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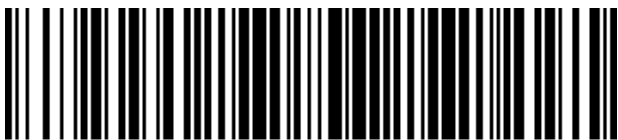
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Environment and economy prosper together

Himanshu Kumar

ABSTRACT

“We learned that economic growth and environmental protection can and should go hand in hand.”

Christopher Dodd

Environmental protection and economic growth are inseparable. One cannot exist without other. This paper is an attempt to highlight the importance of international investment in environmental protection. For sustainable development we need proper waste management system, green technology, smart housing, clean air, clean water, green energy etc. Investment is inevitable to achieve these targets. It is estimated that US\$7 trillion per year is required for financing sustainable development goals worldwide and US\$ 3.9 trillion in developing countries. Start-ups like Tesla, Solar-city, Choose energy, Elevate structure etc. are doing extraordinarily well in electric vehicle, green energy, smart housing. Author has discussed current condition of waste management system, public transport, conditions of river, pollution in India. Case studies of waste management system of Sweden and South Korea, public transport system of Paris, London, Madrid etc. are presented so we can understand solutions of these issues. There are plenty of economic benefits of adopting such systems, for example- we can convert our bio waste into compost and earn from it. If we keep our rivers and other natural places clean, then money spent on their cleanliness can be spent on education, infrastructure or some other important policies. In India, Goa is doing well in waste-management system. We should learn from these case studies and adopt these better systems of waste management, transport, housing and move towards a better future. Collective efforts of government and young entrepreneurs are required to achieve these goals.

INTRODUCTION

EPA defines the term 'Environment' as *one which includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, living creatures, plants, micro-organisms and property.*¹

sustainable development is a strategy by which communities seek to can use resources efficiently, create efficient infrastructure, protect and enhance their quality of life, and create new business to strengthen their economies. It can help us create healthy communities that can sustain our generation, as well as those who follow ours.²

Core problem of today's environmental issue is that we cannot live the way we used to live few decades ago, our consumption and production habits have changed drastically in past few decades. We have smart gadgets, smart vehicles and giant production and manufacturing units which have made our life easy and convenient. But on the other hand, these changes bring deterioration and over exploitation of our environment and natural resources, and also has caused air and water pollution, problem of solid and hazardous waste management. The main problem is how we can have economic growth and environmental prosperity simultaneously.

ENVIRONMENT IN INDIA: THE PRESENT SCENARIO

WASTE MANAGEMENT: Average Indian produces 5 times less municipal solid waste than an average American. Average European produces 5 times E-waste than an average Indian. Average Indian also uses less plastic than any westerner but this is ironical that Indian streets, public places are dirtier than any European or westerner counterpart. This is because our waste management system is not efficient at a desired level. Key reasons are:

1. People don't segregate the waste properly,
2. Our landfills are not maintained properly,
3. Large number of people don't have proper knowledge of waste segregation and waste management
4. Shortage of professionals and experts of waste management
5. Informal garbage collectors (KABADI WALA) are not well trained

India produces 1,50,000 tonnes of trash every-day. According to a report of world bank, this number will reach 3,77,000 tonnes every-day by 2025. From total waste produced, only 83% is collected and only 30% treated. Although we have improved in last 5-10 years. 51,734 out of 82,607 wards have

100% door-to-door waste collection, this number was only 33,278 in 2015. 88.4 Mega Watt energy is generated from waste to energy. But we have to improve a lot. Lack of proper waste management system has caused severe serious problems, for example- open landfills produces toxic gases and cause severe health issues like respiratory diseases, skin problems. Land is limited, we cannot just simply dump our entire waste, we have to manage it. Managing these wastes properly have many economic and aesthetic benefits, for examples- recycling, waste to energy plants, we can make compost from bio waste, cleanliness will promote tourism, health benefits, we will have more money to spend on education, infrastructure etc.

Machines can easily be customized according to Indian needs. But, India needs to spend a lot of money to create an efficient waste management infrastructure.

