded area for Malayalees. Even though there are certain writers who tried to integrate feministic ideologies with nature. Through their works they tried to create strong ecological insight in readers. They include:

Kamala Das: Kamala Das absorbed the characteristics of modernism, post modernism, feminism and environmentalism in her writings. But her works are not in an apt reflection of western ecofeminism. The changing morals, perceptions and attitudes of society are accurately portrayed in her works. She is a guiding personality for the new generation poets like, V.M Girija, Prameela Devi, Kanimol, Sushama, Geetha Hiranyan etc.

Lalithambika Antharjanam: The different perspectives of ecofeministic ideologies are more demanded in the works of Lalithambika Antharjanam.

Sarajoseph: Through her workings Sara Joseph revealed the apathetic situations of women's in a heart touching style. She is also a founder of 'MANUSHI' (The organisation of thinking women)

P.Valsala: The short stories and novels of Valsala depicted women's character with strong determination and deep ecological impact.

Challenges that ecofeminism faces today

Despite statistics proving that increased role of women in protecting and preserving the environment can have a better impact on nature, women in India and abroad are only marginally given the chance that they deserve. There are several challenges that ecofeminism faces today. These include:

- Responsibility of household chores lies on the women alone
- Women are not considered breadwinners but bread makers
- Ensuring security of cooked food in the house is the job of the women
- Lack of formal education is a barrier towards knowledge building

- Most women do not have the power to take decisions
- Lack of awareness about reproductive rights
- Inefficient health care for improved health and longevity
- Women have to often migrate to different cities due to marriage
- Gender bias is an issue across the country
- Slow progress towards equality is hampering development

Women Participation in Environmental Protection

In general, women have the natural ability to love and care for their natural surroundings where they live. More specifically, women's environmental protection participation in conserving ecological resources is prominent in economic and business spheres. Ramstetter and Habersack analyzed the perception and behavior of men and women parliamentarians in Europe about pro-environmental behavior and found that women parliamentarian is more environmentally friendly and can affect their policy decisions environmental security. Thus, the need to refresh environmental policies by governing women in an active role in decisionmaking to mitigate climate change. Birindell et al. considered a panel of 96 listed banks of three different regions, namely, Africa, Europe, and the Middle East, for 2011 to 2016 to assess women's leadership's role in environmental performance banks. The results confirmed the hump-shaped relationship between the bank's women director and sustainability reforms that indicate women's positive signal as a director to lead the bank's payoff through green policies. Di Rienzo and Das confirmed the positive relationship between women's political freedom and environmental quality while reducing corruption in a heterogeneous panel of countries. The result enforced the need to involve women in political decisions that reshaping economic and environmental policies for sustainable growth. Allen et al. confirmed that women's role in the energy sector is not limited to redistribute power to the corporate and economic businesses while it improves energy governance matter to use renewable energy transformation globally. Pan et al. collected data of 496 female executives from 524 listed companies working in China's premises to assess women's role in the environmental sustainability agenda. The results show that higher participation of female's executives substantially increases corporate profit by conserving environmental resources that confirmed the viability of women empowerment in resource management.

Conclusion

To ensure the conservation of natural resources in a limited way for a sustainable development of the present and future generation must become a strategic national objective gradually applied as a function of tradition, potential and natural, technical, social and human capital from each state of the world as well the evolution tendencies of regional, geographic and environmental development in the world. Ecofeminism is a movement for existence of life. It is considered as a revolutionary movement for the liberation of women, men and nature. It introduces a new equation for life, that is: Man/Women = Nature.

The goal of sustainable use and management of natural resources can be reached only through overall capacity building of women through education, and the provision of health care, user-friendly technologies and employment opportunities. To achieve this goal, policy makers, planners and development workers must have a better understanding of the relative and often shifting roles of men and women in agriculture and natural resource management, also with respect to decision-making, use of traditional knowledge, division of labour and traditional practices between women and men. One cannot think of successful regeneration or social resource management in the absence of natural resource management with women at the centre of it. Therefore, it is important to involve women in protecting the environment. Women will not only conserve the environment but also create awareness among their family members and the larger society to be more responsible towards the environment.

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ECOLOGICAL INTENSIFICATION AND DIVERSIFICATION APPROACHES TO MAINTAIN BIODIVERSITY

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ABSTRACT

Ecological agricultural intensification enhances natural processes to improve yields, while conventional intensification typically focuses on increased or improved inputs (such as fertilizers, pesticides and technologies) to enhance yields. While many practices that might be utilized in ecological intensification are shared by other agricultural systems, such as agro ecological, sustainable, organic, climate-smart or regenerative agriculture, environmental intensification emphasizes improving yields through these techniques. Ecological intensification practices often act by providing habitat and resources for colonizing beneficial organisms that promote crop growth. Ecological intensification methods can achieve greater environmental sustainability in three ways: first, by minimizing or eliminating negative ecological externalities from farming; second, by supporting natural processes that promote and regenerate the ecosystem services on which farmers depend and third, by also providing those ecosystem services, such as biodiversity conservation and good water quality, that benefit society at large.

Keywords: *Ecological agricultural intensification, pesticides, insecticides*

Introduction

Ecological agricultural intensification relies on enhancing natural processes to improve yields while conventional intensification typically focuses on increased or improved inputs (such as fertilizers, pesticides and technologies) to enhance yields. While many of the practices that might be utilized in ecological intensification are shared by other agricultural systems, such as agroecological, sustainable, organic, climate-smart or regenerative agriculture, ecological intensification emphasizes improving yields through the use of these techniques. Sustainable intensification emerged as a concept during the 1990s (Pretty, 1997; Cook et al., 2015), from efforts to increase the productivity of smallholder farms in African countries. The term has since been adopted by governments, agribusiness and industry, and international organisations, who have applied and promoted the

approach around the world (Mahon et al., 2017; Cook et al., 2015) (e.g. the Sustainable Crop Production Intensification from FAO (2016)). According to the FAO (2019), shortages of available agricultural land combined with the need to ensure sufficient and nutritious food for a growing global population have led to the development of an approach to increase food production without increasing agricultural land. The approach thus aims to address or reconcile the two goals of safeguarding global food security while reducing the environmental impacts of agriculture (FCRN Foodsource, 2018). In 2009, the UK's Royal Society provided the now commonly accepted definition for sustainable intensification, as an approach wherein "yields are increased without adverse environmental impact and without the cultivation of more land" (The Royal Society, 2009), capturing the approach's underlying principles. The intensification of agriculture is, indeed, usually associated with increasing yields, particularly in the context of developing countries.

Ecological intensification

Ecological intensification, as defined by Bommarco *et al.* (2013) and Tittone (2014), involves actively managing farmland to increase the intensity of the ecological processes that support production, such as biotic pest regulation, nutrient cycling and pollination. It means making smart use of nature's functions and services, at field and landscape scales, to enhance agricultural productivity, and reduce reliance on agrochemicals and the need for further land-use conversion.

Landscape Complexity and Connectivity

Habitat loss and degradation -Habitat loss and degradation of habitat quality can reduce the population sizes, composition and species richness of pollinator communities (and alter the structure of plant–pollinator networks , with implications for community stability and pollination processes. Specialised pollinator species adapted to particular plant species, or requiring very specific nesting resources tend to be more vulnerable to land-cover changes than more generalised species Similarly, above-ground nesters seem more sensitive to habitat loss or fragmentation than below-ground nesters. Due to different dispersal abilities, different pollinator groups can also show various responses to configurational changes (Redhead *et al.* 2016).

Habitat fragmentation – It could alter pollinator networks through its effects on pollinator diversity and abundance. Theoretically, by reducing pollinator diversity, fragmentation could reduce pollination network modularity and increase connectance, with small fragments harbouring

homogenised pollinator communities (reviewed in Hagen *et al.* 2012). For crops, pollination service delivery depends largely on flower visitor density and typically on particular locally abundant pollinator species, which are demographically the least vulnerable to habitat loss or degradation.

Increasing landscape complexity- Increasing landscape complexity by employing crop and crop-livestock mixtures, intercropping and cover crops can increase floral resources and habitat for many pollinator species, even in landscapes with little semi-natural land-cover types. Increasing connectivity by reducing distances between foraging resources elevates pollinator diversity and abundance in fields. Diversified agricultural systems typified by a large number of crop types and small field sizes (Fahrig *et al.* 2015) promote wild pollinator diversity, community stability and pollination success of crops and wild plants. Polyculture systems with sequentially flowering or co-flowering crops assure efficient pollination of plants differing in flower phenology by providing seasonal and spatial continuity of food resources supporting pollinator diversity and abundance. Landscape-scale planning of early and late mass-flowering crop cultivation, with consideration of the spatial distribution of semi-natural areas, might aid conservation of pollinators and crop pollination services (Riedinger *et al.* 2014). Landscape complexity can also be achieved by temporarily removing land from production which can promote the establishment of flower-rich habitats and the corresponding species richness and abundance of flower-visiting insects.

Agroforestry- Agroforestry, in which large woody perennials are integrated into farming systems, can also increase landscape complexity. Agroforestry in temperate systems has been suggested to be favourable to beekeeping and has been estimated to contribute to crop yield and profit through its effect on pollination services. In tropical systems, agroforestry is thought to enhance the connectivity of pollinator-friendly habitats, spatially linking natural and semi-natural areas. Further, because in these tropical areas most pollinators rely on tree flowers agroforestry practices could contribute to pollinator conservation, as seen in coffee and cacao plantations. Through its effect on pollinator abundance, proximity to forested areas increases yield as well as resilience and stability of pollinator communities (Bravo-Monroy *et al.* 2015). Further, tree diversity and cover positively correlate with native bee abundance (Klein *et al.* 2002; Jha & Vandermeer 2010) and richness (Hoehn *et al.* 2010), and a link was found between low-impact management, in-field bee diversity and crop pollination (Vergara & Badano 2009).

Land Management to Increase Local Nesting and Foraging Resources
Crop fields- Many traditional systems of land management encompass cultivation of sequentially- and co-flowering crops alongside high wild plant diversity, with low agricultural inputs and low yields. These systems usually favour pollinator biodiversity. Although still largely present in many parts of the world, traditional systems have today mostly disappeared in Europe and North America due to abandonment or conventional intensification of land management. In contrast to diversified farming systems, monocultures reduce landscape complexity (see above) and overall habitat resources for pollinators, despite the provision of alternative foraging resources by certain mass-flowering crops. Monocultures of crops such as canola (*Brassica napus*), clovers (*Trifolium* spp.), sunflowers and orchard fruits provide large amounts of accessible pollen and nectar, which has been shown to benefit bee colonies (e.g. increased densities, reproductive success). However, with few other floral resources in such intensively managed fields, the temporary synchronous pulse of pollen and nectar from such crops means that benefits are transient and limited to the duration of crop flowering.

Grasslands- Grazing livestock and mowing alter ecosystems, affecting wild plant reproduction and the amount of floral resources available to pollinators. Grazing affects pollinators and pollination in complex ways that depend on the grazing intensity, selectivity, timing, climate, habitat type, etc. For instance, the intensity of herbivory can shape the attractiveness of flowers to pollinators with highly intensive grazing able to lower forb coverage or diversity with concomitant impacts on pollinator densities, diversity and network structure. Grazing livestock (e.g. cattle, sheep) results in soil compaction by trampling, and affects the amount of nesting resources available to pollinators, influencing their abundance or diversity.

Insecticides and Herbicides- The use of insecticides represents a hazard to pollinator health, diversity and abundance. However, the risk varies with the toxicity of the particular insecticide to different species and by the level of exposure according to management practice, and the phenology, behaviour and habitat use of foraging pollinators. There are relatively few controlled field experiments assessing actual exposure to insecticides in field settings (Godfray *et al.* 2014, 2015). A notable example is a recent farm-scale replicated experiment, which found that actual field exposure to oil-seed rape treated with the neonicotinoid clothianidin and pyrethroid insecticides decreased survival and reproduction of wild bee species, relative to oilseed rape treated only with pyrethroids)

Viability of Ecological Intensification in Farming

The viability of ecological intensification may be challenged either on the basis that its outcomes are uncertain and unpredictable, or that it might not be able to achieve levels of crop production equivalent to conventional agricultural intensification (Garibaldi *et al.* 2016).

Level of uncertainty-Broadly, when using ecological intensification to improve the sustainability of farming, uncertainties stem from two sources: scientific or agronomic uncertainty on how to implement ecological intensification, and the inherent unpredictability of natural systems (stochastic uncertainty). The efficacy of ecological intensification as a process to maintain or enhance current levels of food production relies on efficient and consistent ecosystem service delivery. However, there is not yet scientific consensus about the structure of service provider communities required to achieve this. On this, Kleijn *et al.* (2015) suggest that a limited number of generalist wild bee species are responsible for the majority of pollination of the 100 most important insect-pollinated crop species globally. However, other analyses show that resilience of pollinator communities over time, and the stability and resilience of pollination services and crop productivity strongly rely on pollinator diversity, complementarity and redundancy.

Level of overall productivity-The potential for ecological intensification to maintain production was highlighted in a farm-scale multi-year field experiment where up to 8% of land was removed from production to create wildlife habitat (e.g. sown patches of perennial native wildflowers and fine-leaved grasses mix) (Pywell *et al.* 2015).

How to Promote or Support Ecological Intensification in Policy

Most current approaches to support environmentally friendly farming assume an income loss for the farmer, who should be compensated or motivated by financial support to implement such practices. For example, costs associated with the establishment and maintenance of practices such as flower-mix plantings can be a major hurdle in their successful adoption (Sidhu & Joshi 2016). Recently, it was suggested that switching to ‘payment by results schemes’ (i.e. paying farmers for outcomes rather than for performing set management activities) could be an effective instrument for changing farming social behaviour, and could encourage the establishment of common goals between farmers and conservationists. However, these schemes can potentially punish farmers who

act adequately but do not achieve the goals because of external variables, such as land configuration .Other potential paths could also include the labelling and production of ‘pollinator-friendly’ foods, as well as promoting ecological intensification with food-producing and retail corporations.

In ecological intensification, while there may be a transition period during which the costs outweigh the benefits (see above), actions are expected to support production and should not entail an overall cost in the longer term. As a result, the framework of compensation for lost income that is embodied in AES does not apply so easily. ‘Compulsory greening measures’ under the direct payments pillar of the EU's Common Agricultural Policy from 2014–2020 represent an alternative approach where payments are not designed to cover lost income, but environmental actions are required as a condition of subsidy payments. These payments incorporate several potential elements of ecological intensification across Europe, such as field margins, buffer strips and fallow land, through an obligation to keep 5% of arable lands as ‘Ecological Focus Areas’ (Pe'er *et al.* 2016; Tzilivakis *et al.* 2016; Table 1). There is a great opportunity now to use the Ecological Focus Areas policy to promote targeted measures effective at enhancing specific ecosystems services such as pollination

Knowledge Gaps and Future Directions

In this review, we identified different knowledge gaps, which we grouped under three main topics: The effect of land use and landscape drivers on the long-term survival of pollinator communities. A lot of research has characterised the effects of specific land management and land-use changes on the abundance or diversity of different pollinator groups. However, long-term impacts of these land changes on pollinator and plant community structure, pollination networks and pollinator demography are little understood. For instance, few studies have empirically investigated how pollination networks are affected by changes in landscape, or evaluated the effect of these changes on the long-term survival and evolutionary potential of affected pollinator species. Better understanding these ecological processes is key for predicting the responses of pollination communities to land use and landscape changes.

