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CHALLENGES IN IMPLEMENTING ENVIRONMENTAL INITIATIVES: AN INDIAN PERSPECTIVE

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ABSTRACT

Environmental degradation and its grave impact on the lives and livelihood is the current focus of developed and developing economies alike. Climate change has stirred every country and it is being discussed at global level where the burden largely falls on the government to take steps to mitigate the hazards. India has agreed for net zero emission by 2070 and also committed to fast generation of renewable energy by 2030. Though each country is set on the path leading to clean environment but the problem is much more acute and entrenched in a developing nation like ours due to its huge population and mass poverty. The study uses secondary data gathered from the reports to reinforce the assertion that environment protection is essential for sustainable development and how technological adaptation can be used as a means of ensuring the same. However, it is observed that given the status of the environment in India, the issue of protecting it is surrounded by multiple vulnerabilities. There are several impediments in the form of poor finance, low literacy rate, rampant industrialisation, inadequate waste management which make the possibility of India attaining the set emission targets grim. The existing state of the Indian economy makes it difficult to become a circular economy with minimal wastage of resources and use of technology for better efficiency and a greener economy as evident from the sectoral case studies.

Keywords: *Environment, India, Pollution, Poverty, Vulnerability, Sustainability.*

Introduction

One of the biggest challenges facing the human race in the contemporary world is the damage to the environment and its grave impact on the lives and livelihood of people. The issue is well debated and cannot be restricted to a theoretical underpinning; rather it calls for constructive action. Climate change has stirred individual countries and global organisations alike, though the burden largely falls on the state to take steps to mitigate the hazards. India has agreed for net zero emissions by 2070 (Bhattacharyya et al., 2022) and also committed to fast generation of renewable energy by 2030. Each country is set on the path leading to a clean environment but the problem is much more acute and entrenched in India. Poverty and population are in fact the distinct character of India where acute dependence on the natural resources is not over-emphasized.

The environmental damage has reached an inflection point where countries, particularly developing countries like ours, are bound to take action to undo this environmental damage. Countries need to upgrade technology in the whole process of environment protection as sophisticated technology reduces emissions as well as enables recycling of the products already consumed. Technology lies at the root of a green economy. However, the cost of this technological upgradation is burdensome and it dares the economies which are facing the threat of an environment holocaust. The introductory section describes the alarming state of environmental degradation and builds upon the need of genuine efforts towards its protection. The next section lists the objectives of the study. Section three details the research methodology followed by a discussion on primary issues of poverty and population as hurdles in efforts towards green economy in section four. Section five presents few sector-specific case studies and the last section concludes the paper.

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Objective of the Study

The study seeks to review ground-level realities and the challenges in successful implementation of efforts directed towards protecting the environment. The relationship between the technological flows across the spectrum which acts on the efficiency leading to cost saving through recycling gets affected by multiple hurdles and puts all the efforts in vein.

Research Methodology

The paper is based on manual content analysis of the secondary information collected through various reports published by government, regulatory bodies and global organisations. It seeks to find as to whether the environment protection efforts through technology adaptation are fast enough and cost effective for a developing country like India characterised by a huge population and mass poverty for meeting the set targets and attaining long term sustainability.

Issues in Treading on the Path to Sustainable Development

Global temperature exceeding 1.5%(Rogelj et al., 2011) has been acknowledged to cause untold devastation in variety of ways. Emission is caused by the burning of fossil fuels and also the synthetic fertilisers which are directly harming the quality of life. The government has been oblivious to the use of resources irrationally which has affected the health and increased vulnerability. What has essentially happened in the flurry of economic expectation in the last three decades in India is the increase in the pressure on water, soil and marine besides atmosphere as a whole which have been taken for granted to fulfil the blanket requirement of people. There are several factors in the form of finance, literacy rate, migration, etc. which may act as a hindrance for embarking on a journey for environment protection or technological upgradation as a means for the same.

- **Funding Constraint**

Technology comes with a cost which has to be borne by the various participants of growth- public or private. The markets in India fail to clear the goods and hence the intervention by the government is necessary to deliver the goods and services as the individuals cannot bear the private cost. With only miniscule of the Indian population paying taxes (A. Kumar, 2023) as compared to tax collections in developed economies, the exchequer often falls short of resources in terms of what environment protection measures require and what is actually being done in terms of technology adoption to protect the environment.

