

Conservation of Land and Biodiversity Factors in the Development of Complex Road Projects: Some Case Studies

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ABSTRACT

Roads are indispensable for the socio-economic development of any region. Roadway projects face various issues such as Land, Environment, Technology and Bio diversity among others. Environment is the surroundings of our living thing. It consists of living things and non-living things. It also includes the Sun and weather of the place you live in, as we depend on our environment for all our needs as it provides us with food, water, air, materials to construct houses and all the useful things we use in our daily life. Humans have found many new ways to keep themselves comfortable, from a wide range of things like good houses to live in, good roads, cars and buses to travel and many more things for the increasing population. However in making our lives comfortable we have damaged our environment and biodiversity in many ways. We have affected forest to build cities and forms, and keep cutting down trees to make houses and roads, thereby destroying animal habitats. The study is quite a comprehensive with a variety of examples and cases, and focused primarily on some key environmental and bio-diversity factors associated with development of roadways, various laws and mitigation measures in order to safeguard the environment in the process of inevitable man made development.

Key words: Environment, Clearance, NHAI, Bio-diversity, Flora and Fauna

Introduction

The subject of road building is becoming increasingly complicated due to numerous physical factors associated during the development stage. Environmental Impact Assessment (EIA) is a study conducted to predict the effect of a proposed activity / project on the environment. However, in this case it is for a highway development project. Environmental clearances are obtained by various acts and legislations such as Forest clearance (Forest protection act), Wild life clearance (wild life protection act), and Land clearance act (land protection act) and many more. The EIA study precisely deals with fol-

lowing parameters-Existing environmental quality, Land use, Hydrogeology, Air, Water, Flora and Fauna species of biodiversity of the area. The project impact on the above environment aspects are generally studied along the alignment of the proposed roadway. Also, different land use categories such as forest land, reserved park, residential slum areas and semi-public zones and the like need to be studied as part of the EIA. The extensive study is required to take into account both the negative and positive environmental and social effects of the project. At the same time on the social front the projects need to be cleared equally. It precisely means the citizens are not convinced about the

project often times, so the appropriate steps are needed to take care of environmental impact on the society as a whole. In some states land acquisition is not easy task, and in fact it is very difficult task particularly if land holding is very small as apparently there are many claimants around it. Land Acquisition (LA) is defined as the award of land to the developer of the project, usually a private entity before the commencement execution on the ground. The possible uncertainty over land possession at times also discourage bidders from making proposals in some states. Some sample data is presented briefly as follows.

Table 1. Land Required for National Highway Projects

State	Land requirement in Hectares	Land acquired in Hectares
Bihar corridor	1,275	NS-EW Road 242 (19%)
Punjab	300	28 (8.66%)
Rajasthan	2,411	2,404 (99%)

Source: Compiled by Author

Every year the National Highway Authority of India (NHAI), an apex agency set a target to acquire a certain amount of land tracts, it is usually like 1000 hectares, 2,000 hectares etc. So far the NHAI has acquired the largest amount of land ever in 2011-12 (Das, M 2011). At the same time in the same period the NHAI had spent about 5,000cr. for land acquisition process across some states. About 15000 ha of land was required for the most recently constructed (Phase 1) Delhi-/Mumbai Expressway of around 1400 km (Gupta and Mangat, 2023)

Even a small piece of land can halt the development of the continuous stretch of the highway road. An important clause is that around 80% of land should be made available to highway developers at the time of signing Model Concession Agreement (MCA) between the Govt. and developers. The MCA was critical document for privately funded infrastructure projects particularly leveraging massive investments into the infrastructure sector across sub sectors like highways, ports, power, metros to mention a few (Kundra, 2023). In a majority of projects, it seems this clause is not followed seriously. This particular fact is revealed in the above Table 1, where the land demand and supply statistics are presented. This land acquisition crisis was reported a decade ago, and ever since the MCA was

brought in by the apex body, the acquisition process has become somewhat better for projects in subsequent period because at that time some states were not cooperating with the Road development agency. Thus, many projects remain uncleared under various clauses of the environment particularly the land. The project even need other mandatory clearances under every type of environmental protection acts. Then only it will achieve the full environmental compliance or else, the compliance record turns out to be poor, then the project can be eventually discontinued. Since infra projects are generally environmentally damaging and and few are unauthorised, the Ministry conducts a strict scrutiny through the verification of Detailed Project Reports, Project Plans, Audited Statements and many more project related documents since the beginning. Every project proponent has to ensure strict compliance with the terms and conditions laid down by the Ministry. However it can consider the few of them on certain terms and conditions such as hefty penalty, creation of an environmental restoration fund, etc. Such terrifying factors discouraged some major contractors and held back the tender. *For Example*, The IRB infrastructure, a Mumbai Based Firm, backed out from developing a project in Goa even after signing concession agreement due to a fact of non provision of land by NHAI since the LA process is considered very expensive.