The effect of changes in the pollinator community on crop yield and the reproductive success of wild plants

Scientists are only starting to understand how changes in pollinator communities affect pollination services (Vanbergen *et al.* 2014b). For example, although it has been shown that more

pollinators increase yield (Garibaldi *et al.* 2011, 2015), it remains unclear whether benefiting generalist pollinators is sufficient to secure crop and wild plant yields. On the same lines, there is no clarity about what level of pollinator diversity or even pollinator abundance is the minimum required to maintain healthy and diverse plant communities, and high crop yield and quality. This knowledge is needed to support efficient application of ecological intensification measures, and a more informed decision-making process.

Communicating knowledge and translating it into policies and actions

Although farmer education and knowledge dissemination have proved effective in applying ecological intensification, these tools appear to be underexploited. To improve this, a better integration of local knowledge and culture into educational programs would largely increase the use and spread of ecological intensification (Geertsema *et al.* 2016). Further, improving our understanding of the financial costs, benefits, return on investment, and how stable those returns are is critical for a successful application of ecological intensification. The integration of cultural, economic and ecological knowledge was successful and fruitful in the global IPBES pollination assessment (IPBES 2016), but similar approaches should also be used at local and regional scales. Doing this will require further integrating and complementing studies on the sociological, economic and ecological aspects of food production and agriculture.

Conclusion

Ecological intensification comprises genetic intensification and socio-economic intensification to give an all-round eco-friendly development. Policies under ecological intensification should be synergistic in the approach to keep the balance between the production sector and consumer sector. The development of new farming systems of intensive to semi-intensive in nature may promote natural resources conservation. Ecological intensification is such an issue which has not been explored properly till date. In this review, we argue that ecological intensification has the potential to support pollinators by bringing ecosystem services into crop production systems, and replacing chemical inputs. However, there is still a long way to reach optimal management in ecologically intensified systems and in filling current knowledge gaps. We describe research supporting a positive impact of most elements of ecological intensification on pollinator diversity and abundance. We suggest that landscape-scale (instead of farm-scale) management of agricultural

areas could result in better provisioning of pollination services by improving habitat availability and configuration. Such landscape management decisions, however, need proper coordination of farmers' land-use decisions. Along with this, and to inform these decisions, we have identified some knowledge gaps that need to be addressed.

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**PHYTOCHEMICAL ANALYSIS AND ANTIBACTERIAL SCREENING OF
STIGEOCLONIUM SP., AGAINST HUMAN PATHOGENS**

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ABSTRACT

Stigeoclonium is an important natural alga present in all substrates like rock, woody, and over small submerged plants. No algae eaters are found to feed on these algae due to their sensation and smell; their growth is not controlled. This present study aims to investigate the presence of phytochemicals and their antibacterial potential against human pathogens. Preliminary phytochemicals of Stigeoclonium sp were screened with three different solvent extracts such Benzene, Ethanol, and Methanol; the presence of ten different types of secondary metabolites such as Alkaloids, Steroids, Tannin, Saponin, Flavonoids, Terpenoids, Cardiac glycoside, Phenolic compound, Aromatic acid, and Xanthoprotein were recorded. In the antibacterial screening, the Benzene extract showed highest activity against Shigella sp with an inhibition zone of 7mm, a moderate level of activity was observed in ethanol extract against Shigella sp with a 4mm inhibition zone, and methanol extract against E.coli and Vibrio sp with the inhibition zone of 3 mm each. From the obtained results, it was noted that all three solvent extracts of Stigeoclonium sp possess different active secondary metabolites with antibacterial potential against bacterial fish pathogens, and could be utilized as a source of natural products.

Keywords: *Algae, Stigeoclonium sp, Phytochemical analysis, Antibacterial activity, Fish pathogens*

Introduction

Stigeoclonium is a common genus of freshwater alga in still and flowing waters, sometimes free-floating but more often attached to other plants or too-hard surfaces. Portions of Stigeoclonium filaments are prostrate and attached to the substrate, while the branches are more upright. Bacterial diseases are a major problem to mankind, to restrict or control bacterial diseases,

different antibiotics and vaccines are used, persistent usage leads to the emergence of resistance in pathogens; demands finding an alternative natural product without any side effects. Many compounds of freshwater algae have antibacterial action viz., fatty acids (Desbois *et al.*, 2009), terpenoids, carbohydrates (Duff & Bruce, 1966), peptides, polysaccharides and alkaloids (Borowitzka, 1995) Many biological and pharmacologically active substances isolated from algae are difficult to be synthesized chemically (Kaushik, 2008).

Materials and methods

The freshwater alga, *stigeoclonium* used in this study was collected from the earthen pond of the Center for Aquaculture Research and Extension (CARE), St. Xavier's College, Palayamkottai. The different extracts such as Ethanol, Methanol, and Benzene of *Stigeoclonium* sp., were tested for Alkaloids, Cardiac Glycosides, Saponins, Steroids, Tannins, Terpenoids, Flavonoids, Glycosides, Phenolic compounds, Aromatic compounds, Xanthoprotein. (Chaudhary *et al* 2010; Evans &Evany 2009) and antibacterial activity was assessed by following a disc diffusion assay. The extract with high activity (methanol extract) was partitioned between ethyl acetate and water this water phase is subsequently partitioned again with n-butanol to localize and to assess the (wright,1998; Slattery *et al*,1995) polarity of the active substance, then the three phases were collected separately, evaporated, concentrated, and screened against ten human pathogens.

Brine Shrimp Lethality Assay.

The toxicity effect of the bacterial extracts was assessed according to the Brine shrimp lethality test (BSLT). Briefly, 20 *Artemia salina* larvae were grown in a vial, each containing 4 ml of seawater with different concentrations of bacterial extract (400 µg/ml, 200 µg/ml, 100 µg/ml, and 50 µg/ml) and incubated at 27°C for 24 hours under a light. Thereafter, the surviving larvae were counted. Each sample was analyzed in triplicate. The mortality percentage of each treatment was determined using the following formula: The lethal concentration (LC₅₀) value was determined by converting the percentage of mortality to the probit value. The LC₅₀ was observed from the fit line by linear regression analysis (Meyer *et al.*, 1982). These calculations are performed using SPSS software version 16.0.

Result

Through our study, we found that *Stigeoclonium* attains mass growth in moderate sunlight. Alkaloids, steroids, tannins, saponins, terpenoids, phenolic compounds, and aromatic compounds are present in all solvent extracts. But the flavonoids are present only in the benzene extract likewise the xanthoprotein is also present only in the benzene extract where cardiac glycosides show a negative result in methanol extract (Table 1).

Antibacterial activity of the Benzene extract showed a higher level of activity of 14 mm against *Salmonella typhimurium* and 7mm against the *Shigella sonnei* followed by benzene, the moderate level of activity was recorded in methanolic extract against *Staphylococcus aureus*, the zone of inhibition of 12mm, 3 mm in *E.coli* and *Vibrio cholera*. The ethanol extract exhibited an inhibition zone of 4 mm only against the *Shigella sonnei*. The least activity was recorded in methanol extract against *E.coli* and *Vibrio cholerae*, with the zone of inhibition of 3mm each. The ethyl acetate, butanol, and water phase of freshwater algae *Stigeoclonium* showed high activity against certain human pathogens like *Salmonella typhimurium* and *Staphylococcus aureus*. The butanol phase showed a high level of the inhibitory zone of 14 mm which was observed in both the test pathogen it indicates the presence of intermediate active polar components in the alga whereas in the ethyl acetate phase, the minimum inhibitory zone of 3 mm in *Staphylococcus aureus* and 4mm in *Salmonella typhimurium* was observed which may due to the presence nonpolar components and no activity was observed in the water phase.

The Lc50 value of the ethanol extract is found to be 1.234; in the methanol extract to be 1.003 and in the benzene extract to be 0.681. The probability value for lethal assay of ethanol, methanol, and benzene is represented in table 3..

Table: 1 phytochemical screening of freshwater algae.

Sn.o	Phytochemical test	Benzene	Ethanol	Methanol
1	Alkaloid	+	+	+
2	Steroid	+	+	+
3	Tannin	+	+	+

4	Saponin	+	+	+
5	Flavonoids	+	-	-
6	Terpenoids	+	+	+
7	Cardiac glycoside	+	+	-
8	Phenolic compound	+	+	+
9	Aromatic acid	+	+	+
10	Xanthoprotein	-	+	+

Table: 2 Antibacterial activity of partitioning extract

Sl. No	Name of the bacteria	Extract of <i>stigeoclonium</i> sp. by partitioning method		
		Inhibition level (%)		
		Ethylacetate	Butanol	water
1	<i>Salmonella typhimurium</i>	4	14	0
2	<i>E. coli</i>	0	0	0
3	<i>Staphylococcus aureus</i>	3	14	0
4	<i>Vibrio cholerae</i>	0	0	0

Table: 3 Bio-lethal assays of ethanol, methanol and benzene extract of *Stigeoclonium*

Dose (µg/ml)	Total no. of shrimp	No. of dead shrimp			Mortality %			Probability		
		E	M	B	E	M	B	E	M	B
0	15	0	1	0	0	3	0	0.037	0.050	0.053
50	15	2	3	3	11	9	11	0.089	0.170	0.143
100	15	3	5	5	17	15	19	0.184	0.396	0.301
200	15	5	9	8	29	28	30	0.325	0.667	0.510
400	15	7	14	10	41	43	38	0.496	0.870	0.715

Discussion

Mestry and shankhadarwar (2015) investigated *Stigeoclonium* and recorded the phytochemical constituents like flavonoids and phenols. Similarly in the present study, we observed the presence of flavonoid and phenol compounds in the benzene extract along with other compounds viz., alkaloid, steroid, tannin, terpenoid, saponin, cardiac glycosides, phenolic compounds, aromatic acid, xanthoprotein. Kausalya and Narasimha Rao (2015), reported that depending upon their solubility and polarity, different solvents showed different antimicrobial activity. So chemical compounds should be extracted in order to screen their antibacterial activity by selecting the best solvent system. We partitioned active methanol crude extract using ethyl acetate, butanol, and water; among them butanol showed the highest level of antibacterial activity followed by ethyl acetate which is due to the presence of the active intermediate polar and polar compound. It is also necessary to evaluate bio-lethal assay to test natural products for biological and pharmacological activity. Methanol extract showed LC₅₀ value of 1.234 which could be correlated with the study by Sreejamole and Greeshma (2013), who observed a cytotoxic effect on brine shrimp and reported that the mortality was directly related to the concentration of the ethanol extract of seaweed *Gracilaria Corticata* tested, the LC₅₀ value was found to be 1.081mg/ml.

Conclusion

The *Stigeoclonium* collected from the freshwater pond showed the presence of different secondary metabolites; the crude methanol extract has shown good activity against the gram-positive bacteria followed by benzene which showed high activity against gram-negative bacteria. The partition extraction of methanol with butanol showed maximum inhibitory activity against both the gram-negative and gram-positive pathogen. The probit analysis of brine shrimp lethality assay revealed higher lethality in ethanol extract and least in benzene extract. The obtained results indicate that the secondary metabolites extraction with butanol would yield a range of promising anti-bacterial compounds that could be utilized for further work.

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E-REMOTE SENSING AND ITS APPLICATIONS FOR MANAGING SOIL DEGRADATION, WATER RESOURCE CONSERVATION AND MANAGEMENT

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ABSTRACT

Remote sensing is the process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance (typically from satellite or aircraft). Principle of Remote Sensing: The source of remote sensing data is the electromagnetic radiations which are emitted or reflected by the object, which then helps in their identification and classification. Components of Remote Sensing :1. Platform, 2. Sensors 3.Elements Involved in Remote Sensing 4.Types of Remote Sensing Systems 5. Basic Processes in Remote Sensing 6.Remote Sensing Applications. Soil degradation is the decline in soil condition caused by its improper use or poor management, usually for agricultural, industrial or urban purposes. It is a serious environmental problem. Soils are a fundamental natural resource, and are the basis for all terrestrial life. Types of Soil Degradation : Soil degradation can be classified into four main types of degradation:1. water erosion ,2 wind erosion, 3. chemical deterioration, 4. physical deterioration. Soil management is the application of operations, practices, and treatments to protect soil and enhance its performance (such as soil fertility or soil mechanics). Water conservation and Management are: .Rainwater Harvesting, Groundwater Harvesting, Drip Irrigation Dams, Water-wise Habits

Keywords : *Remote Sensing , Electromagnetic Radiation, Degradation, Fertility , erosion and deterioration*

Introduction

Remote sensing is the process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance (typically from satellite or aircraft). Special cameras collect remotely sensed images, which help researchers "sense" things about the Earth. Remote sensing is the science and technology by which the properties of specified objects,

area, or phenomenon can be identified, measured, and analyzed without direct contact with them in order to make useful decisions. The applications of remote sensing include land-use mapping, weather forecasting, environmental study, natural hazards study, and resource exploration.

Principle of Remote Sensing

The source of remote sensing data is the electromagnetic radiations which are emitted or reflected by the object, which then helps in their identification and classification.

Components of Remote Sensing

1. Platform

A Platform is defined as the carrier for remote sensing sensors. There are three major remote sensing platforms: ground-level platform (towers and cranes), aerial platforms (Helicopters, low altitude aircraft, high altitude aircraft), and spaceborne platforms (space shuttles, polar-orbiting satellites, and geostationary satellites).

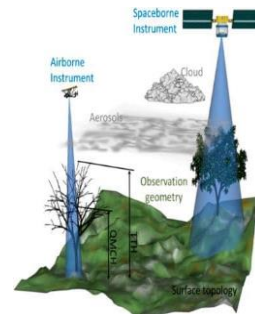


Fig. 1: Ground-Based Platform Fig. 2: Airborne Platform Fig 3: Space-Based Platform

2. Sensors

It is a device that receives electromagnetic radiations and converts it into a signal that can be recorded and displayed as either numerical data or an image.

