

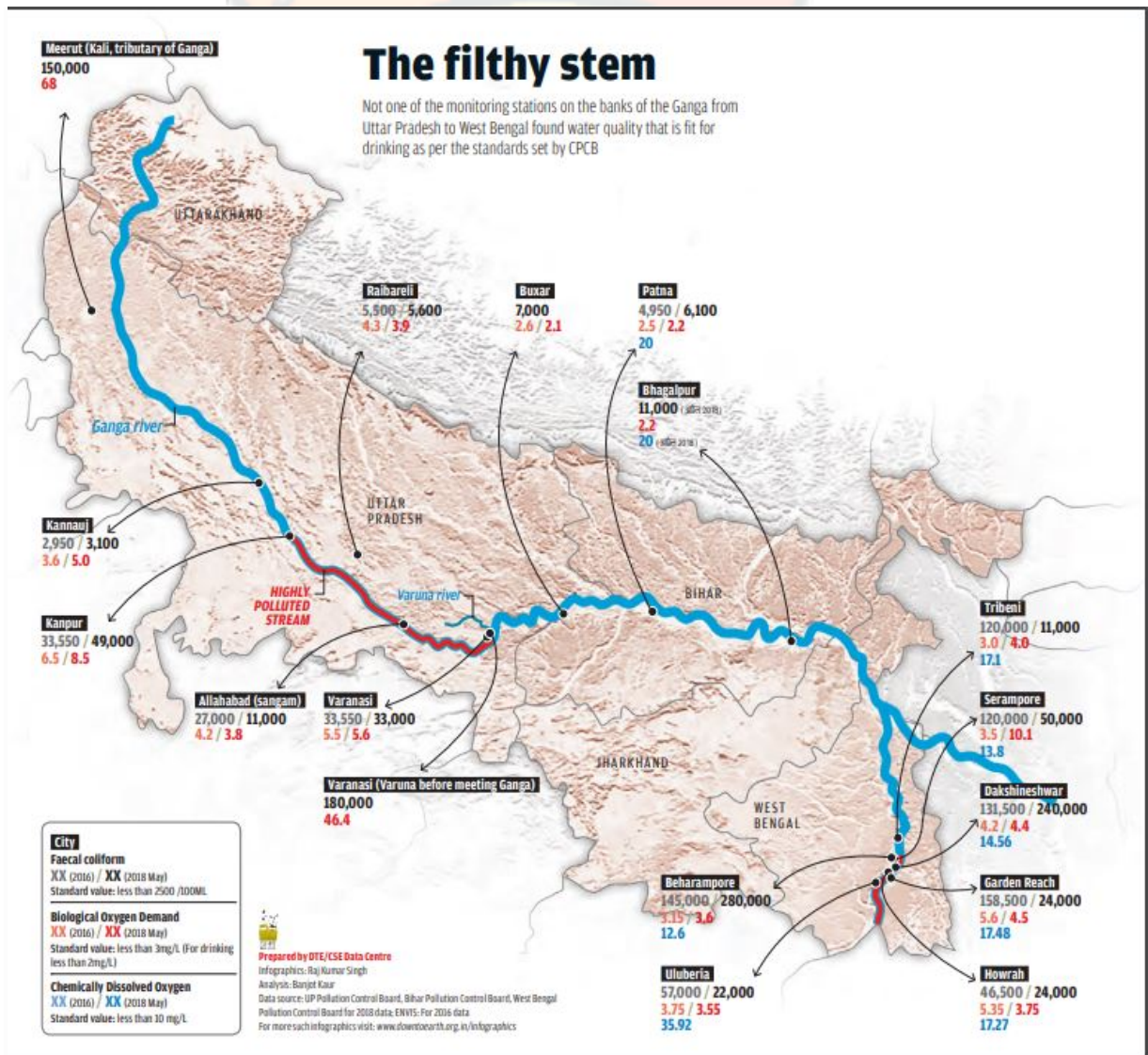
1. Identify the most polluted stretches of the Ganga river system. What are the most prominent contributing factors to this pollution? Can the Namami Ganga plan address the problem of pollution in the Ganges? Comment.

Introduction

Around 40 percent of Indian population is dependent on river Ganga for its water needs, the pollution levels are cause of concern. The government has taken several initiatives to abate pollution levels, conservation and rejuvenation of river Ganga such as Namami Ganga Programme.

