

Causes of Biodiversity Loss Due to Highway Projects in India

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Abstract-

Biodiversity is important for sustainable development. Despite India have large number of biodiversity, due to rise in human and wildlife interference it leads to mass destruction of wildlife species. One of the causes of wildlife destruction is high density of highway projects in India. Due to direct and indirect means highway projects leads to mass destruction of wildlife species. While constructing highway projects it is challenging to minimize biodiversity loss. Last part of this paper suggests some government level measures to minimize biodiversity loss due to highway projects.

Keywords- biodiversity, highway projects, invasive species, poaching, migration.

Introduction-

In 21st century due to uncontrolled growth and overexploitation of natural resources; loss of biodiversity is serious cause of concern. Biodiversity is nothing but varieties of all living forms on earth.¹ India have four biodiversity hotspots [The Himalayas, The Western Ghats, The Indo-Burma region and The Sundarland (Including Nicobar group of Islands)] and 70 per cent of the world's total flowering plants. Due to high level of biodiversity, India is one of the 12 mega-biodiversity countries of the world. Despite transportation projects are important for diverse growth and development; it sometimes leads to loss of biodiversity through direct or indirect means.² In case of India, roads are constructed without taken care of environmental factors as a result due to road projects degradation of natural habitat is happened.

Causes of biodiversity loss due to highway project-

Following are main causes which lead to biodiversity loss-

1. Construction activity-

In case of construction activity land use pattern change drastically; while constructing roads and highways land under wildlife area converted into roads. Due to roads and highways; harmful effects like deforestation and clearing of vegetation which end up into

distortion of wildlife and habitats of certain species.e.g. The Great Indian Bustard which is found in Indian subcontinent which shows drastic decline in numbers from 250 in 2011 to 150 in 2018. One study shows that due to construction of new road networks is one of the factor which responsible for decline in habitat suitable for The Great Indian Bustard.³ Other hand while road expansion and road widening are indirectly leads to destroy wildlife in corresponding area, air and noise pollution, harmful chemical use and wastage during construction activity.

2. Rise of traffic-

Rise of traffic near wildlife area is matter of concern in India. Rise of traffic in wildlife area results in to frequent accidents and animal kills, rise in air pollution level in respected area and decline in frequency of rainfall. Report of wildlife protection society of India (WPSI) shows that 83 leopards were killed in 2019 due to road and train accidents; in which 73 leopards were killed in train accidents. Study conducted by Sanjay Kumar Pandey on National highway No.-7 from Rewa to Mauganj (Madhya Pradesh) shows that wildlife species which are dead in road accidents –Cow, Ox, Snakes, Dogs, Cats, Monkeys, Fox, certain species of birds, etc. Futher study done by Sanjay Kumar Pandey shows that factors which are responsible for road accidents are drunk and drive, overspeed, lack of awareness, driving mindlessly and ignore

wildlife and “why care?” attitude of people.⁴ Study conducted by National Environmental Engineering Research Institute (NEERI) in Mumbai (2010) shows that total contribution of paved road and unpaved road dust in total percentage of Particulate Matter (PM10) is 29.56%. While Particulate Matter released from vehicles is contributed 5.26% in total percentage of Particulate Matter emission. Due to large scale PM10 emission plant species affected badly; because dust particles (PM10) block and damage stomata such that respiration and photosynthesis are adversely affected. So in case of cities like Mumbai were small scale flora and fauna exist have big concern to tackle problem of air pollution.

3.Small scale migration and loss of species-

In case of India, road projects sometimes divide forests into two parts and habitat fragmentation is done. Species which are found in outer part of forest migrated easily to another part where air and noise pollution is low. Other hand species which are found in interior parts, they have less scope to migrate and highly affected by air and noise pollution. Highways act as a barrier to internal mobility of wildlife. So species found in interior parts of forest faced problem like low availability of food, restrictions on migration and high degree of pollution this further results into species extinction. Therefore mitigation and extinction of species are act as main drivers in loss of forest due to road projects.

