



Environmental Impact Assessment of Extension of National Highway Number one: A Critical Study

KEYWORDS

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INTRODUCTION

India is a huge country, despite taking more than 17.5 percent of world population it also account for 2.4% of the world surface area. This vast surface area of 32, 37,263 sqkm and population of 1210.2 million (2011) require high degree of linkages by transport system.

The government of India in an attempt to supply the required transport system was able to provide all kinds of transportation system within its territory; road, rail, air, water and even underground tunnels.

The countries road network is one of the largest in the world with an aggregate distance of 3.4 million km, Husain (2012). The road networks of India comprises:

- i. Expressways
- ii. National Highways
- iii. State highways
- iv. Major District Roads
- v. Other District Roads
- vi. Village/Panchayat Roads.
- vii. International Highways

In the total road networks of the country some 70,934 km are National Highways, 128,000 km State Highways, 470,000 km Major District Roads and about 26, 50,000 km of the rest.

For movement convenience, the width of the roads varied from single lane to eight lane especially for the Highways.

Some 17,089 km or 24% of the country's National Highways are single lane, 36,651 km or 52% of the National Highways are double lane, then 17,194 km i.e. 24% of the National Highways are four, six or eight lane roads (India 2013).

This ambiguity of transport entice the researcher to attempted to view the way environmental sustainability is considered at the course of providing this road network systems.

Study area

The study area of this research for the purpose of data collection will be a stretch of 22km distance from Phagwara to Jalandhar in the state of Punjab.

It should be clear that the project is given by the government in connection with Haryana portion at a length of 291. The following information is quoted from the site of NHAI

Table 1

STATE	LENGTH
HARYANA	116 KM
PUNJAB	175.1
TOTAL	291.1 KM

Source: NHAI

Panipat - Jalandhar (Six lane)

Started in May 2009

Scheduled completion Nov 2011

Expected date of completion 31 March 2014 Constructions SA - Soma Enterprise Ltd, Spain – Indian VG Supervision Constructions SA - Soma Enterprise Ltd, Spain – Indian VG Supervision USA.

AIM AND OBJECTIVES

Aim

To critically assess negative impacts of the extension of NH1 in the immediate environment in order to expose the need for conducting EIA in such kind of projects.

Objectives

- To confirm the negative impacts of the project to the immediate environment
- To explore the level of public awareness about the degree of impact of the project to their environment
- To explore whether the project will harm the natural ecosystem
- To make it clear that EIA is needed for the project

RESEARCH METHODOLOGY

Methodology of each research emphasized on the sources of information from which the researcher gather his data and various methods by which he analyses the data for extracting his research findings.

The following points describe the methodology in making this dissertation. Viz.

Respondents/Participants: - These are the people that supply information to this researcher. They comprises Engineers that are working presently in the field. Residents of the nearby villages will also be consulted to explain how the project affect their lives. Teachers and students of LPU that have been following the road for not less than three years will also be consulted to describe how they know the environment before the commencement of the project and how it is now. Daily commuters that are using the road will also be consulted to describe the way they see the effect of the project to the surrounding environment. Out of our 100 questionnaires 5 will be given to engineers in the field, 40 to residents along the road from Phagwara to Jalandhar, 30 to commuters working on the road, 15 to LPU teachers and 10 to students.

Instruments: - This provide an overview and description of the measures used in the research. In this research we provide a sum of 22 questions that will be answered at ease by the respondents. A time of 15 minutes are enough to supply the required information in the questionnaire. Some sort of observation through reconnaissance and field observation survey will be conducted to absorb information from the immediate environment.

Procedure: - This describe how the data is collected. National Highway Authority of India (NHAI) will be consulted. Indi-

vidual interview and questionnaire administration will be the major pallet of extracting information. Internet and web sites of different organizations related with highway engineering and environmentalist's sites will not be out of consult.