POLLUTION:

Kanpur, Faridabad, Varanasi, Gaya, Patna, Delhi, Gurugram, Lucknow, Agra, Srinagar are one of the most polluted cities not only in India, but even in the world. P.M. 2.5 level of these cities is more than 10^{-6} g/m³

Main causes of this air pollution are- industrial emission of gases like SO₂, CO₂ and emission of such gases from vehicles, crop burning, thermal power plants, toxic gases released from incinerators. India is facing this pollution crisis because-

1. Lack of proper time bound and specific target plans,
2. Less use of public transport,
3. Electric and CNG vehicles are used at a very nominal scale,
4. Many coal industries, thermal power plants and other industries do not follow guidelines mandated by the government, and government too, do not take any strict action in most of the cases,
5. Production methods are not environment friendly,
6. Steps were taken to reduce air pollution, but these steps were scattered and were at very small scale. Well organised steps need to be taken.

In 2015, the government said that all coal based power plant have to follow new emission standards before 2017. But in 2017, not a single coal based power plant was following this standard. And then government extended this time limit to 5 years.

In 2018, a draft was prepared of NCAP (national clean air programme). This programme focused on

–

Air quality monitoring system.

Forecasting systems,

Certification system and indoor air quality.

WATER POLLUTION (IN CONTEXT OF GANGA):

A map released by CPCB (central pollution control board) tells us that high level of coliform bacteria is found in river Ganga.

Government has sanctioned 20,000 crore rupees for Namami Gange Mission for 2015-20. This project is for effective implementation and proper synchronisation with the state and local bodies National mission for clean Ganga (NMCG) was empowered as an authority under environment (protection) Act, 1986 for fast track implementation ¹and to formulate policies for long term sustainability of the Ganga rejuvenation efforts.³ Major components of Namami Gange mission –

1. Sewerage project management through public-private partnership, improved governance through ‘one city one operator’ approach,
2. Urban sanitation,
3. Sewerage infrastructure (111 on Ganga stem and 39 on its tributaries)

After treatment of contaminated water, remaining water also consists effluents like arsenic and mercury etc. and this water is used for irrigation purposes in many areas of adjacent cities. According to scientists at the National Environmental Engineering and Research Institute (NEERI), 70% of the available water in India is polluted.⁴ Continuous efforts and vigilance are required. Government should implement strict standards for industries which releases highly toxic waste in these rivers and strict action should be taken against them.

¹3.economic survey 2018-19, volume II, page 108

⁴India-2001 encyclopedia pg 2-15

⁵.Article 51A(g) of Indian Constitution

⁶.Introduction to environmental law, S Shasnthakumar’s IIInd edition, page 151-152

KEY ENVIRONMENTAL LAWS IN INDIA

The Constitution under part IV A, Article 51A(g) has declared that it shall be fundamental duty of a citizen to *“protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures.”*²⁵

ENVIRONMENT (PROTECTION) ACT, 1986:

This Act was enacted with the object of providing for the protection and improvement of environment matters connected therewith. This Act was made:

To implement decision taken at the United Nations Conference on the human environment

To take appropriate steps for the protection and improvement of human environment, and

To prevent hazards to human beings, other living creatures, plants and property.

Power of central government to take measures to protect and improve environment⁶-

1. To coordinate actions taken by state governments, officers and other authorities under EP Act.

2. To plan and execute a nation-wide program for prevention, control and abatement of environmental pollution.

3. To lay down standards for the quality of environment.

4. To lay down standards for emission or discharge of environmental pollutants from various sources.

5. To restrict areas in which any industries or operations or processors shall be carried out.

²⁶6. To examine manufacturing processes, materials and substances which are likely to cause environmental pollution.

Duties imposed on individuals⁷-

1. Section 7 of the EP Act directs that persons who are carrying out any industry, operation or process shall not discharge or emit any environmental pollutants in excess of standards prescribed by the central government.

2. Section 8 directs that persons who are handling hazardous substances shall comply with the procedural safe guards prescribed by the central government.