Elements Involved in Remote Sensing

1. Energy Source or Illumination (A)
2. Radiation and the Atmosphere (B)
3. Interaction with the Object (C)
4. Recording of Energy by the Sensor (D)
5. Transmission, Reception and Processing (E)
6. Interpretation and Analysis (F)

7. Application (G)

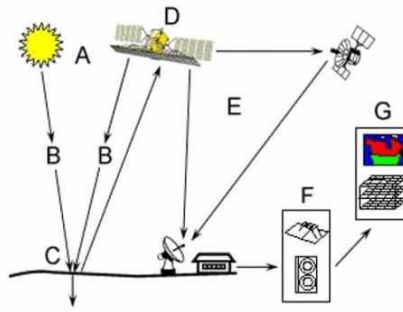


Fig. 4: Elements Involved in Remote Sensing

Types of Remote Sensing Systems

1. Visual Remote Sensing System such as human visual system
2. Optical Remote Sensing
3. Infrared Remote Sensing
4. Microwave Remote Sensing
5. Radar Remote Sensing
6. Satellite Remote Sensing
7. Airborne Remote Sensing
8. Acoustic and near-acoustic remote sensing

Basic Processes in Remote Sensing

1. Data acquisition (energy propagation, platforms)
2. Processing (conversion of energy pattern to images)
3. Analysis (quantitative and qualitative analysis)
4. Accuracy assessment (radiometric and geometric correction)
5. Information distribution to users

Remote Sensing Applications

1. Land Use Mapping
2. Weather Forecasting
3. Environmental Study
4. Study of Natural hazards
5. Resource exploration

Soil Degradation

Soil degradation is the decline in soil condition caused by its improper use or poor management, usually for agricultural, industrial or urban purposes. It is a serious environmental problem. Soils are a fundamental natural resource, and are the basis for all terrestrial life. Avoiding soil degradation is crucial to our well-being. Soil degradation can be either a result of natural hazards

or due to unsuitable land use and inappropriate land management practices. Mismanagement of arable areas by farmers, cultivation practices that are not adapted to local environments and overgrazing by livestock are seen as the major causes of soil degradation.

Types of Soil Degradation

Soil degradation can be classified into four main types of degradation:

1. water erosion
- 2 wind erosion
3. chemical deterioration
4. physical deterioration.

Application of Soil management - Soil management is the application of operations, practices, and treatments to protect soil and enhance its performance (such as soil fertility or soil mechanics). It includes soil conservation, soil amendment, and optimal soil health. In agriculture, some amount of soil management is needed both in nonorganic and organic types to prevent agricultural land from becoming poorly productive over decades. Organic farming in particular emphasizes optimal soil management, because it uses soil health as the exclusive or nearly exclusive source of its fertilization and pest control.

Sustainable Soil Management

- Maintain Soil Livestock. The Recycle nutrients and many other benefits
- Organic Matter (OM) is food for the soil Microbes
- Cover the soil (Mulching), you may loose nutrients due to erosion temperature extremes
- Minimum or No Tillage .It Speeds the organic matter decomposition
- Maintain Nitrogen in Soil , Higher Nitrogen (N) in soil means higher decomposition of organic matters and vice versa also low N starves Pant.
- OM degradation should be less than its addition to maintain the soil fertility. Soil Fertility should be in Acceptable Level before doing Agriculture

Water Resources

Water- a must for all life forms on earth and the most important natural resource. We all know that about three-fourths of the earth's surface is covered with water. But about 96.5% of the global water resources come from the oceans and seas. In India, the water resources amount to an estimated 1897 square kilometer per annum. However, we all know about the shortage of Water we are facing as a country. Let us learn more about the conversation of the water resource

Conservation of Water Resource

The most common misconception people believe is, water is replenish able and will be around us forever. The reality is, many of them are uneducated about the conservation of water resources. If we do not do something now to conserve water, Our future generations will not be able to have access to pure water. By doing proper planning, water can be supplied to many places regularly in town or city. But many times some amount of water is wasted through leakage of pipe and many other reasons.

As we know that proper water management is necessary for water conservation methods. Thus, it is important for CWA authorities to take proper care of these problems while distributing water to our homes. Most of the rainwater gets wasted even though it is one of the most precious natural resources. Farmers can play an important role in water conservation methods by using suitable techniques like rainwater harvesting and drip irrigation.

Water Conservation Methods

The different methods of water conservation are:

- ***Rainwater Harvesting:*** It is the process of collection and storage of rainwater, rather than allowing it to run off. Rainwater is collected from the roof and is redirected to a tank, reservoir, cistern, or natural tanks, etc.
- ***Groundwater Harvesting:*** It is a method for saving water placed under the ground to control the groundwater flow in an aquifer and to raise the water table.
- ***Drip Irrigation:*** It is a type of irrigation that saves water and fertiliser by dripping water slowly to the roots of various crops, either on the soil surface or directly to the root zone, through a

network of pipes, tubing, and valves. This process saves more water compared to the traditional watering method.

- **Dams:** Dams are simple hydraulic structures that act as a barrier between the source and destination of flowing water. Earlier times, these dams were very small and hand-made while in modern times, new engineering techniques and methods are used to construct large dams.
- **Water-wise Habits:** There are various good habits to conserve water for a long time. Some of them are Fixing leaky taps, Keeping the tap closed while brushing, taking a shower of 5 mins instead of long baths are a few examples of saving water. The Indian practice in old times of cleaning water using brass vessels is well known and still continues. Even today water filter systems made from brass are very common. Older people in India use brass pots in the evening to store water and drink it during the daytime.

Water Management

Water is the most important natural resource. Many factors over the years have resulted in the degradation of natural resources including water bodies. Let us discuss the steps that can be taken for the conservation of water and what can be done on our behalf for the same. The activity of developing, planning, managing and distributing the optimum use of water resources is defined as water resource management.

- **Rainwater harvesting:** The method of storage and collection of rainwater into reservoirs or natural tanks is known as rainwater harvesting.
- **Groundwater harvesting:** A method to save water placed under the ground is groundwater harvesting.
- **Drip irrigation:** When the irrigation is done through dripping water slowly with the roots of various crops either directly onto the root out onto the soil surface in the method of drip irrigation.
- **Rainwater harvesting:** The rainwater is stored in big ponds or other things in the method of rainwater harvesting. This stored water can be reused in the future.
- **Water-saving habits:** There are various wise habits to conserve water. Light taking a quick shower instead of long baths, lesser use of water during washing the clothes and fixing leaky taps.

Conclusion

The applications of remote sensing include land-use mapping, weather forecasting, environmental study, natural hazards study, and resource exploration. Soil degradation, a significant environmental issue, refers to the loss of soil quality due to incorrect usage or poor management, generally for industrial, agricultural, or urban reasons. The foundation of all terrestrial life is soil, a critical natural resource. It is essential for our health to prevent soil degradation. Out of 70% of the Earth's surface water only 3% is freshwater. Of which only 1% is usable water in lakes, subsoiler aquifers and rivers and 2% is in polar ice caps. Fractions of this can only be utilized at a global level, 70% of water is used for agriculture, about 25% for industry and only 6% for domestic use. This Article's primary focus is on ways of Water Management.

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VALUE-ADDED GOODS FROM E-WASTE

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ABSTRACT

Technological development is the introduction of environmentally friendly atmosphere for human being. When e-waste is correctly disposed of, significant environmental damage can be avoided, and valuable resources, particularly metals, can be recovered. The electronic waste recycling process is divided into three primary stages: collection, sorting/dismantling and pre-processing and end-processing. Smartphone e-waste innovation focuses on the device's components rather than the device itself. As a result, innovation in mobile device processing and recycling spans a variety of fields, including screens, batteries and printed circuit boards.. The reduction of salvageable components, refurbishment and reuse, and processing for raw material recovery have all resulted in significant global transboundary movement of abandoned smart phones, used electronic equipment, and other items in recent years. Smartphone and their related components are e-waste remains solitary midst the recycling product.

Keywords: - Globalization, Workable, Technology, ICT, Electrical items, Organization, Society, Trash

Introduction

The term "e-waste" refers to electronic waste. It is, garbage generated by broken, surplus, or obsolete electronic equipment. Sometimes it is referred as "e-scrap" by the users. These electronics frequently contain hazardous chemicals and compounds. Furthermore, students' incorrect disposal of these electronics may result in the discharge of dangerous substances into the environment. The subsequent processing and reuse of these electronic wastes is referred to as "e-waste recycling." It is a technique for attempting to rescue materials from electronic waste. In this way, they can be used in new technological devices.

Air conditioners, televisions, electric cooktops, heaters, DVD players, fans, microwaves and radios are examples of electronic trash. They might also take the form of information technology

electronic equipment such as computers, laptops, mobile phones, batteries, hard drives, circuit boards and displays. E-waste is a significant issue due to the limited usable life of electronics. As a result, they soon degrade into technological rubbish.

E-Waste

E-waste recycling is one of the most hotly debated subjects that receives the most attention because of its potential to lessen environmental risks and pollution. It can also defend the life of humans and other living creatures in our globe. E-waste is the recycling of any type of electrical and electronic equipment that has been abandoned or declared outdated. E-waste, or discarded materials from obsolete electronics, frequently contains a mix of valuable materials, critical heavy components and hazardous toxins. Only 20% of all e-waste generated globally is properly recycled; the vast majority is dumped in landfills, where it eventually pollutes the environment. (Siobhan Treacy, 2020).

Recycling Resources

Recycling is the process of gathering and converting resources into new goods that would otherwise be thrown away as waste. Both the environment and community may benefit from recycling. E-waste recycling is a trend that is on the rise and it was started mostly because of the widespread environmental contamination effects of e-waste.

Millions of electronics are used every day. The majority of them eventually perish in landfills as they near the end of their lifetime. Just 12.5% of e-waste is recycled (Rinkesh, 2019). The following are a few typical commodities that people can purchase that have been manufactured with recycled materials:

Batteries

Individual scrap batteries can be brought to specialised recyclers so that cadmium, steel, nickel and cobalt can be extracted for use in new batteries. They can also be used to create stainless steel. There is an unlimited list of other objects in addition to those that are stated. Overall, recycling any item or component can be done in a certain way. And no, there isn't a one-size-fits-all strategy for recycling e-waste. There is, however, a standard approach to take.

Mercury-Mercury may be removed from devices before sending them to recycling centres using specialised technology. Metric tools, dental amalgam and fluorescent lights are the final products of this elimination.

Hard Disk- Hard drives can be broken down and processed to recover aluminium ingots. These are very helpful for cars.

Circuit Boards-Resources including tin, gold, silver, copper, palladium and precious metals are smelted and recovered by certified and specialised businesses.

Toner & Ink Cartridges- These toner and ink cartridges are taken for recycling by recyclers in various manufacturing sectors that remanufacture them. After that, they use the metals and plastic they recovered as the basis for additional products.

Glass-Glass can be extracted from CRTs (Cathode Ray Tubes) throughout televisions and computer monitors. However, there is a slight issue here. Lead is one of many dangerous chemicals found in CRTS. Additionally, this poses a threat to the immediate environment as well as human health. This makes getting a glass out of CRTs challenging. To ensure safer CRT recycling, consumers can take a few specific measures.

Start by removing the CRT from the television or monitor. Next, smash apart the CRT into little pieces. Utilize over-band magnets to remove the metals. This aids students in clearing that glass of ferrous and even non-ferrous things. After that, clean the phosphors and oxides off the glass using washing lines. Glass sorting is the final stage. Here is where people discriminate between leaded and non-leaded gas. The extract can then be used by users to create subsequent screens.

Plastics

Materials comprised of plastic can be reclaimed and recycled. The recycled plastic elements can subsequently be used to create products like plastic vineyard stakes and sleepers. Additionally, available are equipment carriers, plastic trays, insulators, fence posts, and much more.

Metal- To manufacture newer steel goods and metals, metals can also be retrieved and recycled.

Benefits of E-Waste Materials

- Fewer garbage is disposed of in landfills and burned in incinerators
- Conserve natural resources including water, minerals and wood
- Utilize a home supply of materials to increase economic security.
- By lowering the need to gather additional raw materials, reduces pollution
- Conserve energy.
- Conserves precious resources and aids American manufacturing
- Helps to create employment in the manufacturing and recycling industries
- Reduce Global Warming
- It prioritises Environment Protection
- Conserve available Natural Resources

Conclusion

Recycling e-waste is a vital big phenomenon for a variety of reasons. It has a huge influence on both global life and our local environment as humans. It also ensures significant economic rewards for individuals, communities, and even regional economies. Many people have begun to take advantage of the numerous opportunities that e-waste recycling provides. Entrepreneurs in developing nations are using e-recycling as a stable income stream while also advancing environmental goals. Even though the stages are labour-intensive, they are straightforward to follow. There are several stages to follow, beginning with gathering and sorting and ending with putting everything ready for sale. Consequently, consumers may immediately benefit from recycling e-waste while also helping to save the ecosystem.

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**FUTURE SUSTAINABILITY OF INDUSTRIES (AGRICULTURE, FORESTRY,
FISHERY)**

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ABSTRACT

Sustainable development is the development that meets the needs of the present generation without compromising the ability of future generations to meet their own need. It is the concept which was incorporated in the business operations recent times. The concept was developed over years ago, yet it gets implemented and become a competing strategy in the modern business environment.

Keywords: *Sustainable development, strategy*

Introduction

The word sustainability deals with the giving the current resources to the future generation. The earth is not only for the human species, it is also for the all the varieties of organisms living in it. To remember this concept the term “SUSTAINABLE DEVELOPMENT “ is used. The main motive of the sustainable development is to saving the environment and ecology for future generation. In most often it is mandatory topic to speak in 20th century. In 20th century environment are degraded day by day. It is only be possible to regain all the benefits of environment by sustainable development. Sustainable development is needed in all the branch of environment. Sustainable development deals with the various branch of science in development process. As our technologies have growing day by day; its threats also growing in different propective. I may be looks less impact to the environment, but it has the lot of impact in environment. In upcoming years it also has the large impact on environment. Sustainable development is practiced in 20th century. It has major role in development of ecosystem and environment. Sustainable development is maintaining a delicate balance between the human need and the preserving natural resources and ecosystem on which we and future generation depends. The only sustainability technique will helps us to give the healthy environment for healthy life. There are various types of the sustainability in the field of science.

Because science is broad long lasting growing day by day. Different types of techniques are uses in different types of field.

“THE FUTURE OF SUSTAINABILITY LIES IN GREEN EFFORTS THAT CHAMPION NEW APPROACHES TO HOW PEOPLE USE AND DISPOSE OF MATERIAL”

Sustainability improves the quality of lives protects our ecosystem and preserves natural resources for future generation. In the corporate world, sustainability is associated with an organisation holistic approach, taking into account everything, from manufacturing to logistic to customer service.

Sustainable development of agriculture-Sustainable agriculture is the practice of farming using principles of ecology, the study of relationship between organaism and their environment. This form of agriculture enables us to produce healthful food without compromising future generations ability to do the same.

Objectives- To satisfy human food resource. Make use of non renewable resources and on farm resources an integrate where appropriate. Sustain economical viability of farm operation. Enhance the quality of life of farmers. The main motive of sustainable agriculture is to satisfy the human food and clothing. It has the major role in the well being of the human lifestyle. It takes better advantage on farm resources. The four baic goals of sustainable agriculture are environmental health, economic profitability, and social and economic equity. Some times these three are referred as the “three legs” of sustainability stool.