- **Level of Education**

The fault also lies in the education system and inadequate policy measures to maintain the balance between the three sectors of economy. The peculiarity of India lies in the sectoral composition of the economy which has rendered the people to live in the backwardness. There is lack of skilled workforce due to an insufficient education system. In the early years of independent India, the entire education system was state run and it involved 100 percent social cost by the government. Over the decades as the nation progressed, the demand for educational goods in the form of books, paper, stationary, etc. witnessed a rightward shift. However, the opportunity cost of education was very high due to poverty. Thus, private cost of education started emerging and the privileged section of the society started treating education as a private good that was capable of being purchased. In the present times education is treated as an investment good along with being a private good. This is however, applicable only for the segment that can bear this cost where the marginalised and vulnerable class are excluded. Therefore, this section of the population often lacks the requisite skills on account of inadequate or no education. They seem to be caught in this trap of being unskilled-low paid-poor-compromised consumption-environmental degradation and pollution-low grade products. It is very difficult to break this vicious circle and emerge victorious in terms of treading on the path to sustainable development.

- **Rapid and Rampant Industrialisation**

India is surging ahead on the road to Industrialisation to attain the status of a developed nation and catch up with other big economies of the world. However, the expansion of industries demands mining.This directly impacts the forest cover that can absorb the carbon. Biodiversity, coral reef and mangroves are hurt by the increased traffic on the oceans. Marine life in India has also been severely compromised with the flow of hard material and also slicking of oil from the cargos carrying oil. It is not uncommon to know that wild life is diminishing and the extinction of the species is now no more a mystery. The land space is overly occupied at the cost of deforestation.

Depleting Groundwater Levels Causing Scarcity of Water

Crops are grown at the cost of underground water. The farmers are given subsidies for electricity and diesel to run their pump sets. The water scarcity is another real issue giving birth to several diseases. The potable water constitutes only 2.5 percent of the total water(R. Kumar, 2019). The drainage system is poor and soil quality also deteriorating. As per Niti Aayog report(Chhibber & Gupta, 2021) of the 72,368 million of urban waste water that India generates daily, only 28% is treated, implying that remaining 72% untreated waste water is disposed of in rivers, lakes, groundwater, etc. thereby polluting these crucial fresh water sources.

- **Inadequate Waste Management**

The material used for wrapping, packaging and carrying bags is of inferior quality and hence their degeneration or recycling is not possible at all. They finally flow through the drainage system causing choking of drains and hence make the quality of life poor. It has been seen in NCT of Delhi that waste is dumped in the landfill (Diwakar & Prakash, 2021), because solid waste management is not so easy to do but it is severely harmful to the health of the people living closer or at a distance of the heap. Waste quality is of concern and the separation is very difficult. Otherwise in case waste comprises of bio-degradable components then it can be easily converted into biogas because it would fall in the category of biomass. Thus, it can be observed that environment is in a dismal state and its further deterioration continues in India. This calls for stringent action immediately to contain any further damage to air, water or soil.

Table 1: Populated City-wise Sewage Generation and Treatment

Most Populated City-wise Sewage Generation and Treatment Capacity of Urban Population of India (As on 22.08.2017)			
States	**Population Class-I Cities**	**Sewage Generation (In MLD)**	**Sewage Treatment Capacity (In MLD)**
Delhi	20086422	4399	2693.7
Kolkata (M.Corp)	15802272	3461	328.2
Greater Mumbai (M.Corp)	12657766	2772	2600.9
Bengaluru (M.Corp)	9965309	2182	721.0
Ahmedabad (M. Corp)	7303277	1599	1283.0
Chennai (M.Corp)	5155687	1129	608.0
Greater Hyderabad (M.Corp)	3899838	854	657.3
Jaipur (M.Corp)	3393996	743	269.0
Lucknow (M.Corp)	3105918	680	325.0
Indore (M.Corp)	2055721	450	90.0
India	83426206	18269	9576.1

Abbr. : MLD : Million Litre per day. M.Corp. : Municipal Corporation.

Source : Ministry of Statistics and Programme Implementation, Govt. of India. (ON1692) questions and data accessed through www.indiastat.com

- **Steep Increase in Passenger Automobile Demand**

Passion for automobiles has increased to such a large extent that progress of the economy is determined from the sale of automobile. Their operation is dependent on the fossil fuel or to very less percentage of CNG but their excess sale is consuming a gas which emits chlorofluorocarbon. This is harmful to the ozone layer and ultimately causes health issues. The skin cancer statistics in India is dreadful. The vehicular emission is perhaps the one largest contributor to pollution.

Twin issues in Technology Adaptation: Population and Poverty

The resource application can be contained only when either the population grows in relation to the land area or poverty reduces leaving people with means to turn responsible consumers. These two intertwining issues draw a vicious circle encircling most of the efforts in a close loop rather than trickling down to the masses.