3. Section 9 of the EP Act makes it obligatory on the person who is responsible for the discharge of any environmental pollutant in excess of the prescribed standards or who apprehends any such discharge due to any accident or other unforeseen accident or event to intimate the fact

²⁷ Introduction to environmental law, S Shanthakumar's IInd edition, page 154

8. our common future (1987)

9. guiding principles concerning international economic aspects of environmental policies- council recommendations (1972)

of such occurrence or apprehension to the government. He shall also be bound to render all assistance for the remedial measures taken to prevent the environmental pollution.

Punishments prescribed under the Act-

Section 15 of the EP Act prescribes penalty for contravention of the provisions of the environmental protection Act, the EP rules, orders and directions. If any person fails to comply with or contravenes any of the provisions of the Act or the rules or orders or directions shall be punishable with imprisonment for a term which may extend to 5 years or with a fine of 1lac rupees or with both.

According to section 16 of the Act, if a company has committed an offence under this Act, then every person who was directly in charge of the company for the conduct of the business shall be deemed to be guilty of the offence and shall be liable to be punished accordingly.

According to the section 17 of the Act, if any offence under this Act has been committed by any Department of Government, the head of the department shall be deemed to be guilty of the offence and shall be liable to be punished accordingly.

POLLUTER PAYS PRINCIPLE:

It is now recognised that pollution is a form of waste and a symptom of inefficiency in industrial production. Hence it was important to device various kinds of measures to prevent and minimise industrial pollution. The world commission on environment and development (WCED) in its report⁸ has suggested that the environment cost of economic activity shall be internalized by the enterprises. The organization of economic co-operation and development (OECD)⁹ for the first time agreed to base their environmental policies on 'polluter pays principle' and it was recommended as an "essentially economic efficiency measure to internalise environmental costs".

³The Supreme Court of India in *M.C. Mehta v. Union of India*¹⁰ has impliedly applied the polluter pays principle to deal with the problem caused by the oleum gas leakage from the Shriram food and fertilizer corporation.

¹⁰AIR 1987 SC 1086

¹¹AIR 2004 Raj 1.

¹²(1986) 2 SCC 176

¹³M.C. Mehta v. Union of India, (1987) 4 SCC 463

¹⁴M.C. Mehta union of India, (1996) 4 SCC 750

SOME IMPORTANT CASES

1. The Rajasthan High Court in *Vijay Singh Puniya v. State of Rajasthan*¹¹ observed that “any person who disturbs the ecological balance or degrades, pollutes and tinkers with the gifts of the nature such as air, water, river, sea and other elements of nature, he not only violates the fundamental right guaranteed under Article 21 of the Constitution but also breaches the fundamental duty to protect the environment under Article 51A(g). this observation was made in a writ petition filed against dyeing and printing units, which were discharging effluents and polluting the water sources used for agricultural and drinking purposes.
2. Supreme Court in *M.C. Mehta v. Union of India*¹² directed an industry manufacturing hazardous and lethal chemicals and gases posing danger to health and life of workmen and people living in its neighbourhood, to take all necessary safety measures before reopening the plant.
3. In another case filed by Mr. M.C. Mehta it ordered the closure of all tanneries, which were found to be polluting the river Ganga¹³.
4. In the *Delhi industries pollution case*¹⁴ the Supreme Court ordered for the shifting of 168 hazardous industries operating in Delhi as they were causing danger to ecology.
5. In *S. Jagannath v. Union of India*¹⁵ the Supreme Court has held that setting up of shrimp culture farms within the prohibited areas and in ecologically fragile coastal areas have adverse effects on the environment, coastal ecology and economics and hence, they cannot be permitted to operate.

RELATION BETWEEN ENVIRONMENTAL PROTECTION AND INTERNATIONAL INVESTMENT:

For sustainable development we need proper waste management systems, green technology, solar power plants, smart agriculture, smart housing, clean air, water treatment plans, eco-friendly transport

15. (1997) SCC 811

*SDGs are global goals, built upon the erstwhile millennium development goals. They are exhaustive, universal and integrated and emphasize on are issues of poverty and inequality, economic growth, innovation, sustainable consumption and production, climate change peace and justice and partnerships.

systems (electric and CNG vehicles, better public transport system). Investment is inevitable to achieve these targets. It is estimated that US\$7 Trillion per year is required for financing sustainable development goals (SDGs*) worldwide and US\$3.9 Trillion in developing ⁴countries¹⁶. Investment from both government and big investors is required. Government should spend and ensure safety and security for these institutions. Investors should invest in start-ups which are working for green energy, electric vehicles, eco-friendly infrastructures, smart housing, smart irrigation and waste management systems etc. Young entrepreneurs themselves should take initiatives to work in these core areas. Without collective efforts and co-ordination, it's not possible to achieve these goals.