Benefits of sustainable agriculture-Sustainable farming has huge role in environmental preservation. Sustainable farming produce crops and raise animals without relying on toxic chemical, pesticides, synthetic fertilizer, generally modified seed, or practicing seed or practices that degrade soil, water or other natural resource.. Another main role of sustainable agriculture is to avoid hazardous wate, pesticide. Sustainable agriculture, Which are more efficient for the development of the fertilised agricultural land. Sustainable farmers and ranchers treat animal with care an respect, implementing livestock husbandry.

Sustainable practice of growing series of different types of crops in same area in sequential season, known as Crop Rotation. Crop rotation gives various nutrition to soil, it also mitigates the build up of pathogens and pests that often occurs when when one species is continuously cropped and also

improve soil structure and fertility. It has also a huge role in bio technology use of living organisms to develop or make useful products. It also provide appropriate new tools for use in solution of specific problems in sustainable agriculture. Another one of the major role of sustainable agriculture is to Organic Fertilizer. Organic matter are derived from the animal matter or veg matter. The use of organic matter in sustainable garden and farms re quickly gaining popularity.

Sustainability of forestry-Sustainable forest management is the management of forests according to the principles of sustainable development. Sustainable forest management ha to keep the balance between three main pillers: ecological, economic social cultural. At global level forest mitigate climate change through carbon sequenstration,, contribute to the balance of oxygen , carbon di oxide and humidity in the air and protect watersheds, which supply 75% of freshwater worldwide.

The stepwardship and use of forests and lands in a way , and at a rate, that maintais their biodiversity , productivity, generation capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social function, at local, national, and global levels and that doesnot cause damage to other ecosystem.

It helps to provide important ecosystem services, such as carbon sequentation, biodiversity conservation, and protection of water resources. Sustainable forest management also helps with climate change adaptation by increasing forest ecosystem resistance to future climatic hazards and lowering the danger of additional land degradation by repairing and stabilizing soils and boosting their water retention capacity. Sustainable forests management aims to preserve the worlds forest by maintaining and enhancing the economic , social and environmental values of all types of forests, for the present and the future. Sustainable forest management means using and caring for forests in way that meets daily needs while protecting the forest for future. Forest are fundamentals of food , agricukture, nutrition , health, water, energy, housing, livelihoods , employment, culture , biodiversity. Forest are fundamental of food and nutrition. It provides food and household fuel for 1 billion of world population. Upto 50% of traditional medicine are derived fromfundamental the forest. Forest are fundamentals of water it gives 75% of usable water world wide. Only due to the degradation of the forest the poverty and inequity persists worldwide, including in rural areas. Forest are amongshe most biologically rich orest underpins terrestrial system. Today it understand that forest diversity underpins a wide range of goods and service for human well being. Current scenario of forests : More than 1.6 billion people depend to varying degrees on forest on their livelihoods. The

consumption of main timber products. There are significant growth in non timber forest products(NTFP).

Sustainable development of fisheries

The main goal and objectives of sustainable development of fisheries is to maintain the target species at or above the level of necessity to ensure their continued productivity. To minimize the impact of fishing. Conventional idea of a sustainable fishery is that it is one that is harvested at a sustainable rate, where the fish population does not decline over time because of fishing practices. Sustainability in fisheries combines theoretical disciplines, such as the population dynamics of fisheries, with practical strategies, such as avoiding overfishing through techniques such as individual fishing quotas, curtailing destructive and illegal fishing practices by lobbying for appropriate law and policy, setting up protected areas, restoring collapsed fisheries, incorporating all externalities involved in harvesting marine ecosystems into fishery economics, educating stakeholders and the wider public, and developing independent certification programs.

Conclusion

Primary production required (PPR) to sustain global marine fisheries landings expressed as percentage of local primary production (PP). Estimates of PPR, PP and PPR/PP computed per 0.5° latitude/longitude ocean cells. PPR estimates based on the [www.seararoundus.org Sea Around Us] catch database and PP estimates derived from SeaWiFS's global ocean colour satellite data. The maps represent total annual landings for 1950 (top) and 2005 (bottom). Note that PP estimates are static and derived from the synoptic observation for 1998.[1]

Some primary concerns around sustainability are that heavy fishing pressures, such as overexploitation and growth or recruitment overfishing, will result in the loss of significant potential yield; that stock structure will erode to the point where it loses diversity and resilience to environmental fluctuations; that ecosystems and their economic infrastructures will cycle between collapse and recovery; with each cycle less productive than its predecessor; and that changes will occur in the trophic balance.

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**THE CHALLENGES FACED BY DEVELOPING COUNTRIES TO MITIGATE
EMISSIONS: A MANAGEMENT PERSPECTIVE**

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ABSTRACT

"We are the first generation to experience the impact of climate change and the last generation that can do something about it," says Barack Obama. Companies are altering every aspect of their operations due to climate change, and in the modern business world, sustainability objectives are of utmost importance. People in developed nations have the means and are making various efforts to reduce their emissions. But in developing nations, there are many obstacles to overcome that prevent people from giving up their non-renewable assets. These include the high cost of technology, financial limitations, the legal system, and the general absence of citizen education. Knowing about the problem, a few businesses in developing nations like Infosys, Tata, Safaricom, Sitnesa Company, and others are revamping their industries. Many developing countries are struggling with unsustainable debts while trying to ensure the food and security needs of their people; it's the need of the hour for world countries to support each other on this highly elevated vision. In spite of all the obstacles and difficulties, as well as their unwillingness to give up their non-renewable energy source, people and businesses in developing nations every day make modest advancements towards the lofty goal of net-zero emissions.

Keywords: *climate change, environmental destruction*

Introduction

The Intergovernmental Panel on Climate Change (IPCC) predicts that over time, changes will cause global temperatures to increase, the water cycle to change, and the climatic zones to shift. Climate change has disrupted infrastructure, services, and the supply chain in addition to the ecosystem. By 2030, the EU hopes to have its greenhouse gas outputs at least 55% lower than they were in 1990. Although there is a higher need to switch to alternative energy sources, it is always unclear why developing nations can't do the same. Because fossil fuel subsidies account for 25–30%

of government revenue, population growth increases energy consumption, and developing nations are increasingly dependent on fossil fuels. As they are consistently using their non-renewable resource they risk running out of non-renewable materials. Now, where will they now locate the substitute? Why are they unable to change? How will they supply their future energy demands? It's simpler to say than to do, as the saying goes. How can developing nations change when many things work against their attempts to reduce emissions? The barriers and difficulties that developing nations experience in reducing emissions are generally covered in this paper.

Elements leading environmental destruction

Inducing power-Using fossil fuels to provide power and heat accounts for a sizable portion of world emissions. Burning coal, oil, or gas still supplies the majority of the world's electricity, which produces carbon dioxide and nitrous oxide, two potent greenhouse gases that cover the planet and trap the sun's heat. A little over a quarter of the world's electricity is generated by renewable energy sources including wind, solar, and other natural resources, which, in contrast to fossil fuels, create very little to no greenhouse gases or other air pollutants.

Manufacturing products-Manufacturing and industry generate emissions, primarily from the combustion of fossil fuels to generate energy for the production of cement, iron, steel, electronics, plastics, clothing, and other goods. Mining and other industrial processes, as well as the construction industry, emit gases. Machines used in the manufacturing process are frequently powered by coal, oil, or gas, and some materials, such as plastics, are made with chemicals derived from fossil fuels. The manufacturing industry is a major contributor to global greenhouse gas emissions.

Surfiet consumption-Individual home and power consumption, how people move around, how they eat, and how much waste they generate all contribute to greenhouse gas emissions. Consumption of goods such as clothing, electronics, and plastics also increases. Private households are responsible for a significant portion of global greenhouse gas emissions. Our way of life has a significant impact on our planet. The wealthiest bear the greatest burden: the richest 1% of the global population account for more greenhouse gas emissions than the poorest 50%.

Taking public transportation-The majority of automobiles, trucks, ships and planes run on fossil fuels. As a result, transportation is a major source of greenhouse gases, particularly carbon dioxide emissions. The combustion of petroleum-based products, such as gasoline, in internal combustion

engines, accounts for the majority of the contribution. However, emissions from ships and planes continue to rise. Transportation accounts for nearly a quarter of global energy-related CO₂ emissions. And trends indicate that energy use for transportation will skyrocket in the coming years

Blocks for change

Price of technology -The cost of projects incorporating renewable energy is high; there are many factors that contribute to this. Everything from the cost of the technology used to the cost of hiring experts and specialists for project development to the cost of the actual studies done to determine whether the project is viable and how much funding is needed. Due to the high capital expenses of renewable energy technologies, constructing large-scale renewable power plants is very expensive.

Economic and financial constraints-Lending money at a higher rate is risky in the eyes of financial organizations. Chile's financial marketplaces face difficulties when dealing with renewable energy sources. This is due to a lack of understanding of non-traditional sources, guarantee requirements, uncertainty about long-term profitability, and alternatives in the traditional sector that are accessible with reduced risk and greater profitability. On imported products like PV and related systems, which are regarded as luxury commodities, the majority of developing nations impose astronomical tariffs and Value Added Tax (VAT)

Price imbalance-It is unfair to compare the prices of renewable energy and traditional energy in developing countries because renewable energy is more expensive than fossil fuels due to the lack of environmental externalities, such as health care costs, in the pricing of fossil fuels. Traditional energy has historically and continues to enjoy financial and political benefits.

Non-economic blocks

Policy and legal blocks-The majority of developing nations, particularly those in Africa, lack the resources and the motivation to create the kind of legal framework that would make the energy sector's operations more efficient, where there are regulatory agencies. The government gives renewable energy less support than it does conventional energy. The low level of domestic R&D spending and the absence of federal R&D efforts are examples of this.

Technical blocks-The main barriers to installing green energy in developing countries are a lack of skills in many countries and disparate skill levels across the nation. The limited grid infrastructure in

areas where renewable resources are most plentiful is one of the main obstacles to increased current and future renewable energy production.

Revamping of business in emerging nations

Infosys-Companies have demonstrated their commitment to a more sustainable future through carbon neutrality. However, what is missing is an actionable framework to reach that future. Practical Sustainability is Infosys' framework to tackle the sustainability challenge, with its foundation in five essential elements. An ethical fusion of information, tangible products, and money to conduct business creatively and sustainably. Businesses must use technology to reduce consumption and trash, moving beyond "recycle to reuse." "This makes them to optimum utilization of resources. The company won the 2019 UN Global Climate Action Award.

TATA-Tata Power operates wind power facilities with an installed capacity of 932 MW in the states of Maharashtra, Gujarat, Tamil Nadu, and Karnataka. India's three leading states for promoting wind electricity generation are Rajasthan, Andhra Pradesh, and Madhya Pradesh. In addition to installing more than 55000 solar water pumps in India to date, Tata Power Solar has a portfolio of more than 7GW of ground-mount utility-scale, over 750MW of the rooftop, and distributed production projects. Additionally, it provides a broad range of solar products for both metropolitan and rural markets.

SAFARICOM-Safaricom, Kenya's top telecommunications company, gathered 1,072 tons of electronic waste in its fiscal year 2019 and provided 6.3% of the nation's GDP. Since 2012, sustainability has been a part of the company's corporate strategy; its performance goals directly address at least nine of the UN's Sustainable Development Goals (SDGs).

SITNESA Group-The business group also has a program for urban food security with plans to create eco-tourism in special economic zones which focus on sustainable tourism. This group also focuses on providing health products through the Sitnesa health portfolio and becoming the global part of providing green and renewable energy through Sitnesa energy products.

India's contribution-The shipping sector currently accounts for 3% of the global greenhouse emissions by knowing this India has planned to bring in hydrogen hubs in three major ports namely Paradip port (Odisha), Deendayal Port (Gujarat), VO Chidambaranar Port (Tamil Nadu). India aims to meet 60 percent of its energy requirements at major ports through renewable energy like solar and wind.

Conclusion

“The consumer has more variety thanks to globalization, but society as a whole has less variety”. Innovations are exploding out of nowhere, and industrialized nations have a vast array of resources to quickly introduce new innovations. On the other hand, emerging nations are having trouble reducing emissions. For established or developing countries, respectively, did e-vehicles develop? Is that feasible for less developed nations and economies? The aim is to achieve net-zero emissions, but this lofty goal cannot be realized unless and until all nations work together to support one another in achieving their sustainable objectives and in creating renewable energy technology that is affordable in developing nations. We can’t deny the fact that the global net-zero goal can only be achieved by doing these.

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CONTRIBUTION OF CHRISTIAN MISSIONARIES IN THE DEVELOPMENT OF ENVIRONMENT IN TAMIL NADU

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ABSTRACT

The world we live is filled with various Religion, Culture, Environment and traditional practices. Our motherland is the only nation which supports the concepts of unity in diversity. The people of Tamil Nadu receive innumerable support and benefits from various communities who favor the betterment of people and their upliftment in the society. In these situations, the wholesome efforts of the Christian missionaries play a significant role in South India especially in Tamil Nadu. Histories remark that the Christian missionaries were the main factors to renovate the lifestyle of people in Tamil Nadu. They introduced a number of welfare schemes to prove the quality of education among the children and to imbibe medical facilities to the needy. The paper “Contribution of Christian Missionaries in the development of Environment in Tamil Nadu” tries to bring out the adaptations and inevitable help and support provided by the missionaries to have an ecological balance in Tamil Nadu.

Key words: *Deterioration, Decadence, Multifariousness, Ecological, Habitat*

Introduction

Environment includes air, water, and soil and several other flora and fauna. The main duty of the Human beings is to protect and save the nature for future generation. India is a land of variety of Resources. In olden days before arrival of the Christian Missionaries from the various countries, the common people were not provided with any Resources because they do not know the value of it. Christianity which has spread throughout the world was started by St. Thomas, a disciple of Jesus, in Musiri, a port on the Malabar Coast in the first century in India. St. Thomas taught about the love of Christ and Jesus. First, he knew the presence of Jews in Kerala and taught them and then preached

the gospel of Jesus to the Hindus. It is known that St. Thomas also did Christian work in Tamil Nadu in the vicinity of Nagercovil, Chennai, Mylapore.

St. Francis Xavier, Paul Comrade and Francisco Mancilas were sent to India by the Church of Jesus. First St. Francis Xavier arrived in Goa from Lisbon on Monday 6th May 1542 AD. After 5 months, he came to Manapadu near Tuticorin District south-eastern part of Tamil Nadu and started his Christian work especially among paravas people. When St. Francis Xavier compares Lisbon, the capital of Portugal, and Tamil Nadu region, the people of Manapadu region are uneducated, uncivilized, unsanitary life, caste cruelty, lack of temples, lack of good environment, lack of reason, and nominal Christians. He spends most of the time teaching the children than doing any other ministry. He regretted to know that. Apart from the above, the troubles and hardships that faced are innumerable. He was opposed by Brahmins and Muslims for his services in the upliftment of Environment in coastal areas. Paul Comrade and Francisco Mancilas arrived in India in October 1842 AD. Father Diogo arrived in Goa in 1548 AD six missionaries came to India with him. After his time, the Christianity was growing through the missionary works of Fr. Enriques, Fr. Robert De Nobili, Fr. John De Britto and Fr. Joseph Constatius Beschi, Rev. Ziegenbalg, Rev. Schultze, Rev. J.D. Jaenicke, Rev. Gruendler and Mrs.Gruendler, Rev. Philipp Fabricius, Rev. Christian Frederick Schwartz, Mrs. Mary John Thomas, Clorinda, Emi Carmichael etc. At the time when Christian missionaries visited in Tamil Nadu, famine, unsanitary life, pestilence, cholera, superstition, slavery, Devadasi system, caste discrimination, environmental cleanliness, lack of cleanliness, ignorance of the benefits of forest trees, lack of village progress, lack of civilization etc. A difficult situation was observed in Tamil Nadu.