Data analysis: - This provide an overview of how each hypothesis will be analyzed. Simple statistics by using Mean, Median, Standard deviation and other forms of charts like Pie chart, Histogram, Bar chart etc. will be employ to present data. For this research focus on the use of EIA in the extension of NH1, the project that will continue for several years, there is great need for continue research on the issue for proper investigation on the mitigation of the affected areas on the course of the project.

Sampling size: - The number of the respondents will be 100 from sources described above.

DISCUSSION AND ANALYSIS

Field survey conducted and questionnaire that was addressed to people that know the area provide this research with the following information. In this research we found a reasonable rationale for which we can conclude by affirmation the need for a sort of EIA in the extension of national highways.

RESIDENCES OF THE RESPONDENTS

Figure 1



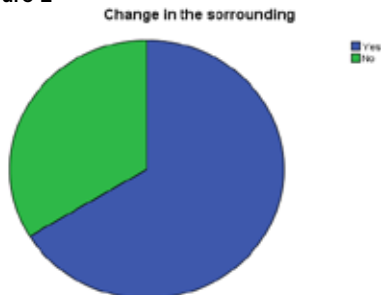
Source: Field survey

For accuracy determination we make sure that our respondents comes from the towns that are directly in contact with the road and are within the vicinity of our study area. Phagwara town being most vividly affected area within our study area give a good turn in responding to our questionnaires where 41% of the respondents are from there, 38% on the other hand comes from Jalandhar then some 21% from Lovely Professional University and other villages like Cheheru, Nanak Nagri, Madhopur, Mehtan etc. between Jalandhar and Phagwara. The following chart give the statistics of the respondents with respect to the towns within our study area.

ENVIRONMENTAL AWARENESS

To get clear notion of weather people in our study area are interested on their environment and they are monitoring to recognize any change that may occur on their ecosystem, we address them with weather they recognize any environmental change as the extension of this highway started.

Figure 2



Source: Questionnaire survey

The responses are appreciable for 64% answer with Yes that

declare their watchful eye they have on their acumen. Even the 36% that responded with No have grasp on the effect that occur due to the extension. This is clear when we found their talent answers to other questions that list the problems that may occur due to the extension which they make it clear that they see the impact. The following table and above figure are for this statistics.

Table 2

Responses	Frequency	Percent
No answer	2	2.0
Yes	64	64.0
No	34	34.0
Total	100	100.0

Source: questionnaire survey

Impacts of the extension of this national highway are multi-dimensional with respect to its social, economic and ecological imprint on the affected area.

As our research is related to the environment we critically selected environmental parametres that may be affected and found how much they are harmed in order to make it clear that there is need for EIA in conduct of the project which will help to minimize the negative impacts.

RELATED PROBLEMS

The problems that are related to environment which we found worth looking at to reduce the negative impacts of this extension on ecosystem are viewed one after the other as follow:

CLEARANCE OF VEGETATION

Removal of vegetation is a serious environmental disaster that is depleting the ecosystem globally. Removal of vegetation is always associated with aggravated soil erosion, deterioration of bio-geo-chemical cycle, global warming, wild life extinction etc.

In the extension of national highway 1 a large number of trees were removed talk less of the grasses and other underground biomes.

In our field survey we found 67% of our respondents are able to remember a group of trees that are now removed for the purpose of this expansion.

The following table display the responses when people are asked whether they can remember any group of trees that are now removed for the purpose of this extension.

Table 3

Responses	Frequency	Percent
No answer	1	1.0
Yes	67	67.0
No	32	32.0
Total	100	100.0

Source: questionnaire survey

Figure 3



Source: Field survey

When we try to depict the probable number of trees that are removed we found that the people give different opinions. We are sure that some overestimated and indeed others underestimate. For making it clear we use two measures of central tendencies and take the mean as 13700 tree stands, median value is also found as 399 tree stands. In the table below we display the statistics.

