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SOCIAL IMPACT ASSESSMENT OF ROAD INFRASTRUCTURE PROJECTS

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Abstract

Social Impact Assessment (SIA) is defined as an effect (both positive and negative) on a social issue resulting from infrastructure development projects (UNESCAP, 2001). It involves assessment of impacts on both communities and their environment. When viewed from the standpoint of sustainable livelihoods, an infrastructure project is likely to alter the asset base of communities and social impact assessment attempts to identify and, wherever possible, quantify these effects. However, a quick literature review reveals that attempts at gauging or measuring social impacts of infrastructure projects have been suggestive or, at best, normative. The main objectives of the Social Assessment exercises are to assess the Social Impact of the project, identify issues and assess consequent risk to the project due to positive and negative impact, measures to mitigate the negative impacts and risk due to the road interventions.

Keywords- *Social impacts and Variables, Social impact assessment methods for Road infrastructure projects, Cost benefit analysis, Analytic Hierarchical Processes*

Introduction

Introduction of Social Impacts

The means of Impact assessment as per the Comprehensive guide for Social Impact Assessment 2006 Centre for Good Governance is that, Social problems arise largely due to conflicts between economic development and natural resources. Economic losses and social costs from environmental degradation often occur long after the economic benefits of development have been realized. Most often, the development projects provide economic benefits and better living environment, but they also affect local people adversely. Social impact assessments help in understanding such impacts.

Any development planning has to focus on to the environmental, social and biodiversity impacts of the economic development. This impact assessment process helps to identify the positive and negative impact of the proposed projects.

Social impact assessment process benefited in many ways to gov departments to understand how the of socio-cultural, institutional, historical and political contexts influence to the social development outcomes of the specific projects.

What are the social impacts?

As per the guideline social impacts are the cost of the human population by any public and private actions that change the people live, work, play, relate to one another, organize to meet their needs etc. Social impact focuses on the human dimension of environment, and seeks to identify the impact on people who benefited and loses. The major types of social impacts are relates to lifestyle, cultural, community, quality of life and health related impacts.

Social Impact assessment (SIA) definition

SIA is a process to provide a framework for defining key relevant social issues or risks for involved of stakeholders. SIA is also give the impact of public/ gov intervention on the social aspects of the human environment. For example peoples way to use environment for recreation, spiritual, cultural, shelter, making livelihood, industry etc. So through SIA we can see how these activities have changes through this alternative implementation.

The output of the SIA would be any measurable result form organizations activities, e.g., units of housing, number of people placed into employment, number of youth served. The outcome of the specific changes in the

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attitudes, behaviors, knowledge, skills, status, or level of functioning this results from activities of finding a job, avoiding getting sick.

Identification and analysis of estimated effects

This process involves analyze the impact with versus without the action. This involves the identification or prediction of impacts without the actions and with the actions. This prediction of impacts the real data of the proposed actions, record of previous experience, census and vital statistics, hearings, group meetings etc.

My thesis study will focus on the social impact identification after the project has already implemented, so I will focus on the impact before the action has done and impact of the existing situation after the action has done.

As per the Rabel J. Burdge's article on the main goal of SIA is to help society as well as government and private organizations to understand the possible social changes for human population and community for the planned and unplanned projects.

As per the Burdge's statement in 2003, the SIA has not been widely adopted in the assessment process for environmental and natural resource decision making. The reasons are, minimal consensus to the definitions and label of SIA, we need batter model to understand linkages between biophysical, land use, financial and subsequent social impacts. And also there is no body of research findings that might direct the SIA practitioners.

SIA provides some benefits such as, it helps to understand the changes of lives of person due to the proposed actions, it alerts planners, decision makers to change in the primary and secondary zones of influences, also provides both qualitative and quantitative indicators of social impacts that can be understood by decision makers and peoples So the main goal of the SIA is to help community , government, private sectors to understand and better anticipate the possible social problems for human population of planned and unplanned social changes resulting from proposed actions.

The major anticipates SIA variables as per this study are as follows.

- Population changes: size, density and rate of influx and outflux of person
- Influx or out-flux of temporary workers: occupational composition of persons employed
- Presence of seasonal (for instance, leisure/ educational)
- Relocation of individuals and families
- Dissimilarity in age, gender, racial or ethnic composition

Some Myths surrounding SIA as per this study:

- Social impacts cannot be measured; therefore they should be ignored
- Social impacts are common sense and everyone knows what they are
- Social impacts seldom occur and therefore need not be assessed
- Social impacts deal with costs, not benefits and SIA slows down or stops projects
- SIAs and/or EIAs increase the price of projects and do not improve benefits

So we need to change this all myths of the people and this society really needs to learn that what are implications will occur from the new actions.

Social Impact assessment variables

As per Audrey Armour (1990), Vanclay (1999) & Jusle´n (1995), some important variables are listed below :

- Community lifestyle
- Culture, thinking, society, principles and language
- Community structure, strength, personality, services, and amenities.
- Political influence—the level of public participation for decision making process, the level of democratization.
- Environment—air and water quality of surroundings; food availability and quality, Hazardous waste pollution (air, water, noise). Facilities of water supply, sanitation, health and safety and sustainable use of resources.
- Health—As per the World Health Organisation definition: ''a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity''
- Personal and property rights—Economic status of people affected, or experience inconvenience, which may include a violation of their civil liberties;
- Doubts and aspirations—Community perceptions about safety, uncertainty about future of community, and hope for the future of children.
- Psychosocial impacts (community unity and social networking disturbance);
- Impacts on transportation and safety

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- Impact on existing public and private facilities

A framework for conceptualizing social impacts

Changes in social process due to interventions may leads to direct and indirect social changes. For example, resettlement of people can directly impact on increase processes of rural-to-urban migration and indirectly changes in food production and consumption process. In adding up, the social practice of change (human impacts) can also incite community to start change in behavior that eventually leads to additional social change processes. For example, the negative human impacts (experiences) linked with unemployment due to resettlement of community can start the social change process of rural-to-urban migration for employment opportunities.