Role of Christian Missionaries for Environmental Development

Religious Teachings on environment-When St. Francis Xavier came to Manapadu area for Christian service, he was saddened to learn that there were no Christian churches. At the same time, the environment in the Manapadu area attracted him. All the trees in the Manapadu area are as green and the fresh sea air seeing the offering, he decided that the shade of the trees would be a good place to worship. So, he continued his teaching under the shade of the tree. All the people listened to his teachings in the natural environment and were converted. He knows the benefits of palm leaves and built small temples of palm leaves. The church was built on palm fronds and provided a good environment for the people.

Educational services-Christian Missionaries played a major role in the development of education in Tamil Nadu. Only Brahmins with education knowledge served in High positions under the British rule. Brahmins built houses in areas with clean, Hygienic and clean air and lived in a good environment. The poor people were seen without any facilities and without any educational knowledge. So, schools were started to provide them with education and environmental awareness. Rev. Rhenius started the first school in Tirunelveli in 1820 at Vannarpet. Hindus do not send their girls to school. As soon as they heard that the Hindu girls remained illiterate, the two sisters of the Christian Missionary As borne in 1868 paid Rs.10, 000 were given to Hindus girls students. Realizing the need for female education for social progress, Rev. John Thomas and his wife decided to build the Girls Boarding school, which was opened in 1841, as a separate school for girls. This effort led to the establishment of Eliot Duxford School. Women were also given education. Apart from free education, Prizes were also given to the children who attended the school. Students were taught about the benefits of the environment and the benefits of trees and water conservation. The habit of growing plants and vines at the side of the house was also taught as part of the evening time.

Creating Gardens

In 1709, three Christian Missionaries came to Tharanganmbadi including Rev. Earnest Gruendler, Rev. George Boevingh, Mr. Poly Carp Jordan. With the money they brought, a garden was bought in a village called Porayar. The village Porayar is located in Tharanganmbadi Taluk of Nagapattinam District in the state of Tamil Nadu. This garden was very useful for the Christian Missionaries in the Porayar region. In the evening a worship meeting was held in this garden. The worshipers were also told about the benefits of the plants, vines, and the benefit of environment the garden. Rev. Charles Theophilus Ewald Rhenius bought a garden in Tirunelveli town from Rev. Houv. Rev. Rhenius was overjoyed to have acquired the garden. He thought that this garden would be very useful for his Christian Missionary work. A men's seminary and a women's seminary were started at Palayamkottai. The seminary students were given Teacher Training, Gardening Training and Environmental Training. In the evenings the seminary students worked in the garden. It is noteworthy that even today Christian Fathers and sisters give importance to gardening and environment.

Papathiyammal Well- Clarinda was the woman who was born in Thanjavur District. She was married to a wealthy man. When he was dead, she was asked to do the cruel practice of Sati. At that

time the British soldier Henry Littleton on rescued her and brought her to Tirunelveli. Clarinda was the first convert of Christianity in Tirunelveli. She started worshiping Christ and did social services. She started a Home for an orphan and women empowerment practices. Mrs. Clarinda generously helped the poor people. She also constructed a well for the use of the people. This well was called Papathiyammal Well. Anyone can draw water from this well without any discrimination. She built this well at her own expense to alleviate the water shortage of the people. Clarinda was also constructed a drain to prevent this well from wasting water. She planted trees near the well and maintained it so that the well did not waste water. Clarinda was also protected the environment.

Teaching Handicrafts

London Mission congregations were found in Kerala state starting from Kollam and extending to Kanyakumari and Koodankulam. Rev. Mead in 1852, Rev. Malt in 1858 and Rev. Thomson in 1850 did the Christian work. Mrs. Mead is an expert in Lace stitching. So, she taught this stitching Handicrafts works to poor women. Through this poor women people started to recover their economic problems. The Lace making Handicrafts spread to Tirunelveli as Rev. Mead's daughter Idyankudi Rev. Caldwell Married. So, this Lace making Handicrafts continued in Menjanapuram. Idyankudi women were not only educated but also skilled in Cooking, Stitching, Reading, Writing, Cleaning, Hygiene, Knitting etc. Christian Missionaries also helped the people to export the products made from Palm leaves. They were well aware of the benefits of the palm leaves. They taught the local people the benefits of every product available from palm trees.

Good Environment in Manapadu

In 1734, the congregational college was established in Manapadu. There six Fathers one chief Father stayed and worked in the Coastal areas. If there were only seven Fathers in total working with the people then it can be seen that their work was transferred to place of Thala as the air, water and environment there were unsanitary. In 1746 it was again change into a college. The reason for this college coming back to Manapadu is the improvement in the health and environment. It was the Christian Missionaries who improved the environment here. In 1886, Father Lazust who took over as the share Father of the Yagabar Church, taught the people of Manapadu to live in a highly civilized manner. In his time the Manapadu was distinguished. The people were wealthy.

Medical Services

Arcot mission was found by John scudder and his family in Arcott to provide medical support and to uplift the Environment. Ida Sophia scudder was as American Christian Missionary who laid a strong foundation in vellore. One right stays in Tamil Nadu changed her life and served for the upliftment of Tamil Nadu. When Ida stayed here, the death of the people made immense change in her. She lived during 18th and 19th centuries. At that time Bubonic plague cholera and leprosy was in a peak people and therefore created awareness in the Vellore area about the causes and preventions of various diseases with the help of maintaining proper Environment. There were several waters contaminated and Air Borne disease which causes diseases. Ida sacrificed her life to create impact in the Environment of Tamil Nadu.

Creation of New Villages

Rev. Sathiyatham built the first Christian village at Mudalur with the help of the British officer Mr. Everest from Palayamkottai. Rev. David Sundaranandam founded the Christian village at Mudalur. Rev. Edward George who worked in Paalai purchased land in the area of Paalainaga. He named it Takarammalpuram and settled some Christian families. All the villages built by the Christian Missionaries were Clean, Hygienic and good environment.

American Madura Mission Records 1944

It is a mission established by American board of commissioners for foreign missions (ABC FM) in 1834. It was established not only to spread Evangelism or Christianity. It was set up with seven Missionaries for the advancement of economy and culture for the upliftment of the environment. As a result of the mission education was provided to the students to create awareness about the environmental protection. Dr. Daniel poor memorial library was established to give resources for the students to gain knowledge about the economy, health and the Environment.

Father Brandolini's environmental Development

There were many disturbances to the spread of Christianity. Some village people who hated Christianity told the king of Marava wrong information about Christian Father. So, the King's servants saw that Parish priest Father Brandolini's house and church were clean and orderly. They also saw all the copper and brass vessels shining brightly. They reported to the king that the house

and churches was well maintained and the environment around the house was good. So, the King realized that the Priest was teaching discipline, self-cleanliness, discipline and environment. Father Brandolini's worked for the environmental Development in Kamanayakkanpatti village.

Conclusion

The Paper Concentrates on the Contribution provided by the Christian Missionaries in the environmental development of Tamil Nadu. They Came to India with the notion to renovate the nation and as a part of their Service Various developmental programes. Were brought in South India. The Services provided by the church mission Society in Kerela and Christian Missionaries in Tamil Nadu are always irreplaceable. The missionaries tried their best to provide eco-friendly atmosphere and practices to the people in Tamil Nadu. Whey they visited the land first, it was but an area with plenty of resources but uneducated minds filled with Superstitious. The missionaries tried to examine the skills and talents of the Dravidians and started to implement their policies. they provided their healthy hands to the needy. The innovations they made have changed the face of Tamil Nadu and the people were very much benefited by these Supportive measures.

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SOIL MONITORING SYSTEM WITH IOT

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ABSTRACT

Agriculture plays the major role in India. IoT embedded Soil monitoring System help the farmers to increase the agricultural production. Soil Monitoring with IoT uses technology to empower farmers and producers to maximise yield, reduce disease and optimise resources. IoT sensors can measure soil temperature, NPK, volumetric water content, photosynthetic radiation, soil water potential and soil oxygen levels. Based on the result, the farmers can cultivate the appropriate crop that suits the soil. The obtained sensor values are sent to the field manager through the Wi-Fi router and the crop suggestion is made through the mobile application. Automatic irrigation system is carried out when the soil temperature is high. Crop image is captured and it is sent to the field manager to suggest pesticides.

Keywords:-IoT, NPK, Soil

Introduction

Soil is an important natural resource, just as the air and water that surround us are. Unfortunately it has been overlooked in the past and taken for granted with disastrous results, such as the North American dust bowl of the 1930s. Today, the role of soil health on our climate as a whole is taken more seriously, with researchers at organizations such as the USDA-ARS (US Department of Agriculture, Agricultural Research Service) looking into how exactly soil interacts with the rest of our environment. Receiving accurate and instantaneous information on soil moisture content, salinity, temperature, and other parameters, soil sensors are an important tool for anyone involved with soil.

IoT Supporting Soil Monitoring System

Smart Agriculture is focused on soil, weather and crop conditions. Given the importance of weather and irrigation, many [Smart Farming](#) solutions are coupled with Smart Environment (Air

Quality) and Smart Water (Pollution, Turbidity, Nutrients) for a complete solution. The most common IoT sensors are listed below:

Soil Temperature

Soil temperature is an essential factor in belowground plant activity, influencing root growth, respiration, decomposition and [mineralisation of nitrogen](#). IoT sensors can estimate soil temperature by measuring air temperature and other factors; however, the most accurate measurement is to use a probe buried in the soil. Depending on the root structure of the plant in question, multiple probes can be installed at different depths. Surface soil temperature can be monitored using a different type of IoT sensor that uses IR technology.

Soil Moisture

The moisture content of soil can also be monitored using buried probes with electrodes. In hydrology, soil science and agricultural moisture content play a vital role in soil chemistry, plant growth and groundwater recharge. Soil moisture content is essential for several reasons:

- ❖ Water in the soil serves as a critical nutrient for all crops and plants.
- ❖ Water is an essential component of photosynthesis.
- ❖ Crop yield is heavily influenced by the availability of water in the soil.
- ❖ Soil water is an important carrier of soluble food nutrients for plant growth.
- ❖ Soil water helps regulate soil temperatures

Weather

Rainfall/precipitation, wind, humidity and atmospheric pressure all play an essential role in plant growth. Our Smart Agriculture systems support several advanced weather stations. Weather stations and soil sensors give you a 360 view of your farming operation. IoT weather stations can measure the following:

- ❖ Precipitation (optical and tipping bucket measurements), Temperature, Humidity.

Air pressure, Wind speed, Wind direction, NPK Soil sensors

Nitrogen, Phosphorous and Potassium (pot-ash) sensors are relatively new to the market but provide a method in which these key soil nutrients can be measured using IoT sensors. NPK IoT sensors use

various technologies, but TDR is a common method used by these sensors. NPK sensors support RS485 to be integrated into IoT solutions, including LoRaWAN and data loggers.

Benefits of using IOT solutions for soil conditions monitoring

- ❖ **Less likely to over or under water crops** -In agriculture, overwatering crops can impact the amount of oxygen that enters the roots, preventing them from normally growing . Any trees, on the other hand, can also cause root rot, which can ultimately cause the crop to fail. In comparison, under watering plants typically have the same effects as overwatering: crops cannot grow properly without adequate irrigation.
- ❖ **Better water conservation**-Agriculture and farming use about 70 % of the world's freshwater supply, based on the World Wildlife Fund survey and study . Water management will ensure the soil water reserves are not depleted or that excess soil is diverted into rivers and other water body.
- ❖ **Save time and resources** -From another field inspection angle, soil humidity levels can be tested manually, and temperature ensures more time will be spent on other areas of the organisation, such as bookkeeping or meeting clients.Preserving time and money also leads to higher income, with also smaller prices and time spent tracking crops.

Conclusion

Soil moisture sensors measure the water content in the soil and can be used to estimate the amount of stored water in the soil horizon. Soil moisture sensors do not measure water in the soil directly. Instead, they measure changes in some other soil property that is related to water content in a predictable way.

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ANTAGONISTIC ABILITY OF MARINE GREEN ALGAE ASSOCIATED BACTERIA

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ABSTRACT

*The Risk of drug-resistant pathogens is increasing and their level of evading conventional antimicrobials is rising. Therefore it is always important to find new antibiotics to counter the arriving challenges. Our preliminary investigation identified 21 isolates were shown Antibacterial activity out of 176 total isolated strain from *Ulva lactuca*. The three strains were identified as *Bacillus licheniformis*, *Bacillus subtilis* and *Providencia rettgeri* as the most potent antibiotic-producing strain among the other identified producers. The current study is to evaluate the Minimum Inhibitory Concentration (MIC) and antimicrobial activity of the ethyl acetate extract of the three potent isolates and its Gas coupled mass spectroscopy analysis. All 4 tested pathogens were susceptible to the Ethyl-acetate extract of all three potent with a maximum of 21mm of Zone of inhibition by *B. licheniformis* against *Enterococcus faecalis* and *Vibrio cholera* respectively. MIC against the pathogens lies between 16 mg/ml and 64 mg/ml.*

Keywords: *Microbiomes, antimicrobial metabolite*

Introduction

Microbiomes are the most successful colonizers on the planet. Screening of marine bacteria isolated from the surface of marine algae and invertebrates has shown that a high percentage of them produce antimicrobial metabolite (Burgess et al. 1999). Burkholder et al. (1966) identified and characterized the first antibiotic from a marine bacterium 1966. In addition, bacteria in biofilms formed on the surface of marine organisms have been documented to contain a high proportion of antibiotic-producing bacteria than in some other marine environments (Anand et al., 2006). Marine epiphytic bacteria, associated with nutrient-rich algal surfaces and invertebrates, have also been shown to produce secondary antibacterial metabolites, which inhibit the settlement of potential competitors (Bernan et al., 1997). Marine bacteria have been recognized as an essential and untapped

resource for novel bioactive compounds. The chemical compounds of marine microorganisms are less well-known than their terrestrial counterparts. During the past two decades, research on marine bacteria has highlighted the tremendous potential of these microorganisms as a source of new bioactive secondary metabolites (Uzair et al. 2008). There is a high expectation that organisms from the marine environment will yield a vast array of new pharmaceutical compounds with novel activities that will provide new drugs (Ramalingam et al. 2013).