Body

Most polluted stretches of Ganga



Central Pollution Control Board (CPCB) is continuously monitoring the pollution levels across the river stretches in India. CPCB considers a Biological Oxygen Demand (BOD) of less than 3 mg/l an indicator of a healthy river. BOD is the amount of oxygen required for the decomposition of organic compounds by microorganisms in a given amount of water.

Most prominent contributing factors

- **Industrial Waste:** Presence of large industries especially in the UP region, releasing polluted water without treating them into the Ganga. They are even responsible for toxic pollution (Leather Industries).
- **Agriculture Sources:** Agricultural runoff containing fertilizers, pesticides being non-degradable and having long life.
- **Municipal/Solid Waste:** The untreated sewage dumped into Ganga, gap between the functional Sewage Treatment Plant (STP) capacity and required STP capacity, has been a cause of concern.
- **Microbial Containment:** such as faecal, total coliform released, this can be observed during the Kumbh Mela. The river also finds the ultimate disposal place for unclaimed dead bodies and other half or fully burned dead bodies which decay and pollute river.
- **Dams:** are also one of the main cause of pollution in the Ganga. Dams obstruct the flow of river and make it slow, due to which Ganga lacks in self-purification capacity.
- **Tons of plastic, polythene and other trash:** are thrown into the Ganga River, choking out life from her waters and blocking existing sewerage systems.

Namami Ganga Programme

The Namami Ganga Programme is an initiative, to make villages on the bank of river Ganga ODF along with interventions dealing with solid and liquid waste management (SLWM). It incorporates activities like sewage infrastructure, ghats & crematoria development, river front development, river surface cleaning, institutional development, biodiversity conservation, afforestation, rural sanitation, and public participation.

Yes, it can address the Issue

- **Infrastructure development-** Activities like sewage infrastructure, river-front development, ghat and crematoria development, ghat cleaning, rural sanitation, etc. have been undertaken under this and all the villages near Ganga have been declared Open Defecation free.
- **Decentralization-** Panchayat Raj Institutions (PRIs) have been accorded a prominent role in the planning and execution of the projects under the Namami Ganga Programme as in case of Ganga Grams initiative.

- Mobilization of resources- financial and technological resource mobilization from the private sector is given priority. The Hybrid Annuity-PPP model has been adopted for the sewage sector.
- Zero black liquor discharge has been achieved in paper and pulp industries.
- National Mission for Clean Ganga (NMCG), nodal agency for implementing this programme has partnered with the National Institute of Urban Affairs to prepare Urban River Management Plan, which aims at preventing the deterioration and to ensure sustainable use of water resources.
- Knowledge dissemination and awareness building- Ganga Knowledge Centre (GKC) was established as a premiere and autonomous knowledge based institution to enhance the quality of the implementation of the Namami Ganga Programme.

Still there are concerns

- Unused funds- As per a report from the CAG, Government had only used \$260 million of the \$1.05 billion earmarked for the flagship programme between April 2015 and March 2017.
- Delays- There have been delays, lapses or complete non-implementation in areas like cleaning of the river, installation of sewage treatment plants, and construction of household toilets.
- Slow Implementation- Attributable to delays in tendering, non- availability of land, legal issues, pending approvals etc. National Green Tribunal recently slammed the government due to the stretches between Haridwar and Unnao being “unfit for drinking and bathing”.
- Financial issues- Inadequate finances and resources with local bodies cripple their ability to treat sewage produced in cities. This finds its way into the river.
- Absence of a long-term plan- The government failed to come out with a detailed action plan for cleaning and rejuvenating Ganga.
- Technical and Engineering aspects- Some of the worst polluted stretches of the river are across UP, Kanpur being the worst in terms of Biological Oxygen Demand. Treating the highly toxic sludge requires advanced treatment technology.
 - Poor inter-agency cooperation.
 - Inability to keep pace with growing pollution loads.