Social change processes can also aggravate biophysical changes. Economic developments interventions increases the many development activities such as industrialization, institutions, tourism in a particular area which can have serious influence on land use pattern and water quality, water availability, air quality. This activity van directly impact reduction in agricultural production and afterward on income level for small holder farmers (Slootweg et al., 2001).

The following are the certain areas for social change processes:

- **Demographic processes**: In migration, Out migration, Presence of temporary residents, seasonal residents, Displacement and dispossession (loss of lands & assets), Rural to Urban Migration, Urban to rural migration etc.
- **Economic Process**: alteration and variations in economic activities, Inflation, Currency exchange fluctuation (devaluation), Concentration of economic activity, Economic globalization
- **Geographic Process**: Changes in land use patterns, Urban sprawl, Urbanisation, Gentrification, Enhanced transportation and rural accessibility
- **Institutional and legal processes**: Institutional globalization and centralization, Decentralization, Privatization
- **Emancipator and empowerment processes**: Democratization, Marginalization, Capacity building
- **Socio cultural processes**: Social globalization, Segregation, Social disintegration, Cultural differentiation.

The Major Social impacts are based on the Social Changes occur during the intervention. The social changes may be positive as well as negative also and which quantifiable or not quantifiable also. So from this paper I have learned that in my study I have to more focus on the existing social changes in the affected community. The important variables are:

- Health impact & Social Well- Being: Death, Nutrition, Health fertility, Mantel health, Dissatisfaction towards intervention, Experience of moral outrages, Positive or negative feeling for interventions.
- Livelihood Impacts: work at home environment or neighborhood, Disruption of daily living practice, recreation opportunity & facilities, Aesthesis quality, physical quality of housing, availability of housing facilities, adequate physical infrastructure & social infrastructure, personnel safety & fear of crime
- Economic Impacts: living cost impact, workloads, access to public goods, access to gov & social services, income level changes, property value changes, occupational status, changes in unemployment, replacement cost of services, disruption of local economy.
- Social & Cultural Impacts: Changes in cultural values, Experience of cultural marginalized, Exploitation of cultural monuments, Loss of natural & cultural heritages, Disruption of social network, Changes demographic structure of the community, Social differentiation & inequality, Social tension & Violation.

The concept of SIA and the variables, The Daniel Frank's paper on SIA of resource projects has also discussed about the Social impact assessment for development. Major objectives of resource projects are life cycle approach, leaving a long term legacy, Engagement with participation of, community and government, align activities with community and government planning, building capacity of communities to undertake activities, Partnership with local and state government, communities, Balance between operational and regional context, strategic use of funds, trusts and other investments and activities, Adaptive management and flexibility.

The various concepts for Social impacts focused on:

- how to identify, avoid, mitigate and enhance outcomes for communities and is most effective as an iterative process across the life cycle of developments, rather than a one-off activity at the outset of mining (Vanclay 2003; Becker and Vanclay 2006; Franks 2011; Esteves et al.,).
- The systems and strategies attempted in the implementation stage of a development (with exploration) to observe, report, estimate, evaluate, and actively respond to change.
- Social impacts are the effect of an action (or lack of action) and can be both positive and negative.

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So it has concluded that the early consideration of social impacts, the alignment of activities with regional and community planning objectives, and meaningful participation of community in decision making are key features of a policy regime that will demonstrate best practice and support the sustainable development of resource communities.

Global Principles for Social Impact Assessment

(Frank Vanclay, 2015) the infrastructure interventions generate opportunities for communities such as increase access to many facilities. However this intervention also creates the negative impact to communities. So we need to properly identify the gap of cost and benefits within nearby communities. For this cost and benefit analysis of intervention here needs to prepare the detailed Social impact management plan for each intervention. The Social impact management plan should include the detailed Community Health & Safety Plan, Resettlement and rehabilitation Action Plan, Stakeholder Engagement Plan.

Following are the steps for SIA.

- **Understand the Issues**
  - understanding of the proposed project,
  - Identify the primary areas of affected by interventions, define the possible impacted and benefited communities (nearby and distant), and stakeholders
  - Understand the social, economic, demographics characteristics of the communities. Also understand the social culture, social networking, the types of employment and the service area for businesses. Collect the data in the way that it addresses the profile of communities which can also point the issues and possible social impacts.
  - Inform communities about the project: Give them overview about the projects and brief them about the cost and benefits of project.
  - Comprehensive community participation and give spaces to help community stakeholders, prepare them for changes

- **How to identify the social impacts?**
  - Identify the Social changes & impacts
  - Proper identification of indirect impacts.
  - How the Intervention contribution to the cumulative positive and negative impacts experienced by the communities**.**
  - Find out the response of various affected groups and communities.
  - consequence of the predicted changes
  - Plan and assessment of other project alternatives options.