Table 4

Frequency	No of trees removed
Mean	13700.72
Median	399.50
Minimum	25
Maximum	1000000

Source: questionnaire survey

Looking at the size of the road as well as the extent to which it is extended is not surprise when one estimate the number of trees removed as 13000 because those that know the area before affirm that the former one lane road is decorated by road side trees.

Figure 4



Source: Field survey

If it is true that approximately 13700 tree stands are removed for this extension between Phagwara and Jalandhar, then in every kilometre this extension causes the clear of at least 622 trees. 622 trees are enough to stabilize soil of its surrounding from massive erosion and even make moderate desert encroachment check.

This ample number of vegetation removed display apparently how this extension deplete environmental resource well especially vegetation biome.

SOIL EROSION

Removal of surface soil by the agency of water, wind or ice is called erosion. In every type of environment rate of erosion is increased by flood, clear cutting, soil desiccation etc. What we found in the above analysis of massive removal of trees is enough for us to forecast coming of soil erosion. It will not be out of place to state here that the recent signs of erosion around NH1 is only the head for the body is yet to come because the contractor are still collecting sands from the surface soil leaving behind craggy surface susceptible erosion. The following table show how respondents of our questionnaire divide in to two in recognizing any sign of erosion after the commencement of the extension of NH1.

Table 5

Responses	Frequency	Percent
Yes	48	48.0
No	49	49.0
No answer	3	3.0
Total	100	100.0

Source: questionnaire survey

The picture attached below show how we see erosion sus-

ceptibilities are set to work in soil little before Jalandhar near Ramamandi way.

Figure 5



Source: field survey

To explore where sand and gravels are taken for this project we ask our respondents where they give variable answers. But significant number of 36% say they are taken from the surface soil and this is what is confirmed by field survey. May be those that say sub-surface soil they mean surface soil for dug has to be done in any gravel or sand taking. The following table show the responses.

Table 6

Responses	Frequency	Percent
No answer	12	12.0
River	18	18.0
Sub-surface soil	34	34.0
Surface soil	36	36.0
Total	100	100.0

Source: questionnaire survey

NOISE POLLUTION

Noise pollution is a displeasing or excessive noise that may disrupt the activity or balance of human or animal life. When heavy caterpillars are used the roar or their engine usually increase the noise of the surrounding area. In the surrounding of NH1 the noise is increasing for the heavy machines used and also for the increase in traffic that slow the movement of vehicles on the road due to congestion on the unfinished overhead bridges and narrow corners.

Noise pollution disturb animals and causes their migration especially birds.

Figure 6



Source: Field survey

The following table show how people ascertain the increase of noise pollution around NH1 after commencement of the extension.

Table 7

Responses	Frequency	Percent
No	45	45.0
Yes	53	53.0
No answer	2	2.0
Total	100	100.0

Source: questionnaire survey

53% consider the increase of noise in their areas while a number of 45% do not consider the noise. It is interesting to note that the people claiming they do not found any change in the noise are from Cheheru or within LPU whom are less in contact with the road than the fringing Phagwara and Jalandhar.

EFFECT ON WILD LIFE

The increase of noise in the surrounding of NH1 may have cause shift of some wild animals especially aves from near the road to somewhere, this is apparent in the sense that a significant number of 53% confirm they consider a change in the wild animals in their respective towns.

The table below show the responses.

Table 8

Responses	Frequency	Percent
Yes	53	53.0
No	45	45.0
No answer	2	2.0
Total	100	100.0

Source: questionnaire survey

The species of animal people found disappearing in the recent time after the commencement of the extension are Sparrows and Eagles. In a real sense these two classes of birds does not disappear to the extent we can conclude the extension cause wild animals extinction because 60% does not consider this disappearance. Table below show the result for this wild life impact.