Material and methods

Sampling and isolation of associated bacteria

The green marine microalgae *Ulva lactuca* were collected from Manappad, Tirunelveli and washed and the resultant tissues of sample were serially diluted, spread on the Zobell marine agar medium and incubated at room temperature for 48 h. Based on morphological features the colonies were separated and sub-streaked and maintain in Zobell marine slants.

Preliminary assay

Pure cultures of isolated bacteria from marine seaweed were inoculated into 10 ml Zobell marine broth 2216. At the exponential phase of growth (48 h) at 30°C, each culture was centrifuged (15000 × g, 4°C, 5 min) and the supernatants collected. Antibacterial testing of the cell free supernatant was performed by the agar well diffusion technique as previously described by Valgas et al., (2007). The diameter of the inhibition halos was used as an index of antibacterial activity. The isolates with maximum activity has been chosen for downstream experiment.

Molecular identification of selected strain

Isolates that showing maximum activity was identified by 16S rRNA sequencing. The genome of the potent bacterial isolates were extracted using a GenElute™ Bacterial Genomic DNA Kit (NA2100). The coding region was amplified using the universal primer 27F (5' AGA GTT TGA TCM TGG CTC AG 3') and 1492R (5' CGG TTA CCT TGT TAC GAC TT 3') according to Bartual et al., (2005). The amplified region was sequenced in Regional Facility for DNA Fingerprinting (RFDF), Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram. Kerala India.

Secondary metabolites evaluation

The potent isolates were cultured in Zobell marine broth (1000ml X 2) in rotary shaker in 110 rpm for 30±1°C for 5 days with pH adjustment to 7.0 daily using NaOH and HCl. The fermented culture broth was centrifuged at 5000 rpm for 10 minutes. (Saravanan et al. (2012)). The cell free supernatant was extracted using Ethyl acetate and concentrated to powder and stored in 4°C. The extracts were analyzed in Gas Chromatography coupled mass spectroscopy.

Pathogens	Antibacterial activity (mm)					MIC (µg/ml)				
	<u>S.aureus</u>	<u>E. faecalis</u>	<u>V.cholerae</u>	<u>E. coli</u>	<u>S. typhi</u>	<u>S.aureus</u>	<u>E. faecalis</u>	<u>V. cholerae</u>	<u>E. coli</u>	<u>S. typhi</u>
Isolates										
<u>B. licheniformis</u>	18	21	21	19	19	32	16	32	32	32
<u>B. subtilis</u>	16	17	19	20	19	16	16	64	32	16
<u>P. rettgeri</u>	20	18	16	14	18	32	16	64	32	32

Antibacterial activity of potent isolates

Minimum inhibitory concentration: The MIC value of the ethyl acetate extract of all the identified isolates was evaluated by Titer well dilution assay against all the five pathogens studied according to Wiegand et al., (2008). The concentration of the extract in 200µl in a series of 256µg/ml to 0.5µg/ml from 2nd to 11th well, first well serve as Media sterility well and 12th well for Antibiotics (Streptomycin 30µg/ml). Antibacterial activity: Ethyl acetate extract of the identified isolates was evaluated for its inhibitory action against the human pathogenic bacteria using agar Disc diffusion assay (Webber et al. 2022). The identified MIC value of the isolates was adjusted with 10% DMSO and loaded into the sterile disc was served as Sample, while the 10% DMSO as negative control and Streptomycin (30µg/ml) as Positive control.

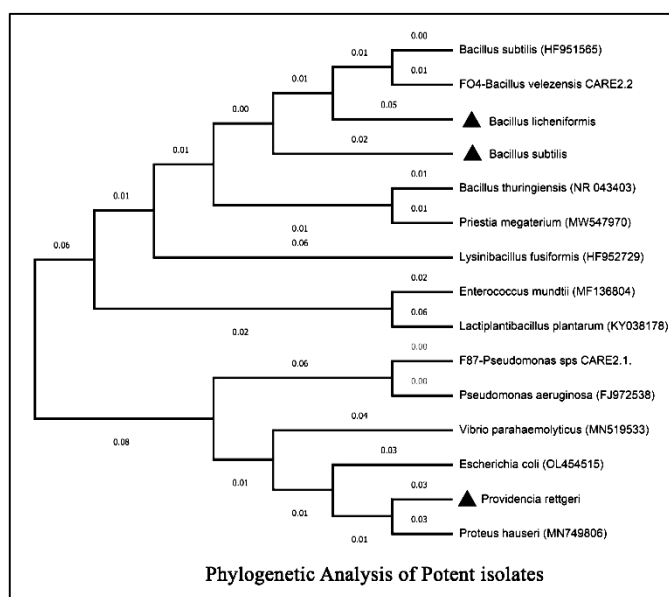
Result and discussion

The Green marine macro algae collected from Manapaadu had enumerate with 62 distinct associated bacteria were isolated and subculture and evaluates the antibacterial activity of the cell free supernatant had reduced to 10 potent isolates which has inhibitory action against all the 5

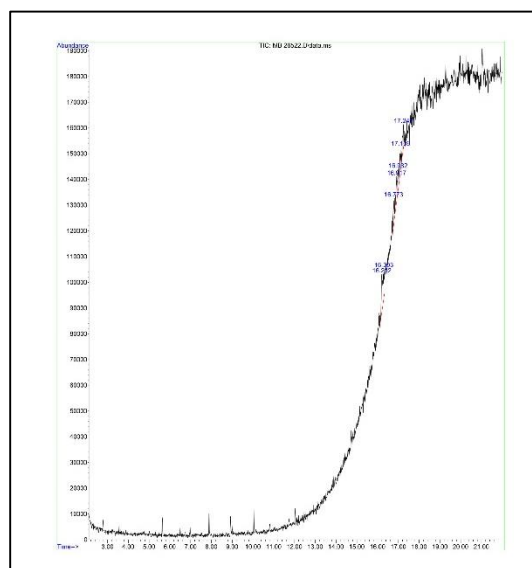
pathogenic bacteria. The top three bacteria with significant zone of inhibition was chosen for the further biochemical evaluation and antibacterial activity.

Molecular identification of selected strain

The selected three isolates with Lab ID MB71, MR60, and MG51 had 16S rRNA sequence of 1299, 1100 and 1358 bases respectively. The BLAST result for similarity with NCBI database was confirmed with phylogenetic analysis by plotted Neighbor joining method with MEGA 11 and conclude that the potent isolates were identified as *Bacillus licheniformis*, *Bacillus subtilis* and *Providencia rettgeri*.



GCMS analysis of Bacillus



Secondary metabolites evaluation

Ethyl acetate extract of the potent isolates *Bacillus licheniformis*, *Bacillus subtilis* and *Providencia rettgeri* were analyzed using GC-MS. The graph shown *B. licheniformis* had shown 7 peaks with maximum of 2, 4-Cyclohexadien-1-one in 21.67 %. The constituents in *Bacillus subtilis* resolved with 4 peaks and maximum area % of 48.28 for Benzoquinoline, 2, 4- dimethyl- in 16.412 min. Ethyl acetate extract of *Providencia rettgeri* had form maximum of 16 peaks. The maximum area % in its constituents was 14.50 for Tris (tert-butyl dimethylsilyloxy) in 17.121 min.

Antibacterial activity

The MIC value for all the three potential isolates against the pathogens were lies between 64µg/ml and 16µg/ml. The antibacterial activity of the ethyl acetate extract of all the three potential strains had varied for the pathogens used for study. The maximum of *B. licheniformis* have shown 21mm ZoI against 2/5 pathogens followed by 20mm ZoI from both *B. subtilis* and *P. rettgeri* against *Escherichia coli* and *Staphylococcus aureus* respectively

Conclusion

This study justify the Marine algae act as an hub of habitat interference stimulated physiological arises that show the production of varied secondary metabolites that can be an source of pharmaceutical and human habitual maintenance in with its systematics in ecology. Among the three isolates studied *Bacillus paralicheniformis* had shown the remarkable and promising effect in its metabolites and nullified pathogenic virulence over the human and other animals.

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EDUCATION FOR SUSTAINABLE DEVELOPMENT: AN INTERNATIONAL PERSPECTIVE

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ABSTRACT

Sustainable development (SD) in each and every field is need of the hour. Research and innovation in education for sustainable development is emerging and important part of education system. When we think of SD, education is an important area which can pave the way to achieve the desired goal of it. Therefore, education and research and innovation in this area is inevitable and can play a great role. SD is not a new concept to the world. There have been long discussions to understand the meaning and concept of SD in nearly every academic and non-academic atmosphere. It emphasizes aspects of learning that enhance the transition towards sustainability including future education; citizenship education; education for a culture of peace; gender equality and respect for human rights; health education; population education; education for protecting and managing natural resources; and education for sustainable consumption. Education for sustainable development has come to be seen as a process of learning how to make decisions that consider the long term future of the economy, ecology and social well-being of all communities. Building the capacity for such futures-oriented thinking is a key task of education. Education for sustainable development must explore the economic, political and social implications of sustainability by encouraging learners to reflect critically on their own areas of the world, to identify non-viable elements in their own lives and to explore the tensions among conflicting aims. Development strategies suited to the particular circumstances of various cultures in the pursuit of shared development goals will be crucial. Educational approaches must take into account the experiences of indigenous cultures and minorities, acknowledging and facilitating their original and important contributions to the process of sustainable development.

Keywords: *Sustainable development,*

Introduction

Education is an essential tool for achieving sustainability. People around the world recognize that current economic development trends are not sustainable, and that public awareness, education and training are key to moving society toward sustainability. It is curious to note that while we have difficulty envisioning a sustainable world, we have no difficulty detailing what is unsustainable in our societies. We can rapidly create a laundry list of problems – inefficient use of energy, lack of water conservation, pollution, abuses of human rights, overuse of personal transportation, consumerism, etc. However, we should not hide ourselves because we do not have a clear definition

of sustainability; many truly great concepts of the human world, such as democracy and justice, are hard to define and have multiple expressions in cultures around the world.

Education for Sustainable Development means including key sustainable development issues into teaching and learning; for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It allows every human being to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future. It also requires participatory teaching and learning methods that motivate and empower learners to change their behaviour and take action for sustainable development. Education for Sustainable Development consequently promotes competencies like critical thinking, imagining future scenarios and making decisions in a collaborative way. It requires far-reaching changes in the way education is often practised today.

Background Information

At the end of the United Nations Decade of Education for Sustainable Development (2005–2014) and the beginning of the United Nations Educational, Scientific and Cultural Organization (UNESCO) Global Action Programme (GAP) on Education for Sustainable Development (ESD), many nations are poised to begin scaling up ESD (UNESCO, 2014). During the Decade, ESD matured and grew. Efforts began with raising awareness, moved to capacity building, then to experimentation and finally, implementation of good practice. In effect, the Decade provided proof of concept for formal education and non-formal educational settings, including public awareness and training. Now, with the advent of the GAP, UNESCO and the ESD community are aiming towards expanding successful projects and involving more schools and institutions in ESD. In spite of widespread implementation and success of ESD, the expansion of ESD in primary and secondary education will require the ESD community to provide evidence that ESD is effective and contributes to the overall quality of education. In today's interconnected world, information is easily acquired. Facts that professionals once collected as a result of years of study are now readily available on the Internet. Today's education requires knowing what to do with information, that is, how to analyze it; make sense of its abundance and complexity; cooperate with others to synthesize information; and communicate the results. Consequently, quality education is no longer based primarily on fact acquisition.

What is ESD?

Although sustainable development and hence ESD are difficult to envision, such frameworks are framed for initial ESD efforts so others can understand and teach it. ESD is a combination of existing and yet to be identified guiding principles, knowledge, skills, perspectives, and values that are organized around sustainability concepts and issues. We recognize that this is one of many possible frameworks or ways to organize ESD. Each community should identify relevant principles to include in their ESD programmes.

Improving basic education

The first priority of ESD as outlined was the promotion of basic education. An educated citizenry is necessary to carry out informed and sustainable development. Nations with high illiteracy rates and unskilled work forces have fewer development options. These nations are largely forced to buy energy and manufactured goods on the international market with hard currency. The relationship between education and sustainable development is complex.

Generally, research shows that basic education is key to a nation's ability to develop and achieve sustainability targets. Education can improve agricultural productivity, enhance the status of women, reduce population rates, enhance environmental protection, and generally raise the standard of living. But the relationship is not linear.

Knowledge and skills for ESD

To be successful, ESD, like all good education, must blend knowledge and skills. ESD must provide practical skills that will enable people to continue learning after they leave school, secure sustainable livelihoods, and live sustainable lives. These skills will differ with community conditions. The following partial list of skills will help initiate discussions about the types of skills students will need as adults in those communities. Note that these skills, while totally consistent with good basic education, also fall into one or more of the three realms of sustainable development:

the ability to communicate effectively both orally and in writing;

- ❖ the ability to think about systems (both natural and social systems);
- ❖ the ability to think in time – to forecast, to think ahead, and to plan;
- ❖ the ability to think critically about value issues;

- ❖ the ability to comprehend quantity, quality, and value;
- ❖ the capacity to move from awareness to knowledge to action;
- ❖ the ability to work cooperatively with other people;
- ❖ the capacity to use various processes – knowing, inquiring, acting, judging, imagining, connecting, valuing, questioning and choosing; and
- ❖ the capacity to develop an aesthetic response to the environment.

In addition, pupils will need to learn specific skills that will help them manage and interact with their local environment, economy and society. Regarding the environment, such skills may include:

- ❖ learning to prepare materials for recycling;
- ❖ learning to harvest wild plants without jeopardizing future natural regeneration and production;
- ❖ learning to grow low-water-need crops; and
- ❖ learning to protect local water sources from contamination

Achieving sustainability: the role of education

It was a quarter of a century ago, that education was described by Schumacher (1973, p. 64) as the “greatest resource” for achieving a just and ecological society. Since then, a series of major international reports have emphasized the critical role education can play in the search for sustainable living. The Brundtland Report, (WCED 1987) argued that teachers had “a crucial role to play in helping to bring about the extensive social changes” necessary for sustainable development. It referred to education for sustainability as a lifelong process, that needs to be understood as part of a broad new vision of education.

Educational Responses to Sustainability

The education for sustainability must differ significantly from much of the nature study work carried out under the environmental education banner. Education with the objective of achieving sustainability varies from previous approaches to environmental education in that it focuses sharply on developing closer links among environmental quality, human equality, human rights and peace and their underlying political threads. Issues such as food security, poverty, sustainable tourism, urban quality, women, fair trade, green consumerism, ecological public health and waste management as well as those of climatic change, deforestation, land degradation, desertification,

depletion of natural resources and loss of biodiversity are primary concerns for both environmental and development education. Matters of environmental quality and human development are central to education for sustainability.

This process of critical enquiry, encourages people to explore the complexity and implications of sustainability as well as the economic, political, social, cultural, technological and environmental forces that foster or impede sustainable development. This entails involving people in questions about the ownership of common property resources, issues of international and intergenerational equity, investigations into regional and national ecological footprints and, most importantly, engagement in debates about qualitative versus quantitative growth.