- **Strategy development for preparation of SIA**
  - Identify the negative impacts and address it properly
  - Develop social benefits & opportunities for employment
  - Develop and implement appropriate feedback
  - Prepare Social Impact Management Plan (SIMP)
  - Strategy to implement SIMP

- **Develop an Impact Management Program**
  - Shortlist the Indicators to monitor social changes
  - Proper monitoring plan
  - Assessment & constant review

In this guideline they have also mentioned about the indigenous people who will be an affected community. Indigenous people have diverse way of leaving standard in the language, culture, fundamental beliefs, structure of governance, way of leaving and livelihood. Following are the several characteristics of Indigenous community..

- Member of specific cultural group.
- Strong link with land, territories and surrounding natural resources
- typical social, economic and political systems;
- Part of a different social group which is not a component of the principal groups within the society.
- Decide to sustain and reproduce their family environments and systems.

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A thorough stakeholder analysis is very important for understanding of social impacts.

The types of stakeholders are listed below:

- Inhabitants in the immediate affected zone who are directly impacted physically or economically.
- Nearly affected communities and the distant residents whose livelihood is affected due to interventions.
- Communities who will be disturbed by the allied works such as irrigation channels, quarries, roads, railways etc
- Construction workers
- Nonresident other land connected communities who have spiritual attachment to the land, river in near to the construction site.

So to identify the proper social impacts due to any infrastructure interventions it is very important to identify the direct and indirect impact on the community. May be sometimes some possible impacts may be really a concern for local community, but sometimes it may turn out to be a least concern for the investigators which leads to affect their feelings and behaviors. Therefore constant and careful community engagements need to occur.

Social Impact Assessment for Road Infrastructure Projects

Transport sector projects are different from country to country and depend on the subsectors, financial mobility and scale. Transport projects include a diversity of types, which can range from local transport facilities to development of national or international networking for road, air, rail, and water transport; and the reform of transport services, policy, and institutional frameworks.(***Technical Note Social Analysis for Transport Projects by ADB 2008***)

The Major Social Issues with Transport Sectors

- **Stakeholder Engagement:** It requires for proper planning and maintenance of projects, major stake holders are financiers, politicians, transport policy makers, planners, transport agency staff, other government agencies, local NGOs, and people living in the transport impact zone.
- **Safety**: Major Economic and social costs of accidents (injury, death, and damage to property) we need to access proper land use pattern of the transport pattern for example, location of Bus stop with shelters, water facilities, toilets, and provision for shops and refreshment outlets.
  The design of road junctions should includes the road markings, traffic signal and traffic signs control, pedestrian footways, street lighting, fencing, and crossings.
- **Access for the Poor**: The road network is more pro-poor through choice of area and quality which is affordable.
- **Transport facilities maintenance**: Road should be maintain in a way that it helps in sustainable development for poverty reduction, local economic and social development. Maintenance is a financial responsibility for transport sector agencies and also they have to involved poor communities from the earliest stages.
- **Extend Employment Opportunities in Construction and Operation for poor**: increase the jobs for local communities, local incomes, and business opportunities from rural road projects if the development and maintenance of road projects are ashore in local resources based methods.

Transport & Gender Equity

Transport projects increases tie mobility facilities for women. Transports needs is different for women and men, transporting goods from market, collecting materials such as firewood, crops, fodder, and water which is necessary for agricultural, income-generation, and household purposes are the primary needs of women for transportation. Public transport generally caters to the formal employees, which is inadequate for women for their tasks such as access to health care, education, informal workplaces, subsistence agricultural sites, and markets which results that women often make long and exhausting journeys every day. So from studies it is shown that women who are depends on agriculture work are less benefited from roads and motor vehicles (Ahmed 1999). So to understand this pattern needs to study in-depth gender analysis, focusing mostly on the relations among gender, transport needs, assets, and women's livelihoods. It is important to adapt transport modes, locations, and timetables according to women's exact needs. This should be initiated by stakeholder outreach with the intention of gender sensitive and open to women's participation.

Gender-Sensitive actions are promoting complementary services that may be more accessible to women to increases the transport facilities such maternal and child health care and education. This service measures include efforts to make sure that women-owned small and medium enterprises and contractors are integrated in supply chain

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and income-generating opportunities. It also needs to make sure that women receive support and training. The Women-owned businesses get supported for advice on markets and products by this complementary transport services. Policies can be amended to ensure that access to markets for deprived women and also apply new and modern technologies road access that can increase women's employment opportunities. We needs to directly target women for transport construction work which may help to reduce the risk that they or their children will be exploited by human traffickers.

Balancing Health and Education Services

Access to transport increases the mobility of medical staff and doctors in to the rural and remote areas where health services was very limited. Now because of increases the road facilities the patients may be more easily avail the health facilities in an emergency and also transferred to a higher level of the health care system. Proper transport and communication services have reduce the maternal mortality rates. Transport can play an important role in reducing maternal deaths due to easy access to hospital. Still women currently spend extensive waiting time for transport and traveling to health facilities so Inter sectoral collaboration between transport and health planners can improve patients' access and transfer to health services.

Likewise, transport projects can improve access to schools especially in remote and isolated areas. Transport projects can increase the mobility of teachers, teaching equipments, and school inspectors. Improved transport associations help school to maintain teacher's presence in remote locations where previously they were unwilling to work. Accesses to social services between villages have improved as well because adequate transport can create distant services easily accessible. Student attendance also increases in the middle and high schools outside the villages. School attendance for secondary education for poor children (especially girls) is mostly dependents on the affordable and easily accessible transport services.