Some popular roads cum expressway which several apparently missed deadlines for completion due to inordinate delay in land acquisition are Delhi-Gurgoan Expressway, Kundi-Palwal expressway, Ganga Expressway to mention a few. *Example*: Lavasa corporation limited – a subsidiary of a major infrastructure company in India made a huge investments on the project for development of an hill station project around Pune Metropolitan area with lot of enterprises set ups. The project of this scale was likely to generate services and employment, there by a massive economic development overall. However the project should have set up the Environmental Restoration Fund (ERF), with sufficiently large corpus as per MoEF laid down stringent terms and conditions, may be due to this fact the project appears to be not showing much progress on the ground for past few years (Vishwa, 2011).

People Protest Against Land Acquisition

The highway project runs mostly through several

villages and agricultural land and poses several social impacts and the way of general life style like people living in the adjacent neighbourhoods do not interact as the access remains virtually cut-off. noise problem, pollution problem, market areas are removed, prices of daily items/vegetables may increase. Living standards and cost of living may be affected as a whole, are some of the key reasons for the people opposing the infrastructure projects. It is a major concern. Some land owners take adamant stand on handing over the land. And at the same time, and it is not possible for the govt. to interact with every panchayat resident. This can lead to the law and order issues. Thereby It faces legal issues. Police also intervene during the people protest and stop projects temporarily. They have property documents in their possession, and claim the ownership of land where the project is coming. People file complaint with village panchayat and panchayat are prompted to issue a stop work. People should receive prior intimation or notice about the project. However, project on Govt. land does not need any permission from any panchayat/village. Expert Appraisal Committee of the Environment (EACE) ministry will intervene and ask the project proponents to conduct public hearing as per the provisions of the EIA notification, 2006 taking into account the opposition by project affected people. Some are much needed projects and should not be opposed. The Govt. is legally trying to acquire land by spending around Rs. 10 cr. for compensation packages. However People do make several other demands, and the govt. shall check feasibility of such demands. The Govt. should hold dialogue with people for streamlining the project. However, people always feel troubled due to the project development process. Moreover, they prefer only cash compensation whereas the govt. can not spend so much cash. Land Transfer Development Right (TDR) – this is another form of compensation, though most of the land owners may not agree for TDR. Notwithstanding its complications, LA has become indispensable even for many other infrastructure projects besides road projects. *For Example*, Airport at Bhogapuram near Vishakhapatnam required 2,200 acres of land. Many things need to be resolved by the Govt. including rehabilitation for affected people in several surrounding villages. For instance, the residential colonies with all civic infrastructure and pucca houses are made ready to rehabilitate those people (Sridhar, 2023).

Bio-diversity Factors

Biological diversity is nature's variety in the biosphere, precisely called as "biotic" which means the living part of the world. India is divided into four major regions based on the geography, climate and many more things in the Environment. The Eastern Himalayas, the North Eastern States, The Western Ghats and the Andaman Nicobar islands are extremely rich in species of both the flora and fauna, and many sub species of different animals and birds which have evolved on these small Island separated by the sea from our main land. The Islands are exceptionally rich in Orchids and ferns. India reportedly has close to 50,000 Floral species and over 1,00,000 Faunal Species (Bharucha, 2022). Because of its rich bio-diversity in terms of massive number of both the animal and plant species it is one of the leading nations in the world and remain in the top 15 countries in the area of Biological eco system. While species are being protected in our national parks and sanctuaries, the extensive changes in the land use and a wide variety of human activities are a major factor in the loss of abundance of many species. It is also reported that a considerable portion of species is showing a much higher degree of endemism. The conservation can only happen if people everywhere value biological diversity and ecosystem services. It is therefore important to disseminate knowledge on issues related to sustainable economic, societal and ecological development throughout. The Biological Diversity Act of 2002 has brought in the concept of conservation of biodiversity along with sustainable use of resources. Conservation reserves and community reserves have been added through an Amendment of the Wildlife (Protection) Act in 2003. Under this Act, the project should obtain wild life clearance. For example, the most recently constructed Delhi-Mumbai Expressway was planned to avoid Ranthambore Wild life sanctuary in Rajasthan (Gupta and Mangat, 2023). Further, it means that the project should not object the free movement of animals across the neighbourhood tracts.