Conclusion

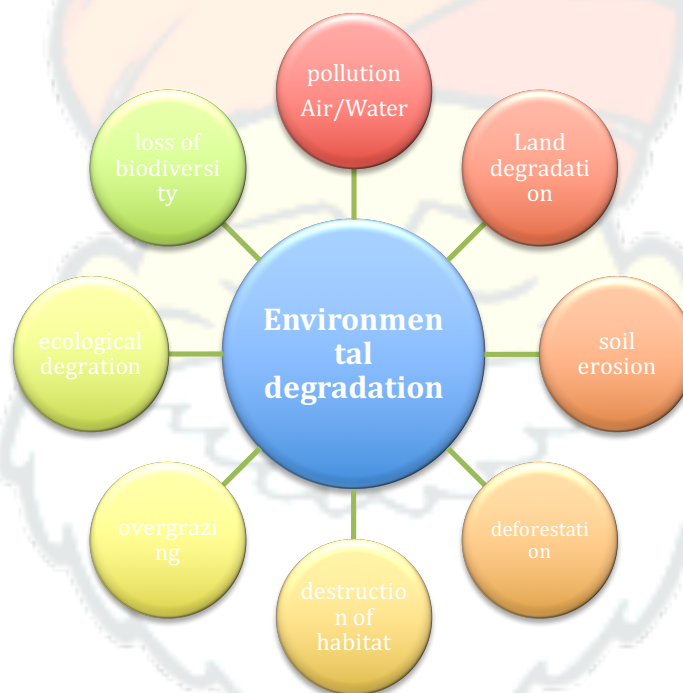
The gap between the functional capacity of STP and required capacity of STP needs to be plugged, the awareness levels need to be promoted, initiatives like Ganga

Praharis to educate, motivate citizens. The development of Ganga River must be a lesson for improving the stretches of other polluted rivers in India.

2. Is it possible to strike a balance between developmental imperatives of a growing economy like India and the limits to growth imposed by environmental degradation? Critically analyse.

Introduction:

There is a certain carrying capacity of the environment. When the rate of extraction of resources exceeds the rate of their regeneration, the environment fails to perform its activities. The resulting phenomenon is called environmental degradation.



Body:

India's remarkable growth record has been clouded by a degrading environment and growing scarcity of natural resources. Rapid economic development is turning India into a vast wasteland. A World Bank report finds that environmental degradation costs India \$80 billion per year or 5.7% of its economy.

Development and Environmental Degradation:

India's development objectives have consistently emphasized the promotion of policies and programmes for economic growth and social welfare. At the same time, because of the growing population and high degree of mechanisation, mindless and ruthless exploitation of natural resources, we have degraded our physical environment such as, soil, water, and biotic factors on which we all subsist, and on which our entire agricultural and industrial development depends.

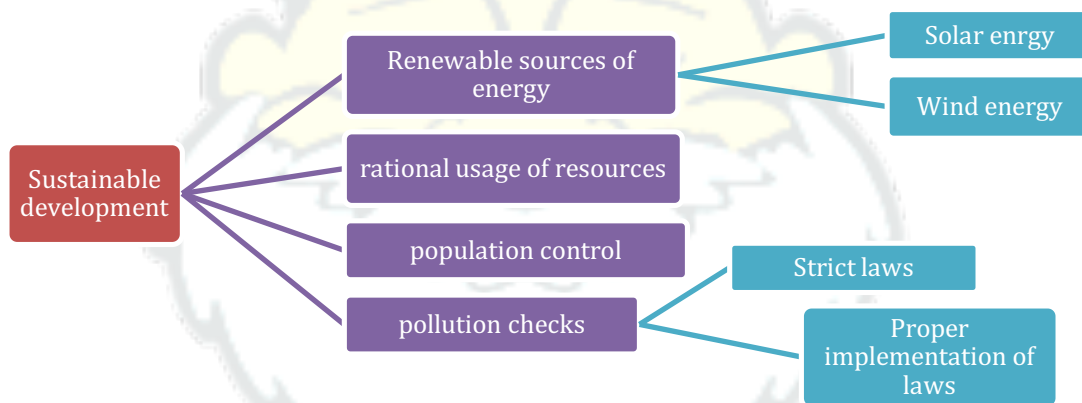
- The manufacturing technology adopted by most of the industries has placed a heavy load on the environment, especially through intensive resource and energy use, as is evident in natural resource depletion (fossil fuel, minerals, and timber), water, air and land contamination, health hazards and degradation of natural eco-systems.
- With high proportion fossil fuel as the main source of industrial energy and major air polluting industries such as iron and steel, fertilizers and cement growing, industrial sources have contributed to a relatively high share in air pollution.
- Large quantities of industrial and hazardous wastes brought about by the expansion of the chemical-based industry have compounded the wastes management problem with serious environmental health implications.
- Transport activities have a wide variety of effects on the environment such as air pollution, noise from road traffic and oil spills from marine shipping. Port and harbour projects mainly impact on sensitive coastal ecosystems. The iron construction affects hydrology, surface water quality, fisheries, coral reefs and mangroves to varying degrees.
- Direct impacts of agricultural development on the environment arise from farming activities which contribute to soil erosion and loss of nutrients. The spread of green revolution has been accompanied by overexploitation of land and water resources, and the use of fertilizers and pesticides have increased many folds. Shifting cultivation has also been an important cause of land degradation.
- Economic growth and changing consumption patterns have led to rising demand for energy and increasing transport activities. Air, water and noise pollution together with water scarcity dominate the environmental issues in India.