Table 9

Responses	Frequency	Percent
No disappearance	69	69.0
Pigeon	13	13.0
Sparrows	18	18.0
Total	100	100.0

Source: questionnaire survey

EFFECT ON DRAINAGE

Drainage is the natural or artificial removal of surface and sub-surface water from an area. Many agricultural soils need drainage to improve production or to manage water supplies. In the table below our respondents show how they recognize changes on the drainages along NH1 after the commencement of the extension. 58 percent claim to see some changes on the drainage.

Table 10

Responses	Frequency	Percent
No response	1	1.0
Yes	58	58.0
No	41	41.0
Total	100	100.0

Source: questionnaire survey

Most of the effects construction activities like highway extension may have on the drainage system are related to

1. Change of course; which form due to diversion of the channel for bridge construction.
2. Filling of the channel by sand; which may be formed due to increase of erosion by the removal of vegetation.
3. Reduction in discharge; which may be associated with increase in sediment content of the river or sinuosity.
4. Pollution; this may be related to deposition of unwanted sand by the constructors on the river side.

The following table show how our respondents recognize the change that are coming to the drainage around the NH1 after the commencement of the extension.

Table 11

Responses	Frequency	Percent
No response	2	2.0
change of course	17	17.0
Reduce discharge	15	15.0
Pollution	43	43.0
Filling with sand	23	23.0
Total	100	100.0

Source: questionnaire survey

Among the 58% that recognize the change 43% attribute the change to pollution, 23% filling of the drainage by sand, 17% changing of course in the rivers, 15% reduction in discharge while 2% of them do not responded. Actually the pollution is not for the extension as we confirm it by our field survey. The pollution is related to the effluent discharge from industries in Phagwara. But change of course is found in White Bein which was diverted and re diverted for bridge construction. Other reasons given are to a larger extent show no impact as confirm by our field survey.

EFFECT ON FARMLANDS

Agricultural land which is part of environment that give contribution to the growth of plant crops is affected by this extension. Effect on farmlands can reduce the cultivated land which in turn affect the amount of plants that are cycling in the area. On the other hand this can also affect the economy of the agrarian people of the area whom when change the land use their reaction to environment can significantly change. The following table show how people recognize changes in the farmlands along NH1 after the commencement of the extension.

Table 12

Responses	Frequency	Percent
No response	9	9.0
Yes	72	72.0
No	19	19.0
Total	100	100.0

Source: questionnaire survey

A significant amount of 72% confirm the effect of this extension on the farmlands along the road.

Figure 7



Source: Field survey

When they are asked about the estimate of how much is the size of the farms lost the following table responses are given.

Table 13

Responses	Size of farms lost (hectares)
Mean	1215.00
Median	9800.00
Minimum	300.00
Maximum	10000.00

Source: questionnaire survey

The size of the farms lost according to peoples estimate is highly variable, some reduce it much to 300 hectares while others maximize it much to 10000 hectares. But the mean value given is well reasonable that is 1215 hectares or 12 square kilometre.

EFFECT ON HOUSING AND COMMERCIAL UNITS

People settlements and their commercial structures are also affected by the extension and the survey got the following table on the effect of this extension on commercial and housing units.

Table 14

Responses	No of housing/commercial units affected
Mean	3012.73
Median	300.00
Minimum	50
Maximum	1200

Source: questionnaire survey

Within our study area there is significant removal of houses and commercial structures that our respondents estimated to be between 300-3012.

The following picture was snapped in Phagwara where commercial structures are cleared on the road side.

Figure 8



Source: Field survey

ROAD ACCIDENT

Many people that we discuss with respect to the effect of this project on their environment they also brief us with serious impact that the work has on their lives especially with respect to road accident that is occasionally happening due to heaps of sand and gravels deposited as well some time as heavy tractors working on the way. The following picture was snapped in Phagwara where accident happen near the overhead bridge still under construction.

Figure 9



Source: Field Survey

For the purpose of concise explanation of the result we enlisted the elements as below with clarification.