Transport risk for Resettlement

Land Acquisition and Resettlement: Construction of transport infrastructure may leads to displacement of people from land, house, roadside shops and businesses which impact their income source and livelihood. So it is necessary to looking carefully for alternative road designs that may be feasible to reduce the impact. It is observed that sometimes instinctive displacement may get worse the poverty and vulnerability. So this combination of loss of social networks and social capital may increases vulnerable people to take risks of traffic accidents or human trafficking. So this kind of risks reinforces the need for successful resettlement plans.

Outcome Indicators

Following are the changes due to the projects.

- transport use by particular social groups (women, poor, aged, disabled);
- employment generation for specified local groups
- travel times for specific users
- bus services availability
- number of visits to local markets
- number of visits of additional workers,
- Health, education and credit providers
- attendance of schools
- women, children and other specific group's safety in public transport
- Road business activities
- Fatality and injuries due to road
- user satisfaction with the quality of transport facilities
- satisfaction of specific groups in the impacted zone
- traffic safety programs participation rates

Output Indicators

Following are the changes due to the projects.

- Road, railways and waterway constructed, rehabilitated, or maintained by local labor
- number of poor or vulnerable local workers hired for construction and maintenance of road
- during design and construction safety audits have implemented
- construction of road safety features
- developed and implemented the road safety public awareness programs

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- Facilities for the disabled, poor or remote area residents.
- Proper equipment procured and installed for safety
- Construction of underpasses and overpasses
- identified the risk of people
- implement the public awareness activities
- undertake the stakeholder consultations
- Publicized the grievance redress mechanism for workers, transport users, and people in the impacted zone
- Operationalize the partnership agreements with NGOs, community-based organizations, and independent researchers.
- executing agency have to conduct the social monitoring activities
- Conduct the independent monitoring visits

Transport Impacts

Transport impacts on Health

Transport has both positive and negative impacts on health.

Positive impacts are: Increase the access to health services both in emergencies and for primary care.

Negative impacts are: the spread of disease, particularly HIV/AIDS, increased dieses due to air and noise pollution.

Transport impacts on deprived Groups

Transport impacts on the poor, women, elderly, disabled people and children are improved access and mobility reduces isolation, vulnerability, and dependency. Many studies show that transport is the key factor associated with deprivation. However the transport is working well, many people cannot travel alone due to poor security, or the transport service may be physically unreachable for the elderly or disabled.

Transport Impacts on Employment and livelihood opportunities

It is observed from popular approach of transport that the after the construction of road, it is handling over to the local community for maintained which have the potential dual benefits of well-maintained roads and generating income for the local community. The main constraints of such an approach is that the local community must be willing to carry out the maintenance, and the required knowledge, support, materials, tools and capacity must be easily available for local community.

Some Key Social and Developmental Dimensions of Transportation Projects

Transport Benefit – Cost Analysis

Benefit-Cost Analysis, also referred to as Cost-Benefit Analysis, is a systematic process for calculating and comparing benefits and costs of a project for two purposes:

- to determine if it is a sound investment (justification/feasibility)
- to see how it compares with alternate projects (ranking/priority assignment)

Benefit-Cost Analysis works by defining the project and any alternatives; then by identifying, measuring, and valuing the benefits and costs of each.

One of the most common economic evaluation methods is Benefit-Cost (also called Cost-Benefit) analysis, which uses monetized (measured in monetary units) values to compare total incremental benefits with total incremental costs. The results can be presented as a ratio, with benefits divided by costs (which are why it is often called Benefit/Cost or B/C analysis). Net Benefits is defined as the sum of all benefits minus the sum of all costs, which provides an absolute measure of benefits (total dollars), rather than the relative measures provided by B/C Ratio.

To perform Benefit-Cost Analysis it is necessary to monetize all relevant impacts. In recent years economists have developed techniques for monetizing non-market impacts, and some transportation agencies have adopted standardized values for travel time, crash damages and environmental impacts.

Benefit-Cost Analysis is most applicable for evaluating proposed projects that meet the following criteria:

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(1) The potential project expenditure is significant enough to justify spending resources on forecasting, measuring and evaluating the expected benefits and impacts.

(2) The project motivation is to improve the transportation system's efficiency at serving travel and access-related needs, rather than to meet some legal requirement or social goal.

(3) Environmental or social impacts that are outside of the transportation system efficiency measurement are either: (a) negligible in magnitude, (b) measurable in ways that can be used within the benefit-cost framework, or (c) to be considered by some other form of project appraisal outside of the benefit-cost analysis.

Social Impact Assessment of Major Roads (By 20th World Road Congress Montreal, Quebec September, 1995)

As per this report Social impact assessment is a process of analyzing, predicting and evaluating the future social and economic effects of proposed policy, program and project decisions and actions on the well-being of people, and their businesses, institutions and communities. Its goal is to protect and enhance the quality of life by ensuring that potential socio-economic impacts are minimized and sound environmental decisions are made. Social impact assessment involves identifying: significant potential positive and negative changes in peoples' cultural traditions and lifestyles, their physical and psychological health, their families, their institutions and their community. And, it identifies ways of avoiding, mitigating, enhancing or managing those changes (e.g., monitoring and impact agreements).

Benefits of social impact assessment process are:

- Predicts the nature and size of potential negative and positive effects on individuals, businesses and communities;
- Develops and implements appropriate recommendations and impact management measures to avoid potential negative socio-economic impacts and enhance positive impacts.
- Identifies net social and economic impacts occurring after mitigation measures are applied, including roadway routing, design and operating conditions.
- Helps resolve public issues by working with the community to address the potential impacts.