Way forward:

On the other hand, to eradicate poverty and increase growth in the economy, development is mandatory. Without economic development, a nation cannot come out of the vicious circle of poverty. As our population grows, finding a balance between economic advancement and consumption of natural resources is a vital question that we should address.

- Green growth strategies are needed to promote sustainable growth and to break the pattern of environmental degradation and natural resource depletion. Emission reductions can be achieved with minimal cost to GDP.
- Conventional measures of growth do not adequately capture the environmental costs, therefore, it is imperative to calculate green Gross Domestic Product (green GDP) as an index of economic growth with the environmental consequences factored in.

- Policy interventions such as environmental taxes could potentially be used to yield positive net environmental and health benefits with minimal economic costs for India.
- GDP growth rate will be negligibly reduced by about 0.02 to 0.04% if we adopt for environmentally sustainable growth models, but simultaneously there will be significant health benefits which will compensate for the projected GDP loss. Another important benefit would be a substantial reduction in CO2 as a co-benefit which has the potential of being monetized.
- Good environmental governance which limits the exploitation of natural resources to sustainable levels.
- Reduce multiplicity of authorities for environmental management and improve coordination among them.
- The transition to economic growth coupled with efficiency in natural resource use and its conservation can help India attain its goals of inclusive growth with sustainable development.



Conclusion:

Environmental sustainability could become the next major challenge as India surges along its projected growth trajectory. While the overall policy focus should be on meeting basic needs and expanding opportunities for growth, they should not be at the expense of unsustainable environmental degradation. We need to save our resources for our future generations so that they can live in a healthy environment.

3. Why are urban floods so frequent and devastating in India? What measures can be taken to address urban flooding in India? Discuss.

Introduction:

Flood is an overflow of a large body of water over areas not usually inundated. Thus, flooding in urban areas is caused by intense and/or prolonged rainfall, which overwhelms the capacity of the drainage system and hence affects large number of people due to high population density in urban areas.

Body:

Urban flooding is significantly different from rural flooding as urbanization leads to developed catchments, which increases the flood peaks from 1.8 to 8 times and flood volumes by up to 6 times.

Causes of frequent urban floods:**Natural:**

- **Meteorological Factors:** Heavy rainfall, cyclonic storms and thunderstorms causes water to flow quickly through paved urban areas and impound in low lying areas.
- **Hydrological Factors:** Overbank flow channel networks, occurrence of high tides impeding the drainage in coastal cities.
- **Climate Change:** Climate change due to various anthropogenic events has led to extreme weather events.

Anthropological:

- **Unplanned Urbanization:** Unplanned Urbanization is the key cause of urban flooding. A major concern is blocking of natural drainage pathways through construction activity and encroachment on catchment areas, riverbeds and lakebeds.
- **Destruction of lakes:** A major issue in India cities. Lakes can store the excess water and regulate the flow of water. However, pollution of natural urban water bodies and converting them for development purposes has increased risk of floods.
- **Unauthorised colonies and excess construction:** Reduced infiltration due paving of surfaces which decreases ground absorption and increases the speed and amount of surface flow
- **Poor Solid Waste Management System:** Improper waste management system and clogging of storm-water drains because of silting, accumulation of non-biodegradable wastes and construction debris.
- **Drainage System:** Old and ill maintained drainage system is another factor making cities in India vulnerable to flooding.
- **Irresponsible steps:** Lack of attention to natural hydrological system and lack of flood control measures.