Perspectives and values

ESD must include more than knowledge and skills; education does not stop at literacy and numeracy. If society is to address sustainability it must also address worldviews, values, perspectives and aspirations. These perspectives include such underlying assumptions as: • a healthy environment is essential for sustainable development; • sustainability is a global goal for the betterment of both humanity and the planet; • sustainability should be achieved through democratic processes; • sustainability depends on peace, justice, and equity; • the individual has basic human rights; • no nation or people should prosper through the explicit impoverishment of another nation; • diversity, both biological and cultural, is intrinsically valuable; • development is to be human-centred (i.e., for the betterment of humanity as a whole as opposed to empowerment of a few); and • intergenerational respect and responsibility will safeguard the rights of future generations.

Teacher education

While the effort can begin with the current cadre of teaching professionals, it is clear that institutions of teacher education need to reorient pre-service teacher education to address ESD. Reorienting of teacher education institutions is a key element in the CSD work programme on ESD. The development of new professionals with ESD expertise will profoundly shorten the response time for achieving sustainability. Two models of human resource development currently exist: in-service training and pre-service training. In the first, experienced professionals are provided with additional training. In turn, they reshape existing programmes by drawing on their new knowledge, previous expertise, and understanding of national and local systems. In pre-service training, concepts,

principles, and methodologies are provided during initial training. The new professionals step into their jobs with ESD as part of their expertise. Due to the cost of replacing teachers during in-service training, pre-service training is generally more cost effective than retraining educators and administrators. For initial success, both in-service and pre-service programmes are necessary.

Pedagogical approaches in ESD

There is no ‘correct’ pedagogy for sustainability education, but there is a broad consensus that it requires a shift towards active, participative, and experiential learning methods that engage the learner and make a real difference to their understanding, thinking and ability to act. Five pedagogic elements that cover a host of pedagogical approaches or methods that staff at Plymouth might use to bring these elements into the learning environment.

- ❖ **Critical reflection** – including the more traditional lecture, but also newer approaches such as reflexive accounts, learning journals, and discussion groups.
- ❖ **Systemic thinking and analysis** – the use of real-world case studies and critical incidents, project-based learning, stimulus activities, and the use of the campus as a learning resource.
- ❖ **Participatory learning** – with emphasis on group or peer learning, developing dialogue, experiential learning, action research/learning to act, and developing case studies with local community groups and business
- ❖ **Thinking creatively for future scenarios** – by using role play, real-world inquiry, futures visioning, problem-based learning, and providing space for emergence.
- ❖ **Collaborative learning** – including contributions from guest speakers, work-based learning, interdisciplinary/ multidisciplinary working, and collaborative learning and co-inquiry.

Conclusion

The results of international research project provide abundant qualitative evidence that ESD contributes in many ways to a quality education. When the curriculum includes sustainability content—delivered in terms of local, social, economic and environmental contexts—teaching and learning transforms primary and secondary education in all contexts. Research also provides evidence that ESD pedagogies facilitate the learning of knowledge, and promote the learning of skills, perspectives and values necessary to foster and maintain sustainable societies. Nevertheless, the authors recognize the need for more research which clearly demonstrates the contributions to

quality education and the extent of those contributions. We know intuitively that the path we have been travelling will not lead to sustainability. We also know that we have not yet developed a common vision. Thoughtful, inclusive dialogue followed by educational experimentation is our hope for finding a new path to the yet elusive sustainability. To democratically move forward, in a time frame that will prevent massive human suffering and environmental degradation, we desperately need an informed and understanding populace. For this reason, the international community perceives education as essential to a sustainable future.

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EFFECTS OF POLLUTION ON HUMAN HEALTH

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ABSTRACT

Effects of environmental pollution on the human health. Polluted air adversely introduces the harmful effects on the health of human beings. Nitrogen oxides, Sulphur dioxide, Carbon Monoxide, Ammonia and Ozone are the major air pollutants. When the concentration of the pollutants in the air becomes high from a certain level, the resultant effects may cause a degree of difficulties regarding human health specially the severe breathing problems leading to maximum as even the deaths may occur. Water pollution occurs when a body of water is adversely affected due to the addition of large amounts of materials to the water. Sewerage water, industrial wastes and disposals are the sources of water pollution. Waterborne diseases caused by polluted drinking water are Typhoid, Amoebiasis, Giardiasis, Ascariasis, and Hookworm. Land pollution is the degradation of the Earth's land surface through misuse of the soil by poor agricultural practices, mineral exploitation, industrial waste dumping, and indiscriminate disposal of urban wastes. The term noise is commonly used to describe sounds that are disagreeable or unpleasant produced by acoustic waves of random intensities and frequencies. Noise from industry, traffic, homes and recreation can cause annoyance, disturb sleep and effects health. Thus, sound is a potential serious pollutant and threat to the environmental health.

Keywords: *Environment, Pollution, Human Health*

Introduction

Environmental pollution is a world-wide problem. With growing population and industrialization, the concern about human health, hygiene and ecological balance has developed among natural as well as ecological scientists. Pollution not only effect deterioration of environment and creates health hazards but also effects loss to the national economy. Now-a-days industrialization is considered to be a barometer of economic development of any country.

Environment pollution in India arises from poor socio-economic living conditions as well as urbanization, industrial growth and modernization of agricultural practices, mining and quarrying which have gained momentum during, the last 25 years of planned modern economic era. There is a need to create an awakening on the problems arising due to faulty agricultural practices, and other related consequences and to suggest means to reduce the stress on environment in the rural areas as well as in urban areas which had always been considered pollution free and safe for living. Increase in awareness and knowledge can go a long way in minimizing the cause of environmental pollution. This is the only way to ensure a pollution free environment for our generations to come. Environmental pollution may be of five types – air pollution, water pollution, soil pollution, noise pollution, radioactive pollution.

Air Pollution-Air pollution occurs when gases, dust particles, fumes (or smoke) or odour are introduced into the atmosphere in a way that makes it harmful to humans, animals and plant.

Causes-Biological sources of air pollution are also found indoors, as gases and airborne particulates. Carbon monoxide (CO) poisoning and fatalities are often caused by faulty vents and chimneys, or by the burning of charcoal indoors. Air pollution can result from both human and natural actions. Natural events that pollute the air include forest fires, volcanic eruptions, wind erosion, pollen dispersal, evaporation of organic compounds and natural radioactivity

Effects of Air Pollution -Air pollution is a significant risk factor for multiple health conditions according to the WHO. The health effects caused by air pollution may include difficulty in breathing, wheezing, coughing, asthma and aggravation of existing respiratory and cardiac conditions. The burning of fossil fuels releases harmful gases such as nitrogen oxides and sulphur 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. The release of chlorofluorocarbons, halons, and hydrochlorofluorocarbons in the atmosphere is the major cause of depletion of the ozone layer.

Water Pollution-Water pollution is often defined because of the introduction of pollutants into a body of water. These can cause detrimental effects on the organisms that live in the water body or interact with the water. However, the causes of pollution can occur from natural processes or phenomena too.

Causes of Water Pollution -Chemical pollutants include heavy metals such as mercury, lead, cadmium, etc., solvents from industries, pesticide run-offs, oil spills from ships, etc . Storm water runoff carrying various oils, petroleum products, and other contaminants from urban and rural areas (ditches). Plastic materials/waste in contact with water may degrade slowly releasing harmful compounds for both human health and ecosystem

Effects of Water Pollution -Toxic doses of chemicals cause either acute or chronic health effects. Examples of acute health effects are nausea, lung irritation, skin rash, vomiting, dizziness and even death. About 70% of the water bodies in the India are polluted. Many people put their waste directly into water bodies. Moreover, households may use septic tanks, which eventually infiltrate into the soil, causing pollution of groundwater which is not served by municipal treatment plants. Deforestation can cause soil erosion. When these loose soil particles enter a water body, they will make the water murky.

Soil Pollution -Soil pollution refers to anything that causes contamination of soil and degrades the soil quality. It occurs when the pollutants causing the pollution reduce the quality of the soil and convert the soil inhabitable for microorganisms and macro organisms living in the soil.

Causes of Soil Pollution -Disposal of electrical goods such as batteries causes an adverse effect on the soil due to the presence of harmful chemicals. Excessive use of inorganic nitrogen fertilizers leads to acidification of soil and contaminate the agricultural soil. Also known as agrochemical pollution. leaking of sewerage system can also affect soil quality and cause soil pollution by changing the chemical composition of the soil.

Effects of Soil pollution -Over the time the soil will become less productive due to the accumulation of toxic chemicals in large quantity. Living, working or playing in the contaminated soil can lead to respiratory diseases, skin diseases, and other diseases The surface run-off after raining will carry the polluted soil and enter into different water resource. Thus, it can cause underground water contamination thereby causing water pollution.

Noise Pollution -Noise pollution, unwanted or excessive sound that can have deleterious effects on human health, wildlife, and environmental quality.

Causes of Noise Pollution -In most of the developing countries, poor urban planning also plays a vital role. Congested houses, large families sharing small space, fight over parking, frequent fights

over basic amenities lead to noise pollution. Weddings, public gatherings involve loudspeakers to play music resulting in the production of unwanted noise in the neighbourhood. Industrialisation has led to an increase in noise pollution as the use of heavy machinery such as generators, mills, huge exhaust fans are used, resulting in the production of unwanted noise.

Effects of Noise Pollution -Noise affects brain responses and people's ability to focus, which can lead to low-performance levels over time. Studies suggest that high-intensity noise causes high blood pressure and increases heartbeat rate as it disrupts the normal blood flow. Excessive noise pollution in working areas such as offices, construction sites, bars and even in our homes can influence psychological health. Wildlife faces far more problems than humans because of noise pollution since they are more dependent on sound. Animals develop a better sense of hearing than us since their survival depends on it.

Radioactive Pollution -Radioactive contamination, also called radiological pollution, is the deposition of, or presence of radioactive substances on surfaces or within solids, liquids, or gases (including the human body), where their presence is unintended or undesirable. Causes of radioactive pollution

- ❖ Nuclear explosions
- ❖ Nuclear weapons testing
- ❖ Production and decommissioning of nuclear weapons
- ❖ The mining of radioactive minerals
- ❖ The handling and disposal of radioactive waste
- ❖ Accidents at nuclear power plants

Effects of radioactive pollution

- ❖ **Carcinogenic effects** – Ionizing radiation increases the probability of most forms of cancer.
- ❖ **Mutagenic effects** – The genetic material changes due to mutagenic effects and the mutations get transferred to the offspring.
- ❖ **Teratogenic effects** – The development of the embryo is affected and this results in birth defects.

Conclusion

Population overgrowth and technology advancements have all led to the increase in demand for resources for optimum survival. However, we must not forget that the environment has been forced to pay a huge price for the same and we all should be responsible enough to do our bit in order to curb the ever increasing environmental pollution or else, it may be difficult for future generations to even survive on this planet. Better methods such as the use of solar energy, wind energy and other ecologically safe technologies can surely be considered an alternative in order to live in a healthy and pollution free environment.

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ENVIRONMENTAL POLLUTION AND PUBLIC HEALTH

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ABSTRACT

Environment and health are inextricably inserted. Pollution can damage the human health, through the water, air, land and noise. The things used by the human can create the pollution such as coal burning, industries, transportation. Green environment prevent the human health. Health impacts prevent through green audit. In developed countries, the impacts are mostly caused due to over population and uncontrolled transportations and developing industries. The pollutions caused so much of health problems for humans like asthma, lung cancer, ischaemic heart disease, stroke, typhoid and many other disease. In India early expiry and disorder due to major environmental health hazard accounts for nearly 20 percent of the total drain of disease in India. Glitches such as unsafe water, sanitation, and hygiene, and air pollution are major contributors to the worldwide disease drain. These problems can be reduced by green audit and by controlling the transportations.

Key words: *inextricably, drain, ischaemic, glitches*

Introduction

Human health and well-being are familiarly linked to the state of the environment. Good value natural environment provide basic needs, in terms of clean air and water, fertile land for food manufacture and energy and materials inputs for production. Green organization also serves to control climate and avoid flooding. Access to green and blue spaces also provides important opportunities for reformation and supports well-being. The air we breathe contains emissions from many different sources such as industry, motor vehicles, heating and commercial sources, household fuels as well as tobacco smoke. The epidemiological evidence suggests that adverse health effects are dependent on both exposure concentrations and length of exposure, and that long-term exposure have larger, more persistent cumulative effects than short-term exposures. Ambient air pollution has been connected with a multitude of health effects, including death, respiratory and cardiovascular hospitalizations, changes in lung functions and asthma attacks.

Current scientific indication directs that air pollution from the burning of fossil fuels causes a spectrum of health special effects from allergy to death. Recent assessments suggest that the public health powers may be significant. Air pollution is related with a broad spectrum of acute and chronic health things, the nature of which may vary liable on constituent of the pollutants as well as the cluster of the population. Current experience to PM from anthropogenic causes leads to the loss of 8.6 months of life prospect in Europe – from everywhere 3 months in Finland to more than 13 months in Belgium. The most recent evaluations of impacts of PM on impermanence, based on PM10 and PM2.5 monitoring data in 40 European nations, indicate that close to 5 Lakhs deaths per year are hastened due to revelation to ambient PM in those nations. Agreeing to the WHO Health Reports, air pollution at recent levels in European metropolises is in charge for a substantial burden of deaths, hospital admissions and exacerbation of symptoms, particularly for cardiovascular disease.

Human exposure to air pollution

Air pollution is a combination of particulate matter, gases, in addition vapor-phase molecules. The direct rout of revelation to the air pollution is a breathing tract. In case of sprinkle pollutants the size of particulate matter is in performance an important role in the environmental health risk. Particular matter is regarded as by aerodynamic diameter. Particles under 10 μ m in diameter are ordered as thoracic units. The revision of Terzano et al. (2010), specifies that the ultrafine subdivisions in disparity to larger-sized spots pass into the capillaries by different transfer routes and mechanisms and then are scattered into other body organs, including the brain with prospective neurotoxic paraphernalia. The particulate matter is lethal to the human health in line for absorption on their surface of many harmful impurities such as: heavy metals (cadmium, mercury, lead and etc., organic compounds (PCBs, furans, dioxin and polycyclic aromatic hydrocarbons). Gaseous pollutants, conditional on their solubility in the water, are immersed in the proximal or the distal parts of the respiratory tract. This is significant from the position of the health effects. Sulfur dioxide and formaldehyde are extremely water-soluble gases, therefore they do not extent the lungs, and they are frustrating the flight lane epithelium of the upper respiratory tract. For example, Up to 98% sulfur dioxide may be captivated in the nasopharynx during nasal inhalation. NO₂ is a poorly water-soluble gas, therefore, is set down far more irrelevantly in a respiratory tract equated with SO₂, but does not spread the alveoli in any substantial quantities.