Types of Social Impacts form Road project:

- **Displacement of Residents**: Local residents displaced for the construction of the road may experience added impacts such:
  Economic impact due to purchasing new housing at a new location, Social and psychological impacts, due to interruption of existing social relationships and establishing new relationships in a new social environment.
- **Dislocation of Businesses and Community Services:** In some transport projects, businesses and community services (e.g., churches, community centers, and parks) experienced a important impact when they are removed or relocated. This also have a major impact in some communities.
- **Impact on inhabitants:** When the road is open to use it can increases access to jobs, schools, stores, recreation and other community services and amenities. These effects can also increase the land values. However, there are many negative impacts also for some residents living near the road which includes increased noise, pollution and aesthetic impacts.

Effect that a highway or its widening on the socioeconomic lives of the people (Sengupta, 2007)

From a collective infrastructure developmental perspective, to develop a transport infrastructure is expected to directly increase the income by promoting traffic and goods movement so it will help to expand the size and the access to the markets by variety of direct and indirect linkage impacts. The the benefits of such huge public investment schemes will benefit to local or poor community at large in the long term. This would certainly at the HH level the partial impact of a road or its widening eventually leads to a development in the level of well-being especially to the poorer ones, living near area of the highway. The study region is in India, as government is now

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implementing many transport programmes in the country for infrastructure development and linkages between metro cities. Simultaneously in the country poverty level is also increases. So it is very important to examine the socio economic impact of such a huge public investment.

Study area is NH2 which is one of the oldest highways between Agra and Dhanbad, They have examined the poverty status of rural population and how this widening of road have impacted on the socio economic status of the same populations. They have collected a HH level data for pre-project baseline and post project end line data.

The main outcome variables which they have considered were mobility, poverty status, earning and employment opportunities, asset holding, access to education and health services and other infrastructure services. They have examined the impacts from the two different types of HH from influenced villages and control villages. They have also considered the other influenced factors for the impact assessment. So as a result, the impact of nearer HH as reflected as a single differences of the observed values of the outcome variable which is possibly not entirely free from the influence of other factor having impact on them. So the expected outcome is different in the both the zones. So it has observed from the study that the beneficial influence of the NH2 is extend up to 5km of both the side of the road and influence decline after that.

Social Impact Assessment Methods for Road projects

The SIA can be efficient by focusing socio- economic data collection on the social issues and possible local impacts. Following are the steps for SIA:

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Tools use for analysis of social impact assessment: (Paolo Beria- 2012)

The major two approaches are commonly used for evaluation of transport mobility. 1. Multi Criteria Analysis (MCA) and Cost- benefit Analysis (CBA), MCA is technique which is used for acknowledging the sustainability whereas CBA is used for large transportation or infrastructure projects. Here we will discuss the strength and weakness of both the techniques and their application to sustainable mobility.

Based on the different study it has concluded that the MCA is widely used for micro scale infrastructure projects whereas CBA is adopted for larger infrastructure projects.

Details of MCA

MCA is very useful tool for selecting an alternative projects which have important social, economic and environmental impacts. MCA allows taking many criteria and stakeholder opinion into an account. So to include a multi-stakeholder in to decision making process is a crucial factor for successful infrastructure projects. Within MCA also it is very important to identify the proper indicators which can be monitor. However it is also based on the scoring, ranking and weighting of the qualitative impact categories and criteria.

The most suitable MCA methods are depends on the nature of the project, nature of the decision making process and nature of the problems. Based on these objectives MCA categorized in three classes.

- Analytical Hierarchy Process (AHP)
- Analytical Network Process (ANP)
- REGIME

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AHP and AMP is most used and well known MCA techniques. And REGIME used for assess sustainability of the projects. Here for this research study I will use the AHP technique for analysis. AHP used in three stages. 1. Build hierarchy. 2. Weighting of indicators by pair-wise comparison. 3. Calculate the final value of alternative. The different stakeholder would be a part for construction of hierarchy. Once the criteria and sub criteria have decided, and then calculate the weight of each criterion which describes the relative importance of each criterion. The weight analysis is done by the pair wise comparison matrix, for each nest in the hierarchy once the weight is decided this matrix is collapsed. So for each option structure there will one final weight. This final weight is used for rank the alternative options.

Cost- Benefit analysis

It is very commonly used tool for assessing the infrastructure investment especially for transport projects. CBA measured by the money value of cost and benefits for total investment. Once the all cost and benefits are quantified, then inter-temporal discount is used to translate future costs and benefits by means of a social discount rate, future can be compared with present. The main in the CBA technique is sum of user's surplus, Social surplus, producer's surplus, government surplus. Surplus is the difference between the willingness to pay/sell/produce and the efforts for this good, situation id with and without it. CBA also compare with the trade-offs, total benefits with total opportunity cost such as labor, time, monitory cost etc to make project feasible, otherwise social cost will exceeds the social benefits and the project will be rejected.

So the transport CBA will quantified based on the investment plus running cost of the project and compare directly with the benefits which are represented by time, running cost and environmental cost savings.
Here in this research study we will touch on the both the methods to overcome the weaknesses of the both the tools.