Impact of the devastation due to floods:

- **On economy:** Damage to infrastructure, roads and settlements, industrial production, basic supplies, post disaster rehabilitation difficulties etc.
- **On human population and wildlife:** Trauma, loss of life, injuries and disease outbreak, contamination of water etc.

- **On environment:** Loss of habitat, tree and forest cover, biodiversity loss and large scale greenery recovery failure.
- **On transport and communication:** Increased traffic congestion, disruption in rail services, disruption in communication- on telephone, internet cables causing massive public inconvenience.

Measures to address urban flooding in India:

- **National Disaster Management (NDMA) Guidelines:** In 2010, NDMA had issued guidelines on Urban Flood Management in India -to create a National Hydro-meteorological Network for providing early warning, use of Doppler Weather Radars to be expanded to cover all urban areas in the country, an inventory of the existing storm water drainage system to be prepared etc.
- **Rain water harvesting and other check measures:** on-channel storage of rain water in storm drains, artificial recharge trenches, retention basins, deepening of ponds and lakes etc.
- **Sustainable usage of land:** Low-lying areas in cities have to be reserved for parks and other low-impact human activities, restrict encroachments in natural drainage areas; clearance of river beds, proper implementation of Coastal Regulation Zone rules. Planting drought resistant and flood resistant sturdy trees in vulnerable areas also helps.
- **Utilising International best practices:** Implementing 'Mobile Walls' like in Germany, and 'sponge' cities in line with cities in China which involves replacing concrete pavements with porous pavements to ensure better filtration.
- **Policy making and city planning:** Each city should have their Flood mitigation plans strongly embedded within the master plan of the city. There should be prompt, well-coordinated and effective response in case of urban floods to minimize casualties and loss of property and also facilitate early recovery.
- **Wetlands protection:** Urban flooding may increase if wetlands not protected. Centre for Science and Environment(CSE) has recommended strong laws to protect urban lakes, their catchment and feeder channels

Conclusion:

Floods have become a more common phenomenon in the wake of the climate change and unorganised urban development has worsened the situation. India has to learn its lessons from recent floods, in Assam, Bihar, Tamil Nadu, Karnataka and Kerala. Addressing the underlying causes and taking immediate effective corrective measures is most important need to tackle and overcome the floods and its devastation.

4. In climate negotiations, can India afford to stick around the erstwhile position that it took along with other developing nations? What are the constraints imposed upon India's historical posturing on climate change by the changing dynamics of global politics? Analyse.

Introduction

For India and other G77 nations, the Kyoto Protocol emphasised the continued relevance of the firewall differentiation between developed and developing nations with respect to the burden of responsibility for climate action. India was able to successfully protect its space for socio-economic development while simultaneously pushing for developed countries to take on more responsibilities.

Body

Background

- As President Donald J. Trump withdrew the United States from the Paris climate agreement, elsewhere in the world other leaders clarified their commitment to the pact
- Asserting that India and China have “already grown” and it was unfair of them to take advantage of the “developing countries” tag by the World Trade Organisation (WTO) by USA.

India can stick around the erstwhile position along with developing nations:

- India is still backward: India also continues to remain a poor country by global standards with a third of the population below the poverty line.
- GDP per capita: In India in 2015 was roughly 1,600 USD per annum compared to 56,000 USD in the United States (World Bank 2016).
- Per capita emission: India's per capita emissions are low at around a third of the global average, and average Indian electricity consumption per capita is roughly a quarter of the global average and stood at just 10 percent of that of the Organisation for Economic Co-operation and Development (OECD) countries.
- Huge population and area: Both for its sheer size and its position as an emerging economic power, India is an important aspect in climate action.

India cannot stick around the erstwhile position along with developing nations:

- **Largest emitter:** India is the world's third largest emitter with rising emissions and therefore matters significantly to climate action.
- **Common But Differentiated Responsibilities (CBDR):** CBDR is based on relationship between industrialization and climate change. The more industrialized a country is, more likely that it has contributed to climate change. States came to an agreement that developed countries contributed more to environmental degradation and should have greater responsibility than developing countries.
- **Responsible for climate changes:** India had stated its goal to reduce its carbon intensity by some 35 percent by 2030, and had crafted an

ambitious package focused on the rapid deployment of renewable energy—175 GW of renewable energy capacity—by the year 2022.