ELECTRIC VEHICLES:

The global electric vehicle market was valued at US\$118.86 billion in 2017, and is projected to reach US\$567.29 billion by 2025, growing at CAGR of 22.3% from 2019 to 2025.¹⁷ 2017 was a landmark year for electric vehicles (EVs) as global sales of battery electric vehicles (BEV) and plug-in hybrid electric vehicle (PHEV) surpassed 1 million units for the first time. Policy and regulation has created an environment that has allowed the EV market to grow¹⁸. Tesla motors' (a well-known electric vehicle company) revenue in 2019 was US\$4.57 billion, and number of employees was 48,016. Automobile industry is shifting its interest. Event companies like Audi motors has launched its EV series Audi e-Tron, Tata motors, Hyundai, Toyota, MG etc. are working hard on EVs. This is a growing industry, and will play an important role in both- economic development and reducing pollution. Both budget cars and luxury cars are available in EV segment. But the problem is that we don't have adequate charging stations. It will take time for a complete shift from petrol/diesel cars to EVs. Electric bikes and scooters are also managing their place in two-wheelers' market.

¹⁶. Economic Survey 2018-19 volume II, page 105

*. Economic Survey 2018-19 volume II, page 125

¹⁷.<https://www.alliedmarketresearch.com>

¹⁸.<https://www.deloitte.com>>deloitte

SOLAR ENERGY:

INTERNATIONAL SOLAR ALLIANCE-*

ISA is first treaty-based International Intergovernmental organization launched by India and France on 30 December, 2015 in Paris and entered into force on 6 December, 2017. At on June 2019,75 countries have signed and out of which 52 countries have ratified ISA framework Agreement.

Motto- “let us make the sun brighter”

ISA has launched five programmes so far-

1. Scaling solar applications for agricultural use,
2. Affordable finance at scale,
3. Scaling solar mini grids,
4. Scaling solar rooftops,
5. Scaling solar in E-mobility and storage.

5

KEY INITIATIVE-

1. ISA has been working with various financial for scaling up financing, lowering the cost of capital, and designing innovative financial instruments to accelerate the massive deployment of solar energy.
2. France has committed 1.5 billion euros for financing solar projects and thereby, 27 projects have been funded by French Development Financing Agency for approximately 720 million euros.
3. ISA has forged financial partnership with various MDBs, UN agencies, Climate parliament, European Commission, Commonwealth Secretariat and other International and intergovernmental organizations.
4. ISA solar award has been instituted for solar scientists doing extraordinary work across ISA countries with a one-time corpus contribution US\$1.5 million from the government of Haryana.

Use of solar energy has increased in past few decades, as we can see solar panels in many farms, schools, colleges, metro stations and even in many houses. Solar energy is costly than our conventional energy sources, but this is one-time cost, maintenance is very cheap. Once we set up solar panels, then it provides electricity at a very cheap rate. Re-search is going to minimise this cost and to enhance this technology, so people with low income can also adopt this system.

SOLUTIONS

We don't need to find solutions of how we can grow our economy without harming our environment, because solutions are already available. With an enhanced public transport facility like- Paris, London, Hong-Kong, Seoul, Tokyo etc. and waste management systems like- Sweden and South Korea, countries like China, Japan, UK, Germany and India are doing well in using solar power.