Case Studies

Undertaking Social Impact Assessment Using A Sustainable Livelihoods Approach: The Case Of Two Roads In Central And Southern Ethiopia (*Catherine Butcher, GY Associates and Smita Biswas WSP International Management Consulting)*

This paper has used a sustainable livelihood approach for economic & social impact assessment. Possible positive impacts of using a Sustainable Livelihoods Approach in carrying out a Social Impact Assessment were seen below:

i) The objective of road improvements is to improve the livelihood of the people, so to setting the proposed road improvements design which should be in the context to bring profit to people.
ii) More focus on assessing impacts which can be experienced by the more vulnerable members of community.
iii) Provide a proper analytical framework that linked potential social impacts and also can also integrate the qualitative and quantitative approaches.

This approach also gives an example of how to link social and links economic assessment with regards to the role of non-motorised transport. Though, to make sure that social factors are fully taken into consideration of alternative options, there should be need of new tools fully incorporate social, economic and environmental factors. This approach describes the same approach for Social Impact Assessments of two roads, which although apparently similar in their goals and context.

First Road is 199km long and 6 m wide and in very bad condition so the project is to up gradation of the existing road, the livelihood in the area is primarily based on Agriculture with trading service. This road is among the most densely populated area of the country. Other road in 162 km long and under the hilly area which also undergo several vivid changes in altitude rang from 1,100m to over 2,500m. The main livelihood source is agriculture and livestock along the route. Also some numbers of indigenous peoples resides in that area.

Data Collection Methodology

Primary data collection method for the community living in the control area of the roads. Data collection was conducted by consultancy firm. Following are data which have to collect.

- The types of properties (assets) available by the individuals and households.
- Details of income and expenditures at individual and community level also the details of credit and savings facilities.
- Total annual investment in transport activities in a HH
- Availability of current transport services
- Existing land use patterns and use of Natural resources
- The use of transport to maintain social networking

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Identifies Social Impacts Due to Road

- Rapid changes in the price of necessary goods due to influxes workers and also from relocation or resettlement or from operational aspects of implementation it also leads to abrupt changes to livelihood systems.
- Due to increases male workers local people are facing many new dieses.
- Unexpected loss of social and cultural values, relationship between social groups especially between men and women.

Some policies, institutions and processes aspects were planned to be investigated during the social impact study are Compensation, road maintenance, ownership of land (Policy, legal and administrative background), Motorised and non-motorised transport operation (Private Sector), Organisations and institutions (Organisations and institutions) that have potential as partners during road construction and maintenance, Barriers to the uptake of services (Cultural context).

Methodology

- Literature review and study of background documents
- Consultation with organizations and institutions
- Consultation with members of the public
- Differences in methods between the two roads

The possible impacts for both routes were summarized according to individual focus of male and female, and a combination of social and economic aspects identified by the members of the public consultations, members who are indicated by secondary sources and those derived from analysis of information gathered.

Impactors (causes)	Impacts (effects)			
	Individual focus		Local focus	Wider focus
	Men	Women		
POSITIVE IMPACTS: Longer-term				
POSITIVE IMPACTS: Short-term				
NEGATIVE IMPACTS: Longer-term				
NEGATIVE IMPACTS: Short-term				

Scoping matrix for potential negative impacts

	1	2	3	4	5	6	7	8	9	10	11
	Impact parameters	Without Project	With Project	Nature	Magnitude	Extent/ location	Timing	Duration	Reversibility	Likelihood/ risk	Significance
1.											

C: during construction; Post-C: post-construction

Conclusion

While there is increasing gratitude of the potential positive impacts or benefits out of the improved transportation on poverty reduction, there are also increases the awareness of the facts that transport sector projects can lead to both short and long term negative impacts or dis-benefits. This negative par of transport projects needs to address and prepared the mitigation plan which incorporate the avoidance of such impacts. The practical responsibility of a social impact assessment is useful tools to make sure that the positive benefits are maximized and that any also potential negative impacts are also identified and addressed. Also the sustainable livelihoods approach as social impact assessment helps to focus on the most vulnerable

Rural Road investment to Help Reduce Poverty – Case of Vietnam, By The World Bank, Washington, DC, USA (DOMINIQUE VAN DE WALLE)

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This paper focuses exclusively on the appraisal and selection of investment projects in the rural roads sector, where the specific objective is taken to be poverty reduction. The paper first critically reviews the methods typically used for selecting roads, both conventional cost–benefit analysis (Section 2) and the more recent hybrid methods which combine cost– benefit methods for some projects with cost effectiveness calculations for others.

Traditionally, road investments in World Bank financed projects have been selected based on benefit indicators derived from consumer surplus calculations of road user savings, comprising both of vehicle operating cost savings and journey time savings. Forecasts of traffic demand—reflecting both normal growth in traffic and that generated by the project—are used to derive willingness to pay estimates to proxy project benefits. Now it considered benefits accruing to motorized four-wheel vehicles to also including gains to no motorized traffic and pedestrians based on reduction of travel time savings. In some cases, estimates of the value of agricultural production increases induced by the road investment are also included, but this approach is appropriate in high traffic areas such as urban areas, but not for low traffic areas or in rural areas.

The aim has been to focus the discussion back squarely on the objective of poverty reduction, but doing so within a public economics framework in which efficiency and equity concerns are inseparable, information is incomplete in important ways, and resources are limited. The approach tries to avoid the tendency to treat budgets for so-called ‘‘social objectives’’ outside the realm of hard-nosed economic analysis, but also recognizing the constraints faced in practice in implementing rigorous appraisal with limited information.