- **Population**

The environment degeneration is linearly linked to growth in population in the developing countries in the present regime but quest for luxurious life style in developed countries. The environment degeneration is reckless when there is either ignorance or lack of concrete efforts of refurbishing it. The

excess use of fossil fuel with the start of industrial revolution almost two centuries ago and its inducement in the developing countries has brought the earth planet to such a stage that the life and livelihood are seriously challenged.

India is a developing country with almost 18% of world population residing in it(Aditya, 2011). It is ranked seventh in terms of area but has recently taken over China in terms of population. This high growth of population accompanied with mass urbanisation has led to immense pressure on the resources. The explosion in the population and uninterrupted application of natural resources are a cause of worry because poverty also continues to be a serious problem.

- **Poverty**

The GDP per capita for India is much below the world average. Multitude of factors discussed above along with urbanisation have led to sprouting of slum dwellings especially in areas with high industry concentration. The creation of slums happens in a situation where the urban land is not in a position to accommodate the migrants from the rural areas who are unable to manage their family expenditure due to low earning opportunities and hence the migration is the only way to go into the cities where there is demand of unskilled workers to do the petty jobs so that assured cash income can be made, good enough to support their families in their original places. They live in shanties and consume sub-standard products for living and eating. The drainage system is weak in such pockets and drinking water is hardly available provided through public channels. Their sub-standard consumption proves that they produce waste which is not bio-degradable and hence flows through the streams of water ultimately falling into rivers and finally into the ocean. Thus, production as well as consumption both are marginalised.

Table 2: Population in India

Year	Slum Population	Total Population
2011	93055983	1210855000
2012	94977993	1226731000
2013	96907923	1242607000
2014	98845216	1258483000
2015	100786594	1274359000
2016	102729415	1290235000
2017	104668340	1304457000

Source: Loksabha unstarred questions and data accessed through www.indiastat.com

Since the poverty is very acute in India and the number of people living at subsistence level is considerably high, their quality of consumption and use of the material is of substandard quality. The untimely rains, excess rains or heat waves are harming the people living in the exposed environment in terms of food, shelter and clothing. Inferior materials are used in the manufacturing of the products and after their use they cannot be easily exhumed. There is an emerging situation when the resources untreated or even extracted or managed are used without realising their consequences in the future.

Such problems affect the life of people directly in the current situation. When the demand from the resources was endogenous, the damage to environment was voluntarily less, but in the present day the demand of goods and services is expected to increase at reasonable rate, resource application is expected to increase. Technology can be adapted to have minimum wastage and optimum production as well as consumption. But primacy of survival over sustainability is the harsh reality of developing economies.

Sectoral Case Studies

This section highlights the specific struggles of select sectors in India. The multi-dimensional nature of problem makes it difficult to achieve tangible benefits on sustainability front.

- **Automobile Sector**

The automobile sector in India accounts for 12% of the Gross Value Added (Chhibber & Gupta, 2021) in the manufacturing sector and contributes 7.5% of the GDP at large. However, it is categorised in the red zone as one of the most polluting industries. For the last two decades, the automobile sector has seen an unprecedented growth and the automobile industry has continued to increase in size and is maintaining magnitude and quality at par with any advanced country. Though there was lack of consciousness about environmental damage initially, the technology being used in manufacturing has been updated consistently. Tyre industry which is closely related to the automobile industry and is also counted amongst one of the major pollutants after petrochemicals has also been upgrading technology to reduce emissions.

However, there is a flip side to this from product demand perspective. The automobile manufacturers have differential choices. The market capitalisation of these companies and their turnovers have no doubt been increasing and this is directly related to technological upgradation, but this market capitalisation is not equalising. With the assumption of competitiveness there should be marginal difference in market capitalisation. However, gaps in market capitalisation shows gaps in technological upgradation. The silent underlying assumption is that the technological adaption is synonymous with environmental consciousness. Given the limited wallet size of average Indian consumer, smaller variants of cars and bikes dominate demand side. The problem in India is that automobile and tyre industry cater to the lower segment also and accordingly they continue to offer lower variants. Adapting to sustainable technology while offering cheaper variants is not a commercially viable alternative. Environmental impact thus takes a backseat requiring state support and intervention.

Electric vehicles are an environment friendly alternative but the proportion of population purchasing EVs is still very small due to its high upfront cost and inadequate charging infrastructure. The electric vehicles need lithium-ion batteries and lithium is available abundantly in Chile and China (Larocca, 2020). Therefore, the import will make cost of technology expressively higher to replace the old generation vehicles. A company invests or rather has a compulsion to invest in technological upgradation only when there is a demand. But in Indian economy there is a segmentation of demand and it lacks uniformity. The technological dynamics and cost dynamics of automobile industry is segmented in India and till the time this continues the results expected in terms of environment protection are not forthcoming. Similar patterns or linkages between technological adaptation and environment protection can be seen in steel, petrochemicals, thermal power or even consumer goods industry in India. The Indian population lacks the cost bearing capacity of such technological upgradation as labour force is huge and needs to be fed.