WASTE MANAGEMENT: CASE STUDY OF SWEDEN²⁰ AND SOUTH-KOREA:

In Sweden 4.4 million tonne trash/year is produced, out of which only 1% is dumped in landfills. Main reason behind this success is that local administration provides a proper manual of guidelines to segregate the waste in many segments, for example- paper, card-board, plastic bags, plastic bottles, metal waste, e-waste, organic waste. So, recycling becomes easy because waste is segregated in a better way. Almost 7,50,000 tonnes of waste per year is of such kind which cannot be recycled. So, this waste is sent to waste to energy plants, where this waste is incinerated. Almost 1,00,000 people are benefited from the heat generated from these plants and same are benefited from electricity generated from it. Local authority tells that CO₂ generated from these power plants is two times lesser than prescribed emission limit. 10% out of total waste which is treated is imported. They earn 36 euro/tonne, Sweden earned almost 50 million euros by treatment of waste. They see waste as a commodity. Waste is not something useless as per their theology. We must remember that segregation is the key element in their strategy to reduce landfill rates.

South Korea is a remarkable example to understand how India can reverse its situation regarding poor waste management issues. Since 1980s South Korea's landfill rate has dropped from 90% to 10% and recycling rates has grown to 10% to 80% during the same time period. South Korea has volume based garbage rate system, it means that if you produce more waste, you have to pay more. South Korea is working like this-



South Korea has set certain targets-

- ☐ Resource recyclability evaluation

- ☐ Recycled product quality certification
- ☐ Waste-to-energy
- ☐ Merger of treatment districts

So here we saw the difference between the systems of India and South Korea's waste management systems. In South Korea and Sweden, waste is a source of income and energy, on the other hand, in India waste is source of diseases, economic burden and many more problems. Is India wants to adopt systems like Korea and Sweden, then the government have to spend massive amount of money to build that kind of infrastructure, energy plants, smart waste collection systems, we also need to spread this in school, college's curriculum so that students can have a deeper understanding of smart waste management systems.

SMART TRANSPORT-CHINA'S INITIATIVE²¹⁶:

China is world's number 1 country in terms of population. China also had problems of traffic jams and all. But China decided to tackle this problem through starting rental electric cars, bikes, scooters and by-cycles. These vehicles are easily available on markets, bus-stops, statins and other public places, one can easily book them on a mobile app at a very cheap price. You don't need to ask any person to rent this to you, you just have to scan a code and ride, after competing your journey, just park it and leave. In China almost 90% vehicles are always parked. By using these rental vehicles, problem of parking is solved because vehicles are mostly on road rather than in parking premises. Because these vehicles are electric, environment ⁷pollution is also reduced. We also need to change are mindset and start riding electric vehicles and cycles. Government should develop an enhanced public transport system. A shift in our habits is required. We feel shamed while riding a by-cycle, this is not good neither for environment nor for our health.

SMART CITY- A CASE STUDY OF SINGAPORE²²:

Singapore is a small country which has set a remarkable example in the field of smart housing, agriculture and water management. It is one of the most live-able city in the world. HDB (housing

⁶²¹ source- zee news

⁷²² source- national geographic channel

development board) of Singapore has and is working hard in high-tech, innovative housing solution, improved quality of life. Through computer assimilation they design architect in such a way which is compatible with the environment. Long-term comprehensive planning is the key of their success. They have a small land to meet all the need. They have developed smart infrastructure to build vertical multi-level farming and smart residential planning. Underground subways, tunnels are constructed. They are using their minimum and to a maximum extent and efficiently.

Due to lack of land they import 90% of their food. Thus, they have developed commercial vertical farms to produce food without soil, sunlight. They can control sunlight, humidity, oxygen level, wavelength of light and they can optimize their crop at every single phase of their growth. Singapore polytechnic food innovation and resource centre is conducting a re-research to produce a food product for exact need of the person.

Singapore consumes 2 billion liters/day. This small city imports 50% of its water need. It has set up de-salination plant. It de-saline 30 million gallon/day. They are also conducting a re-research to cut the cost and save energy, because conventional de-salination plants are energy intensive. A company named Evoquor is working on an enhanced technology.

CONCLUSION

As we have studied that developing a better and eco-friendly infrastructure is very important to live a quality life and it also demand a massive investment. Investing in these areas have many benefits- citizens will get a better life, employment generation, country will prosper and government will have less burden and will have more money to spend on education, employment etc. green start-ups can be the next global business dominants. EV and solar energy are billions dollar industry. Even green bond issuance in Q1 of 2019 reached US\$48. So, economic benefits cannot be ignored. Singapore is well known example to understand how environment and economy can prosper altogether.

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