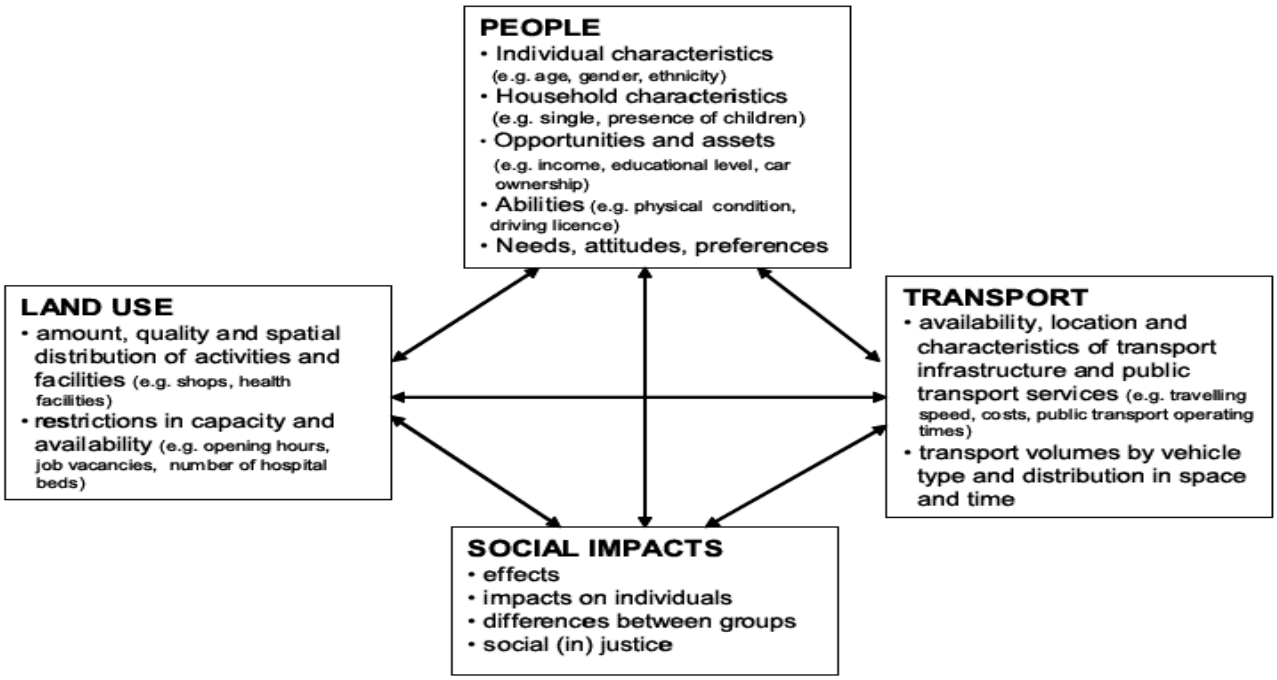
The advantages of proceeding as outlined in this proposal include that it holds the hope of building capacity, and is participatory; it extracts local information that may not be readily available to the center, and it appears to be feasible through its reliance on the participation of local authorities and residents in the appraisal of subprojects. The method promises to assure that the most effective investments are selected from the point of view of poverty reduction, given both the information and resource constraints.

Social Impacts of Transport with Literature Review and state practice in the Netherlands and the United Kingdom

Transport sector social impacts give a defined positive and negative influence in the community preferences, safety behavior or awareness of individuals, groups in the society.

Conceptual model for factors affecting social impact of transport:

Social impact on transport are due to multiple factors which is Thus, social impacts of transport are caused by a multiplicity of factors, which might be also support or depends on each other. Such as, lack of proper transport in the area may affect the many local services such as access to local services or activities (jobs, healthcare, schools,



market etc) which also indirectly reinforce the social exclusion of particular community. In UK it has observed that

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for almost 40% of job-seekers in the UK is not getting proper job due to lack of personal transport or poor public transport, and almost 1.4 million people reported that they have missed medical help due to transport problems.

From above figure it has concludes that in a long time due to transport related social impacts can affect the land pattern of the area or also can affect people's preferences.

Social Impacts of Transport are:

- Infrastructure preference
- Parked vehicles presence.
- Presence of transport facilities, services and activities
- Traffic (movement of vehicles)
- Travel (movement of people)

Netherlands and the United Kingdom have very comprehensive government approved guidelines on transport policy, and also they have much practical, so these two countries are very good examples for transport studies. This transport guideline also defined social impacts in to two categories such as direct impacts (e.g. benefits of travel time and dependability benefits), indirect impacts (e.g. improved functioning of housing and labor markets, and international rearrangement).

Social Impact Assessment Methods

They have used 4 methods for social impact assessment which is described in below.

- **Cost–benefit analysis method**: To monitor the project economic appraisal, included a quantified an assigned social impacts in a monetary value.
- **Multi Criteria Analysis**: assigning non-monetary weights to the individual impacts with quantified impacts which are included in an overall project appraisal.
- **Quantitative measurements**: all social impacts estimated in physical units or numbers.
- **Qualitative assessment:** using standard criteria all impacts are classified into ranked categories

In the impact assessment research, some impacts are quantified and monetized out of all reporting impacts. It has observed that to integrate the social impacts into a cost benefit analysis is a great advantage. To quantify and place the value for social impacts is a very important for any decision markets for transport projects. In some countries, they have moved away from quantifying the specific social effects. In Denmark and Sweden they have moved away from a quantified effect to separation, for example, they have skip to separately quantify the time lost by pedestrians when crossing roads. Also CBA is not well positioned to address the sharing of costs and benefits terms of acceptability. CBA will justify when the total amount of utility is maximized, in spite of of the distribution.

