EVS Report Writing Activity : Sem - I		
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Name of the News Paper / Research Paper	Environmental Impact Assessment in Highway Construction Case Study and Data Sampling.	
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Biodiversity Damaged Due To Highway Construction:

1. Introduction

Construction of highways is of great importance for the economic development and the improvement of the infrastructure of many countries. However, it often results in the destruction of biological diversity and local ecology. With the increasing number of people and pace of urbanisation, due to the growing need, more transport networks are constructed resulting in highways built over natural zones which are previously left untouched. This research paper discusses the various aspects of the impact of constructing highways on the environment, especially on biological diversity, and the span of their impact on the environment, and offers some proposals to minimise such damage.

It is needless to say that biodiversity is a critical resource to be conserved. Highly diverse ecosystems are known to be more stable, more productive and deliver a wider variety of ecosystem services. These were provision of clean air water, regulation of climate, pollination and soil. Such delicate ecological balances interlinked in nature are disturbed when highways constrict and degrade natural zones and these often have far reaching effects in the ecosystem.

It is important to realise the full extent of the threat imposed on biodiversity by infrastructure development in the form of highways if more eco-friendly construction practices have to be adopted in the future. This helps us to understand the importance of thorough eco-impact studies and new approaches for mitigation of ecological damage by looking at the direct and indirect effects on plants and animals.

II. Body

1. Direct Habitat Loss and Fragmentation

Among the effects brought about by highway construction, loss and fragmentation of habitats is one of the most direct and noticeable on biodiversity. “Road development is major source of damage to the environment including ecological destabilization, habitat disturbance and damage to flora and fauna,” reads the reference document. This process entails:

a) Clearing of vegetation. A great deal of natural vegetation is cleared in order to establish the road itself and also other structures such as bridges, interchanges and service areas. This creates elimination of very critical habitats for a number of plant and animal species.

b) Habitat fragmentation: The presence of highways on a landscape divides the landscape and ecosystems into patches. These patches can be termed as fragmentation, and fragmentation can have several adverse effects on animal populations, such as:

-Loss of population migration that leads to the development of a niche due to less diversity within populations.

Increased extinction rates in local populations.

Habitat loss- making it difficult for the animals to migrate and find the needed resources

c) Edge effects: New roads built along the forest clear trees or vegetation, which allows edge species or opportunistic species to invade and expand, as they are more adapted to that kind of environment.

2. Wildlife Mortality and Population Impacts.

The building and functioning of highways lead to the direct and indirect kill of many species of animals:

a) Road kill: When animals and cars collide, it is one of the leading causes of wildlife deaths. Animals with a great home range or animals that migrate are the most vulnerable.

b) Changes in animal behavior: Areas with highways can influence how animals behave, causing:

Animals to move far away from roads, thus cutting off their habitat

Noise and light pollution that increases anxiety in some animals

New prey-predator interactions that change how animals hunt and the arrangement within the food web.

c) Population isolation: As seen in the source, a highway can also be described as “habitat disturbance”. Such disturbance can also result in the fragmentation of wildlife’s interbreeding populations which diminishes gene flow and increases local populations’ chances of extinction.

Changes to the Ecosystem Processes

Highway building does not only impact single species but has the tendency of interfering with the following ecosystem processes:

a) Hydrological changes: Roads and their drainages have the potential to change the natural hydrology of a particular location in the following ways:

- Disrupting the normal direction of surface waters
- Enhancement of the erosion-sedimentation cycles of nearby water bodies
- Polluting the subterranean water sources with harmful substances picked by the runoff from roads.

b) Soil degradation: This includes the following but are not limited to: Ensuing construction and persistent utilization of highways which may cause:

Dirt consolidation leading to diminished water and root penetration

Lost high organic matter content soils due to top soil erosion

Built-up contaminants due to vehicular pollution or coming from maintenance of the roads

Microclimatic changes: The creation of large paved surfaces can result in:

- Increased local temperatures (heat island effect)

- Altered wind patterns

- Changes in humidity levels.

4. The Introduction of Invasive Species

The disruption caused by highways to the natural ecosystems can facilitate the intercontinental movement of invasive species.

a) Involuntary transportation: Vehicles can facilitate the involuntary transportation of seeds, spores, and small animals.

b) Created habitats: Newly created environments, such as disturbed vegetation along roadsides, often encourage alien species which tend to outcompete the local flora and fauna.

c) Non-native species introduction: Non-native species also used for aesthetic purposes along highways usually spread to the adjacent natural areas.

5. Road Traffic Emission and Noise Pollution

The study assumes that “the traffic emissions will certainly contain pollutants which, on close contact, will have adverse effects on the

people as well as animals living near the highway.” This type of pollution affects the ecosystem as follows:

a) Gas emissions: The exhaust from vehicles comprises various gases that can:

-- Lead to plant tissue damage and decreased plant photosynthesis

-- Get into soils and water bodies and go up through the food chain

-- Have direct involvement in acid rain formation which damages vulnerable species and their surroundings

b) Road noise: Traffic noise can be considered as static traffic:

-- Makes communication and mating calls of animals much harder

-- Modifies the normal behavior of wild animals leading to starvation

-- Decreases overall quality of the environment for species that are disturbed by noise

6. Permanent Ecological Impacts

The effects are permanent and so is the change in the nature of the highways, therefore the effects of new roads can be observed not only in their vicinity but also in their vicinity for a relatively long time.

7. Socioeconomic Factors and Indirect Effects

Due to the construction of a highway, a previously isolated area may now become more accessible, leading to:

a) Enhanced development: Construction of new roads may result in the growth of cities and the development of farmland, which leads to the loss of even more wilderness.

b) Exploitation: With better transportation networks come more logging, mining or any species destroying extraction efforts.

c) Increased human-wildlife conflict: Settlements are forced to move along these roads and people's interaction with wild animals becomes more frequent and often ends up in destruction of either or both parties.

8. Mitigation strategies and Sustaining Measures

In order to deal with the interruptions made to the flora and fauna by the highway construction, a number of mitigation measures need to be taken:

a) Route selection: Preferably these highways do not cut across core areas so that habitat undergoes minimal fragmentation.

b) Wildlife crossings: Where animals are likely to come into conflict with people, structures such as underpasses and overpasses and culverts designed for that purpose may also be built.

c) Habitat restoration: Where losses of habitats occur, establishing new habitats may be made possible by improving damaged areas around the banks of the roads.

III. Conclusion

Construction and highway operation pose a serious threat to biodiversity, as they lead to habitat destruction and fragmentation, wildlife deaths and injuries, disruption of ecosystem, pollution and many others. These are not single events but sequential ones which aggregate and remain in the ecosystems and the fauna and flora they host for an extended duration.

With the growing awareness of these impacts, it is apparent that the usual practices of building highways are never in alignment with the aim for improving biodiversity. This creates a dilemma between the need for better transport networks and the need to conserve our ancestors.

Development of highways is a complex undertaking which requires highway planners, highway engineers, ecologist and policymakers to come up with new and better methods to construct highways that

are environmentally friendly. This includes questioning the need for new highways in certain ecologically delicate locations, finding routes and ways of transportation other than highways and when highways must be constructed finding ways to reduce impacts during a construction.

It should be possible to envisage a situation where economic growth, development of socioeconomic infrastructure, and biodiversity development and protection will be synchronized, provided attention is focused on the other aspects of the environment.

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