Ozone, in divergence to nitrogen dioxide, does not liquefy in water and in gaseous form collections the lungs where it activates its malicious goings-on. Gaseous pollutants can be also captivated into the body concluded dermal surrender of exposure.

However for the broad population the role of this route of revelation is immaterial. The unforeseen rout of exposure to the air pollutants is duodenal tract; it follows from the exchange of pollutants in the environs. The food chain is an important pathway of human revelation to, dioxin, PCBs, polycyclic aromatic hydrocarbons, and heavy metals (lead, cadmium and mercury).

Pollution Harms Health and Environment

The lives of individuals and other human being are unnatural by environmental pollution, both in a straight line and circuitously. For centuries, these living beings have cohabited with persons on the planet.

Effect on the Environment

Smog is formed when carbon and dust elements bind collected in the air, causing breathing problems, vapour, and smoulder. These are created by the ignition of fossil fuels in built-up and trade facilities and vehicle incineration of carbon hazes. Additionally, these factors impact the exempt systems of birds, making them shippers of viruses and diseases. It also has an power on the body's system and organs.

Land, Soil, and Food Effects

The humiliation of human organic and chemical unwanted harms the land and soil. It also discharges chemicals into the land and water. Bug killer, composts, soil erosion, and crop residues are the main sources of land and soil pollution.

Effects on water

Water is easily filthy by any toxin, whether it be human waste or factory chemical ejection. We also routine this water for crop irrigation and drinking. They grow polluted as a result of impurity. As well, an animal dies as a outcome of drinking the equal tainted water. In addition, nearly 80% of land-based pollutants such as chemical, agricultural, industrial waste wind up in water bodies.

Furthermore, because these water sinks sooner or later link to the sea, they contaminate the sea's biodiversity ultimately.

Food Reaction

Agricultural and Crops and produce become noxious as a result of filthy soil and water. These crops are undid with chemical components from the twitch of their lives until yield when they reach a figure level. Owing to this, tainted food has an impression on our healthiness and organs.

Climate Change Impact

Climate change is also a basis of pollution in the surroundings. It also has a conclusion on the ecosystem's biological and physical modules. Global warming, Ozone exhaustion, and greenhouse gas emissions, and are all examples of environmental pollution. Likewise, volcanic activity, malnourishment, fog, carbon particles, shallow rain or snow, thunderstorms, volcanic eruptions, and landslides are all caused by climate change, caused entirely by environmental pollution.

Methods to Avoid Environmental Pollution

To minimize this issue, some protective measures need to be taken. Principle of 3R's: To protect the environment, use the Reuse, Reduce and Recycle. Re-claim products again and again. As a replacement of throwing away things after one use, find a method to use them again. Reduce the cohort of waste products.

Recycle: Paper, plastics, glass, and electronic items can be treated into innovative products while using scarcer natural resources and lesser energy. To circumvent and regulate air pollution, better-designed tools, and smokeless firewood should be used in homes and industries.

Noise pollution can be diminished by well design and proper maintenance of vehicles. Industrial noise can be concentrated by sound proofing equipment like generators, etc. To control soil pollution, we requisite rest the usage of plastic. Sewage ought to be preserved properly before using it as stimulants and as landfills. Some measures can be adopted to regulate water pollution. Some of them are water intake and usage that can be minimized by altering the techniques involved. Water should be reused with management. The melting icebergs in Antarctica resulted in rising sea levels, due to the world's environmental pollution, which had become a severe problem due to global

warming, which had become a major concern. Rising carbon smog poses a risk for causing natural disasters such as earthquakes, cyclones, and other natural disasters.

More public consciousness movements are being established to educate people about the risks of pollution and the importance of protecting our atmosphere. Greener routines are becoming more popular; for example, energy-efficient lighting, and the usage of wind and solar power are just a few examples.

Governments stress the need to plant more trees, minimize the use of plastics, improve natural waste recovery, and reduce insecticide use. This ecological way of living has helped humanity protect other creatures from loss while making the Earth a greener and safer ecology. Conclusion:

It is the charge of every individual to protect our planet from these environmental pollution agents. If protective measures are not taken then our future generation will have to face major consequences. The government is also taking steps to produce public awareness. Every individual should be tangled in helping to decrease and control pollution.

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ENVIRONMENT POLLUTION AND PUBLIC HEALTH

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ABSTRACT

The living environment role in the health of individuals evolves. The world changes and it is important to analyse the relevance of the environment to health at the light of different factors. Increasing evidence exists that human health is influenced by our way of living and dealing with the environment. In a society where inequalities exist, it becomes clear that a positive relation exists between a good living environment and people's well-being. From the way we interact with each other through social contacts until the way we treat environment, with its consequences, all accounts to our well-being and mental and physical health. Social relationships are directly connected to a healthy environment and are a beneficial part of this equation, allowing persons to be healthier and to live longer. Clearly, a person's individual characteristics plays a crucial role in these connections, since these relations do not constitute an exact science. It is essential to pay attention to the way emerging economies conduct their development, because it carries important responsibilities for the future of the next generation with adverse impacts caused by pollution and representing a threat to human health and well-being. The associations between environment as a whole and human health are very complex. However, some clues may enlighten us regarding some connections between both study areas.

Keywords: *Environment, human health, living environment, pollution, urban planning*

Introduction

As stated by Verheij health is believed to be influenced by both ecological (aggregate) as well as individual characteristics, yet much large scale sociological and geographic research focuses on either the individual or his environment. Thus, it has become to make sense to study individual and environmental determinants in health simultaneously aiming to answer to the question: What is

the role of the environment in explaining the health of individuals? In fact, this question makes even more sense today when we are able to see that scientists cannot make politics to understand what is at stake relating global warming, for instance, and all the consequences arising from their actions. We know that a more sustainable future should rely in the built environment. In Western societies, the relevance of the environment to health has become obscured or it is narrowed, relating specific toxic, infectious or allergenic agents and broader psychosocial mechanisms are rarely given importance. On the other hand, it becomes evident that a more strategic approach needs to be found, enabling environment and health to be related, namely in what concerns contemporary health . At this respect, it is also important that researchers from different disciplinary and methodological backgrounds are able to work together to maximise the value of each approach to the research and to health promotion. Accordingly, it is clear that it is more expensive to focus our responsiveness in what is already made than to pay attention to the design of new European Union and supporting infrastructures. It is also true that in the past, research emphasis has been primarily on urban constraints rather than on urban opportunities and that positive aspects of urban living potential are often insufficiently appreciated. Considerable energy savings would be achieved by altering existing buildings but it is not easy to do that without expressive economic incentives. In China, a country whose environmental concerns are increasingly being considered, Wang has concluded that advanced renewable energy should be developed and made available use of by rural residents, representing also considerable environmental and public health benefits. An Energy and Environmental Prediction model would be able to retrieve important information to allow the development of a sustainability plan that enables to improve energy efficiency since, unfortunately, energy is still considered by societies as relatively cheap. Among other data, the model enables to predict housing energy use and carbon dioxide emissions, neighbourhood quality and home hazards, between several other parameters. More recently, the work of three authors [5] aimed to automate the collection of data through the use of pattern recognition and satellite imaging to identify building types and age, allowing to speed up data access and acquisition, thus representing an improvement towards data collection.

The Effect of Living Environment on Human Mental and Physical Health

According to different authors, it is important to account with the effect of living environment in health, 53 Journal of Environment Pollution and Human Health since that effect is demonstrated through geographic health inequalities. In fact, the very same authors acknowledge that the social

ecology model emphasises that health is influenced by several aspects in terms of the physical and the social environment, besides several other features. This model has been gaining importance in terms of health promotion. Hawe and Shiell also suggest that epidemiology and ecological level studies may link social capital and health, thus alerting health promoters to reverse the tendency of interventions and allowing urban designers, sociologists, geographers and ecologists to get involved into public health. Maas et al. Also state there is increasing evidence that a positive relation exists between the amount of green space in the living environment and people's health and well-being. In fact, the authors refer that green space may have a beneficial effect on health because it promotes social contact through activities occurring in meeting places. The therapeutic power of green spaces has been studied in the last decades, with accumulating evidence available for their restorative power. Shared gardening - already appearing on Portugal, for example, under the designation of "community garden" - is one of those activities

Evidence-Based Study for Identifying Health Risk Factors and Some Clues to the Future

Epidemiology has the power to influence the quality of evidence base, and thus it presents difficulties for the discipline of environmental health. According to Susser and Susser. its development has been continuously refined due to its confront with the causes of different nature of chronic disease. The two authors have identified a paradigm they have chosen to call "black box paradigm", where the ecological perspective is diminished and health status and risk are linked. This paradigm was dominating the era of chronic disease epidemiology. It is true that epidemiology - always focusing in questions arising from the difficulties resulting from the study design - points to risk factors in individual behaviour or life style and so, change in life style would become the direct target for policy and required actions. Those actions involve two concerns: the mode of intervention and the means of the intervention. The first one has to do with the fact that the intervention is able to remove an exposure or reduce it to safe levels, and the second one implies issues like the environmental control in legislative, fiscal and administrative structures. On the other hand, and according to the same authors, interventions should have two important components: a significant progress towards a desired change and a process must exist whereby the intervention may be applied and be effective.

Environment pollution -Unwarranted disposal of mass or energy into earth's natural resource pool such as water,land or air that results in long or short term detriment to the atmosphere and its

ecological health to negatively impact the living beings and their life both quantitatively and qualitatively.

Climate and Pollution - Air pollution and climate change are closely related. Climate is the other side of the same coin that reduces the quality of our Earth. Pollutants such as black carbon, methane, tropospheric ozone, and aerosols affect the amount of incoming sunlight. As a result, the temperature of the Earth is increasing, resulting in the melting of ice, icebergs, and glaciers.

Climate and weather affect the duration, timing, and intensity of outbreaks strongly and change the map of infectious diseases in the globe. Mosquito-transmitted parasitic or viral diseases are extremely climate-sensitive, as warming firstly shortens the pathogen incubation period and secondly shifts the geographic map of the vector. Similarly, water-warming following climate changes leads to a high incidence of waterborne infections. The spread of epidemics is associated with natural climate disasters and storms, which seem to occur more frequently nowadays. Malnutrition and disequilibrium of the immune system are also associated with the emerging infections affecting public health. Example for The Chikungunya virus “took the airplane” from the Indian Ocean to Europe, as outbreaks of the disease were registered in Italy (49) as well as autochthonous cases in France (50).

Air Pollutants

The World Health Organization (WHO) reports on six major air pollutants, namely particle pollution, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. Air pollution can have a disastrous effect on all components of the environment, including groundwater, soil, and air. Additionally, it poses a serious threat to living organisms. In this vein, our interest is mainly to focus on these pollutants, as they are related to more extensive and severe problems in human health and eOzone Impact in the Atmosphere.

Ozone (O₃) is a gas formed from oxygen under high voltage electric discharge. It is a strong oxidant, 52% stronger than chlorine. It arises in the stratosphere, but it could also arise following chain reactions of photochemical smog in the troposphere.

Ozone can travel to distant areas from its initial source, moving with air masses. It is surprising that ozone levels over cities are low in contrast to the increased amounts occurring in urban areas, which could become harmful for cultures, forests, and vegetation as it is reducing carbon

assimilation . Ozone reduces growth and yield and affects the plant microflora due to its antimicrobial capacity . In this regard, ozone acts upon other natural ecosystems, with microflora and animal species changing their species composition . Ozone increases DNA damage in epidermal keratinocytes and leads to impaired cellular function .

Effect of Air Pollution on Health

The most common air pollutants are ground-level ozone and Particulates Matter (PM). Air pollution is distinguished into two main types:

- Outdoor pollution is the ambient air pollution.
- Indoor pollution is the pollution generated by household combustion of fuels.

People exposed to high concentrations of air pollutants experience disease symptoms and states of greater and lesser seriousness. These effects are grouped into short- and long-term effects affecting health. Susceptible populations that need to be aware of health protection measures include old people, children, and people with diabetes and predisposing heart or lung disease, especially asthma. Short-term effects are temporary and range from simple discomfort, such as irritation of the eyes, nose, skin, throat, wheezing, coughing and chest tightness, and breathing difficulties, to more serious states, such as asthma, pneumonia, bronchitis, and lung and heart problems. Shortterm exposure to air pollution can also cause headaches, nausea, and dizziness. The long-term effects are chronic, lasting for years or the whole life and can even lead to death. Furthermore, the toxicity of several air pollutants may also induce a variety of cancers in the long term .

Environmental Impact of Air Pollution

Air pollution is harming not only human health but also the environment in which we live. The most important environmental effects are as follows. Acid rain is wet (rain, fog, snow) or dry (particulates and gas) precipitation containing toxic amounts of nitric and sulfuric acids. They are able to acidify the water and soil environments, damage trees and plantations, and even damage buildings and outdoor sculptures, constructions, and statues. Global climate change is an important issue that concerns mankind. As is known, the “greenhouse effect” keeps the Earth's temperature stable. Unhappily, anthropogenic activities have destroyed this protecting temperature effect by producing large amounts of greenhouse gases, and global warming is mounting, with harmful effects on human health, animals, forests, wildlife, agriculture, and the water environment. A report states that global warming is adding to the health risks of poor people. Wildlife is burdened by toxic

pollutants coming from the air, soil, or the water ecosystem and, in this way, animals can develop health problems when exposed to high levels of pollutants. Reproductive failure and birth effects have been reported.

Conclusion

The present review does not intend to be focused on one aspect of the possible associations between Environment and Human Health. Instead, it reports several issues regarding concerns present in our society, that reveal these associations are expanding and getting more and more clear. Because of that, many aspects were left behind, but, at the same time a different picture of the situation arises, due to the interconnection between so many different aspects of the problem. It is important that public awareness of all problems associated with the presented association are communicated, in order for actions to be taken regarding a public framework to be established by governments and local institutions, which must also take into account resources sustainability.

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About the College

St. Ignatius College of Education established in Palayamkottai, Tamil Nadu, South India trace its origin to the year 1957 by the ICM Missionary sisters having their generalate in Rome, with an inspiration for commitment sensitivity to human needs and dedicated yeomen service. The motto "Virtue is our Strongest Shield", has kept alive the flame of wisdom and virtue burning in our hearts spreading the beacon- light to our succeeding breed of dedicated women-teachers. The college under its educational purview comprises UG,PG,M.Phil and PhD programmes in education. The college is an autonomous institution and is affiliated to Tamil Nadu Teachers Education University, Chennai and is accredited by NAAC at Grade A+ with 3.42 CGPA (Third Cycle).

About the Conference

The Internal Quality Assurance Cell of St. Ignatius College of Education, in collaboration with The Rise, organizes International Conference on "Sustainable Natural Resource Management: Global Perspectives and Contextualized Action". This conference highlights the nuances of profoundly understanding resources and ecology's scientific and technical features. It rejuvenates the public to protect and preserve flora and fauna to balance the ecosystem and maintain the ecological balance for sustainable base development.



**"Look deep into nature, and then you will understand
everything better" - Albert Einstein**