- **Carbon emissions:** International negotiating position had emphasized India's developmental needs; it's comparatively and historically low per capita emissions, and its desire to grow its economy before curbing carbon emissions.

Constraints imposed upon India on climate change:

- USA wants countries such as China and India to give up their 'developing country' status, given their rapid economic progress.
- USA ended duty-free preferential trade benefits for India — under the Generalized System of Preferences (GSP).

Way forward:

- At COP 19 in Warsaw in 2013, the idea of Nationally Determined Commitments was first mooted and eventually led to the final version of Intended Nationally Determined Contributions (INDCs) which was adopted by countries in 2014 at COP 20 in Lima.
- India committed to installing clean energy capacity equivalent to 40 percent of the total installed electrical capacity in the country by 2030, pledged to reduce the carbon intensity of its economy by 33-35 percent by 2030.

Conclusion

India would do well to adopt a pro-active stance towards international climate negotiations. As a responsible member of the global community, India could offer to be part of an equitable solution based on common but differentiated responsibilities.

5. What are the main principles of Environmental Impact assessment (EIA)? Is EIA central to various infrastructure projects in India? Examine.

Introduction

Environmental Impact Assessment (EIA) is one of the tools available with the planners to achieve the goal of harmonising development activities with the environmental concerns. EIA in India is statutorily backed by the Environment Protection Act 1986, which contains the provisions on EIA procedures.

Body

Main Principles of EIA

- **Purposive:** The process should inform decision making and result in appropriate levels of environmental protection and community well-being.
- **Participative:** The process should provide appropriate opportunities to inform and involve the interested and affected publics, and their inputs and

concerns should be addressed explicitly in the documentation and decision making.

- **Rigorous:** The process should apply best practicable science, employing methodologies and techniques appropriate to address the problems being investigated.
- **Interdisciplinary:** The process should ensure that the appropriate techniques and experts in the relevant bio-physical and socio-economic disciplines are employed, including use of traditional knowledge as relevant.
- **Practical:** The process should result in information and outputs which assist with problem solving and are acceptable to and able to be implemented by proponents.
- **Credible:** The process should be carried out with professionalism, rigor, fairness, objectivity, impartiality and balance and be subject to independent checks and verification.
- **Cost-effective:** The process should achieve the objectives of EIA within the limits of available information, time, resources and methodology.
- **Integrated:** The process should address the interrelationships of social, economic and biophysical aspects.
- **Efficient:** The Process should impose the minimum cost burdens in terms of time and finance on proponents and participants consistent with meeting accepted requirements and objectives of EIA.
- **Transparent:** The process should have clear, easily understood requirements for EIA content, ensure public access to the information, identify the factors that are taken into account in decision making and acknowledge limitations and difficulties.
- **Focused:** The process should concentrate on significant environmental effects and key issues i.e. the matters that need to be taken into account in making decisions.

EIA is central to various projects in India:

- EIA started in India in 1976-77, when planning commission directed the Department of Science and Technology to assess the river valley projects from the point of view of Environment.
- Several Acts and Amendments like Environmental Protection Act(EPA) 1986, EPA Amendment Act 2006 have made provisions for EIA more stronger.
- In 1982, the Environment Ministry has setup Environmental Information System (ENVIS) with the purpose of collecting, collating, storing, retrieving and disseminating information related to environment.

- This has ensured peaceful operations and conflict management in many mining and manufacturing sites in India. Example- Operations in Coal Belt of India, Singareni Coal fields etc.
- Government has time and again appointed committees to look into environmental protection. Example- Gadgil and Kasturirangan Committees on Western Ghats ecology.
- Recently, Bombay High court judgement cancelled the Mumbai Coastal Road project stating work cannot proceed without obtaining an environmental clearance under EIA, is indicative of the importance of EIA for projects in India.

However, EIA has been side-lined many times and is not given significance. The Tuticorin Sterlite Issue, where locals and activists have accused improper environmental assessment. Karnataka and Kerala have been opposing Gadgil and Kasturirangan committee report declaring Western Ghats as eco-sensitive, depicts the lower significance given to Environmental Assessment.

Conclusion

There is a need to strengthen the implementation of EIA, Independent EIA Authority is required for fair and objective decisions. There is also a need for centralised data bank for storing information and the transparency must be maintained in dissemination of all information related to projects from notification to clearance to local communities and general public.