4.Rise in hunting activities-

Due to well developed roads and highways in forest and wildlife area more portion of forest is accessible to human being. High accessibility to remote areas will promote social evils like high degree of poaching and hunting activity. On the basis of report published by TRAFFIC a leading non-governmental organization working globally on trade in wild animals and plants in context of both biodiversity conservation and sustainable development shows that 88 poaching cases were reported in open source media during lockdown period which is substantially higher than 35 poaching incidence reported during pre-lockdown period.⁵

5.Rise in demand for natural resources-

Well developed roads gives improved access to forest area. Roads give access to consumable and non-consumable natural resources. Consumable natural resources contain medicinal plants, fruits, vegetables, essential products for local market and mineral found under the wildlife area. Other hand non-consumable natural resource contain wildlife viewing, camping and general site seeing.⁶ Due to rise in demand for consumable natural resource and to gain super-normal profit producer over-exploit natural resources this will end up into depletion of natural resources and loss of biodiversity. Report published by Ministry of Statistics and Programme Implementation shows that during last 6 years reduction in forest stock growth by 10% in all states except Goa and Sikkim. Further due to unsuitable exploitation of ground water in states like Tamil Nadu, Goa, Chhattisgarh, Odisha and Rajasthan shows decline in water table level.

6.Change in land use pattern and deforestation-

Properly developed and maintained forest road can act as a positive signal to landowners near forest area. Due to well developed roads construction activities are promoted near wildlife area. Due to construction activities negative externalities are created near forest area. Construction mainly results in to deforestation, change in land use pattern and decrease in forest cover. Indirectly construction activities results into air and water pollution near wildlife area. Despite rise in forest area from 7,01,673 Sq. Km. in 2015 to 7,08,273 Sq. Km. in 2017 by Forest Survey of India report; scientific reports shows that Eastern Ghat have lost 15.83% of it's forest area over span of last 100 years.⁷ Report published by National Remote Sensing Agency (NRSA), Hyderabad in November 2017 shows that decrease in mangroves forest up to 15.60% out of its total area.

7.Food chain disturbance and rise of invasive exotic (Alien) species-

Food chain is a hierarchic structure which starts with small organisms and end up with large predator like tiger, eagle, bear, etc. Road

projects indirectly promote pollution, hunting, mining, etc. which end up into disruption of food chain. Rise of invasive exotic species is one of the major cause of biodiversity loss. Factors responsible for introduction of invasive exotic (Alien) species are introduction of new variety of species near forest, accidental transport, natural migration, etc. Due to interference of invasive exotic species, it creates threat to native species. Well developed roads act as catalyst to high degree of human interference in wildlife area; this may result into introduction of invasive exotic species in wildlife. Example 1- Central and South America shrub; Lantana (Lantana Camara) was introduced in India in 1809 as a garden plant in Western Ghat. Lantana has spread extensively which affects regeneration of other forest plants that wild herbivores depended upon it. Government of India, Forest department banned planting this species from 1987 onwards. Example 2-India bought Giant African snail from Mauritius as a curiosity but now day's it causing damage to variety of crops in Kerala and Assam and emerge as invasive exotic species.⁸

8.Lacunae in law enforcement-

There are more than 200 central and state legislations which deals with environmental related issues. Due to large number of legislation it is difficult to enforce certain legislation.⁹ In India highway projects are executed by central and state government; in most of the cases highway projects are implemented without taken care of proper standards and environmental friendly norms. Due to poor law enforcement and loopholes in law, it can not stop poaching, hunting and trafficking activities in India.

Conclusion-

This paper tries to cover main causes of biodiversity loss due to highway projects in India. Highway projects have both direct and indirect impact on biodiversity. Direct impact on biodiversity is due to new construction of projects, wildlife disturbance due to road traffic, habitat fragmentation, change in land use pattern, and deforestation. Indirect impacts of highway projects on biodiversity are rise in hunting activities, rise in

demand for natural resources, food chain disturbance and rise of invasive exotic species. As we can see highway and road projects are inversely related to biodiversity in India; so while implementing any highway project government should take in account sustainable development without any biodiversity loss. Therefore to minimize biodiversity loss highway projects should be designed by taken in account adequate environmental friendly measures to produce net environmental benefits like to create win-win outcome.

Recommendations-

Following recommendations should be considered by the government to minimize loss of biodiversity due to highway projects-

1. Afforestation of plants on both side of highways; it helps to reduce soil erosion, reduce overheating of road and further in long run due to high density plants they helps to reduce air and noise pollution created by vehicles.
2. If it is possible then choose highway project which cause less environmental damage from alternate projects.
3. Set a low speed limit to forest road to avoid road-kills.
4. Set a toll for forest roads; funds collected from toll can be used to betterment of wildlife area.
5. Forest roads should be maintained periodically it can help to tackle problem like air pollution and noise pollution.
6. Technological advancement in forest department can helps in better monitoring and to reduce hunting and poaching activities.
7. To avoid road kill put animal crossing signals on both sides of road.
8. Forest department should conduct periodical survey of wildlife which helps to trace count of each species.
9. To avoid illegal activities in wildlife area there is a need of better law enforcement framework.

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