India has about 900 protected areas by 2019. Out of this 103 National Parks, 544 wild life sanctuaries, 76 conservation reserves and 46 community reserves. Thus 5% of India's land in which the government has notified protected areas is of great importance to our nation as well as for the world. Some of the protected areas are created for highly endan-

gered or endemic species of wild plants or animals in India, otherwise found nowhere else in the world. There are 50 Tiger Reserves which are the most critically important protected areas. Gir sanctuary in Gujarat, The Kaziranga National Park in Assam. The Sal forest of Madhya Pradesh are among the notable parks.

Case Studies

Pench Forest Road Project

In the year 2008, the NHAI proposed a four lane Highway project on NH 7 between Seoni (Madhya Pradesh) and Nagpur (Maharashtra). The Project is of about 130 km. However the final alignment was finalised via the Pench tiger reserve in Madhya Pradesh state. The Pench tiger Reserve, located about 100 km from Nagpur, is a home to many tigers as it spreads over two states - Maharashtra and Nagpur. The reserve is famous for its flora and fauna. This park certainly qualifies as a must-see amongst all other tourist places in Nagpur. The forest road construction is hazardous operation in mountainous terrain and can inflict scars on the landscape and also cause substantial damage to the forest ecosystem of flora and fauna species. Though most of the projects are cleared under the Environmental Protection Act, approvals under Forest conservation rules and wildlife Protection act were essential. In spite of clear the clear cut time frame provided under the rules, the forest and wild life clearances have been the biggest stumbling block for construction roads and other infrastructure development projects. The average time taken is two to three years, and in certain cases eight to nine years are taken for such mandatory clearances. Wild animals such as Elephants and Tigers need corridors to move between areas and mating sites in different seasons. Protected areas must also be integrated with each other by establishing animal passageways between adjacent areas wherever possible so that wild life can move freely between them. This is important to maintain a healthy breeding population so that inbreeding does not occur and the genetic diversity is maintained, hence the forest clearance was not easily obtained. Several agencies like the National Board for Wildlife (NBWL), National Tiger Conservation Authority (NTCA) among others objected the project seriously. Supreme court even intervened in the matter and tried resolve the issue

particularly cutting down a large number of trees, affecting openness of wild life passageways, etc. The Wild Life Trust of India urged the NHAI for legal protection of these endangered species by retention of the animal passage ways. In 2009 a 9.3 km flyover proposal submitted by the NHAI was rejected by the apex body, i.e, the SC Central Empowerment Committee (CEC). At the same time NTCA proposed an alternative road alignment through a place called Chhindwara by widening and upgrading the existing State highways. And this proposal was backed by the CEC. Thereafter a number of under passes and subways were proposed for facilitating the animal movement.

Eco Concerns of Pune Urban Road Project

A 2.1 km urban road between two major locations was planned in Pune city in 1987 to free-up the existing two lane road far exceeding traffic flow capacity by providing an alternative to travellers. However the project was held up for several years on the Environment and Biodiversity issues. A study was conducted by a consultant appointed by the Pune Municipal Corporation (PMC) and it revealed that the project was stuck due to several negative factors related environment and biodiversity as the alignment was planned through an age old urban forest spread roughly over 800 metres. And other land uses were 500 m of residential, 600 m of public and semi-public areas and 200 m of reserved park land among others. So, finally quite a few alternative plans were suggested and the best one was reportedly a 2.1 km elevated motorway involving less number of tree cuttings.

Bio-Bitumen

The national highways in the Country are mostly made of Bituminous material. The annual consumption of Bitumen for laying roads across all states is reportedly around 80 lakh tonnes (lt) which is estimated at 8 lakh cr. annually. While Bulk (50%) of the material sourced from domestic crude refineries considerable portion (25-30%) is imported which cost the ministry about 30,000 cr. annually. So what is the alternative to save this massive amount in the import bill ?

Recently the council of scientific and industrial research Organisation (CSIR) and Central Road Research Institute (CRRRI) jointly developed a technology to make bitumen from Rice Husk, which is considered to be waste as of today in rural areas. This

agri waste is usually burnt leading to pollution. Now this can be done away since the husk is found to be useful and converted into the road making material in the factory set up. As per the Roadway ministry the bitumen making units will get to sell out the material to the ministry henceforth

Conclusion

Infrastructure sector contributes to socio-economic development of any region, country and the world as whole. A highway sector is by far the biggest one of the economic sectors. In India the road sector is ever growing particularly in the past over two decades. It comprises a whole lot of other sub sectors like rural roads, urban roads, national highways, state highways, expressways and so on. Highway planning traditionally carried out by public sector agencies like NHAI, State and Urban road development agencies. However the construction part of the project is substantially contracted to private contractors. The sector is surrounded by several physical issues pertaining to land acquisition, rehabilitation, relocation, bypassing forest and other heritage sites, etc. The paper is based on a comprehensive desk research without any site investigation and intended to help readers understand what all the major and relevant factors are associated with the development stage of a big highway project.

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