The environmental elements that are much affected are:

1. Vegetation; this is by removal of at least 13700 tree stands.
2. Soil; this is by clearing vegetation and producing barren surface that is at threshold to gullyng.
3. Noise; apart from the 53% of our respondents that affirm the increase of noise due to the extension work, another 30 persons comment on our questionnaire seeking mitigation to the increase noise.
4. Temperature; ample number of people comment by testifying increase heat in the fringe of the project, this is due to use of heavy machineries and traffic congestion.
5. Dust; we found that there are a lot of dust blowing by the heavy trucks working on the road and also heaps of sand deposited on the road that passing by vehicles are trekking on flare massive dust particles to the air. This created dust in the atmosphere and dirt that always stain passing by people. More than 60% of our respondents comment on their grievances on the increase dust on the road.
6. Drainage; Phagwara drain and white bein are the only two drainage systems fall within our study area. We found that these rivers will in the future suffer filling with sand and reduce discharge for the vegetation cover around them being removed and also for the susceptibility of their valley side to erosion.
7. Loss of habitat; Many animals habitat especially bird are removed so this will make them migrate to other places. People very close to the road like LPU dwellers confirm reduction in the number of Sparrows and Eagles.
8. Urbanization; houses and factories that are massively developing now near the road can later leads to environmental degradation.
9. Traffic congestion; we found much congestion along the road where one can pass at least four go slow traffics from Phagwara to Jalandhar.
10. Loss of houses and business units; Many people cries the loss of occupation and houses. Their comments ask urgent completion of the project so they can turn to their businesses.

INTERPRETATION

In a matter of fact if an EIA is conducted this massive loss in the biodiversity will be reduced to a minimum level. So also the mitigation measures might could have been taken to

reduce people and environmental suffering ushered by the project.

RECOMMENDATION

From our computed result and field survey observations we can recommend the following points:

- EIA should be conducted in projects of National Highways extension.
- The EIA should be followed by post project survey to make sure the problems intended to mitigate are well mitigated.
- Afforestation is needed along the NH1 to replenish the lost vegetation
- People needs to be oriented about the rationale and importance of the project so they became resistant to the pain that may affect them.
- All extensions of National Highways should be systematically environmental friendly, less harm to environment and eco sustainable.
- Waste management sites needs to be provided so as to curb with the improper disposal of waste that is now waging along the road especially in the outskirts of the towns.
- National parks need to be created so as to increase the beauty of the scenery and added to the sustainability of the environment.
- Government should provide laws and policies related to EIA on the extension of National Highways.
- There is need for proper use of environmental ethics, preservation and protection measures.
- Good drainage for the discharge of rain water and towns gutters is highly needed along the NH1.
- Heaps of sand and tractors that contactors always deposit on the road in the nights has to be removed for this is associated with many road accidents on the road.
- Flyovers has to be finished urgently for this increase traffic congestion and consequently much noise and dusty winds.
- Straight lights are needed to help drivers understand the situation of the road in the nights.

SUMMARY

Undoubtedly there are great impacts on the surrounding environment as generated by the extension of NH1. These negative impacts are preventable by EIA. The number of trees necessary to be removed can be minimize to a laser limit by taking EIA. EIA can also negotiate the level of prone that the environment will exposed to if done otherwise.

In light of the above it is important to anticipate the likely environmental problems and threats that may arise out of the proposed developmental activities and human actions. Such an anticipation is termed "Environmental Impact Assessment" (EIA).

EIA is tool that improves decision making and ensures that the project under consideration is an acceptable option.

CONCLUSION

Conclusively, this research project accept and believe in the positive development that the extension of NH1 will bring to the immediate environment through giving efficient transportation network, employment, industrial development, agricultural development and many other benefits. But the protection of the global environment is in the interest of all of us living on this planet. Various measures have been taken at national and international levels to correct a number of environmental problems as we have already learnt in the previous discussions.

This project is conducted at the time when this extension of NH1 is at commencement, so many of the negative impacts discovered may be change later when some replenishing effort are made by the constructors.

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