- **Micro, Small and Medium Enterprises (MSME)**

There are nearly 6.5 million(Bhavan, 2018) MSMEs in India where majority are in the informal sector. Supply side initiatives by the government are aimed at providing proper supply of electricity, labour, finances, insurance facilities, etc. to MSMEs. However, a sizeable number continues to operate in unauthorised areas in sub-optimal conditions and often employ inefficient methods generating obnoxious gases and effluent discharge. Densely populated yet industrially engaged areas like Peeragarhi, Mundka, Sultanpuri, Mangolpuri in Delhi are classic examples of such high concentration areas of small units and slum dwellings leading to pollution in the nearby environment. The MSMEs production process does not have proper means of combustion and often rely on traditional sources of energy. They continue to be in informal sector and use inferior means. The cost of running as a part of formal system poses a challenge due to lack of skilled labour as well as absence of collateral to raise finances on suitable terms. Their compromised functioning makes them vulnerable and the growth of MSMEs in a hurried manner further leads to pollution of the environment. This seems to continue till sincere attempts are made to optimise their operations through technological adaption, for which they lack the requisite resources or cannot meet the cost.

- **Agriculture**

The agricultural sector being the main stay of the Indian economy employs 42% of the workforce but contributes only about 17 % of the GDP (Murthy, 2019). This is due to the low productivity which is in turn defined as the total production divided by the total manpower engaged. The Malthusian theory of Population which states that with an arithmetic growth in population the food in the economy should grow at a geometric rate also seemed to have been refuted in case of India with erratic weather conditions and frequent regional floods or famines. Unlike US and China agriculture in India lacks the technology to use drones for farming or employ acid rain techniques for the same. If productivity of agriculture has to be improved, we need to either increase production or bring down the population dependent on it as their mainstay. The latter, however, comes with a cost. When unskilled workforce from agriculture move to cities in search for work in manufacturing sector, they often get low wage employment in sub-optimal activities. From here begins the environmental degeneration and degradation with this involuntary migration of farmers.

Findings and Conclusion

After discussing the facts and figures it can be summed up that the consciousness to environment is a relatively a new chapter in India or one can say that regulations to restrict the irrational damage to environment are evolving. However, what is worrisome is that the alarm bell has already started ringing in terms of global warming as pointed out by the latest Inter Government Panel on Climate Change report(IPCC, 2023) released on 20th March 2023, which is the top climate science body of the UN. The

synthesis report titled “Climate Change 2023”, is a final warning and clearly points out the urgency to address the issue immediately. The countries across the globe need to devise their own ways and means to tackle this pressing issue as per their level of economic growth and national circumstances. The adaption, finances, efforts etc. cannot be uniform across nations as well as actors/ participants (individuals, industry, institutions, governments) as energy consumption largely varies as per level of economic growth.

As highlighted, India is characterised by a segmented population which is highly vulnerable. In the current context whereby, environment and economic development are juxta positioned in such a manner that there cannot be growth by overlooking or harming the environment, the concept of green economy has to be worked out for this set up in respect of inputs, processes as well as outputs. Every natural resource should go through a circular process and once this is ensured the environment remains protected. Environment can be safeguarded only with a circular economy, implying that the resources are in a closed loop. The inputs are optimally utilised, with no or minimum wastage that can be utilised for future requirements as well. This kind of circular economy can help a country like India to gradually move ahead on the path of sustainable development echoing the ethos of sustainable development goal (SDGs) issued by UN in 2015. Perhaps it is the reason that government has committed that net zero emission would be in 2070. Relatively, the advanced countries have given the target much earlier due to the developed state of economies.

Since use of fossil fuel is still very high, its mitigation is thrust upon. The switch to renewable resources as a means to curtail carbon emissions also requires structural changes and specific skill sets which may further increase its cost. The role of costly technology has come upon to be adopted on immediate basis. The technology needed for production of hydrogen energy is still in testing phase in terms of the cost and sufficient quantity, even though it is being proposed as the next big thing in renewable energy. While the government is committed to bring down the emission of green- house gases, the work is underway to produce the energy from renewable sources. Solar energy is given utmost priority because sunshine is abundant in this part of the region. Therefore, India must aim to build a market economy with minimal government intervention and maximum awareness amongst people to treat environment with dignity and hence environment will also save them from the unexpected natural furies.

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