The alternative approaches for social impact assessment is Multi criteria assessment which offers decision-makers a alternative weighting schemes based on social justice theories but still the research is necessary to examine whether this alternative weighting systems can be useful for decision-making process.

The place of social impacts in the iterative assessment process: case study of a highway project in the US State of Georgia

The SIA approach consisted of both quantitative and participatory (public involvement) components. Successes in using this approach included: aligning the roadway with access and optimal benefits for the adjacent communities; support for the project despite the change it will bring to the region; improved relationships with the community, which previously had little trust in government; and, most important of all, education of the design engineers about community impacts. The project begins south of the City of Fargo and travels north through the City of Homerville in Clinch County, and continues to the City of Pearson in Atkinson County.

The environmental team analyzed the social and economic impacts of bypasses for small towns, as a bypass was an alternative considered for both the City of Pearson and the community of Colo. Many variables may affect the impacts of bypasses on rural communities, including: the size of the town; types of businesses in town; distance of the bypass from the town center; and potential future growth of the town toward the bypass.

Direct contact with community members as well as elected officials provided an informed perspective of the issues and desires of the communities, and facilitated design of the alternatives. In addition, the project team felt that the process of on-going communication and public involvement ultimately aided in streamlining the process by dealing with issues before they became problems.

Understand the relationship between Social change and its impacts: The incident of rural land use change in south-eastern Australia.

http://www.sciencedirect.com/science/article/pii/S0743016712000526

DOI:10.24105/gjcmp.7.1.1811

In this study they have explain the socio- economic changes due to land use changes. Here they have given the precise attention to the relations between separately observed land use change and related socio-economic changes, recognized cause of change, and experienced impacts due to change. South-east Australia choose as a study region, they have examined the land use growth impacts for dairy farming, , blue gum plantations, cropping and rural local residential community development. They study the impact in following two community criteria:

(i) Rural population trends

(ii) The amount and types of employment accessible in the study region.

They have used multiple qualitative and quantitative methods such as Group interviews (69), Resident survey (899), Landholder survey (81) FGD(66) for analysis.

It has concluded that the awareness about the extent of land use change in local residents is very low, and also it is very difficult to attribute social changes and their impacts to the land use changes to community which can motivate them. Additionally, the observed impacts of land use change appeared dependent on a community's awareness of that change, and on their beliefs about the causes of social change. These results emphasize avenues for hypothetical development to better identify the processes by which social change processes are practiced as community impacts.

Factors such as life stage, occupation, place attachment and adaptive responses may modify human experience of social change processes. In this study the null hypothesis has rejected because the study conclude that the two other considerations, awareness of change and attributed cause of social change. The study provides some evidence that perceptions of the social changes associated with land use change sometimes differ from independently observed social change, and that these perceptions influence how a person then experiences that change e in other words, how that person is impacted by the change.

Ranking Rural Road Projects: Weighting Different Evaluation Criteria with A Focus On The Case Of Nepal.
http://iosrjournals.org/iosr-jmce/papers/vol11-issue6/Version-1/I011615365.pdf

The literature about criteria considered for evaluating rural road projects in developing countries, selected thirteen of them, and submitted a questionnaire to obtain an evaluation of their relevance to a large number of experts from Nepal and across the world in 2013. A total of 63 experts from Nepal and 36 experts from other countries replied to the questionnaire. The evaluation was carried out considering that the criteria would be used in a multi-criteria analysis of rural road projects whereby the final score for each project would result from a linear combination of weights and measures for each criterion. The evaluation exercise was based on Likert scales, commonly used in studies of transport behaviour, but new in the field of road project evaluation. A noteworthy advantage of Likert scales questionnaires compared to using pairwise comparison methods is their simplicity, which results in a number of questions equal to the number of criteria examined, obviates the need to check consistency among replies. Calculations to obtain the final results are also straightforward.

Thirteen criteria were selected and grouped under each of the key aspects of sustainability: economic, social and environmental aspects. Interestingly experts gave a different weight to each such aspect when they were asked about each of them directly and when those where implicit in the criteria being weighted. Little differences in importance may be noted in the first case, with social aspects slightly prevailing for foreign experts and economic and social aspects equally relevant for Nepali. However, in the second case and therefore when we asked questions leading to weights to be used in actual evaluations, economic aspect clearly stood out, social aspects were clearly deemed less important and the environmental pillar of sustainability received a much smaller weight. This underlines the importance of how questions are asked and data are treated in reading the results.

The paper provides sets of weights for each of the thirteen criteria selected which were computed first by considering separately Nepali and foreign responses and then by accounting for all responses together. We noted which items either group considered more important by looking at the highest weights but also noted that, except in a few cases, weights were rather similar across Nepali and foreign respondents. The few exceptions encountered underline the possible importance of the background of the experts involved. Highest weights pertain to elements of the social and environmental groups with "population per km of road" and "access to services other than education" being most relevant along with "impacts on natural systems" and "danger of landslide/erosion" among economic aspects, "accidents costs" are particularly important for Nepali while "maintenance costs" are slightly more important for foreign experts The limited ranges spanned by the weights, likely due also to the number of criteria considered, suggest that attribute evaluation methods more precise than those indicated here (ranking on a five point scale) might be required for alternatives to be distinctly apart for one another at the end of the evaluation process.

Factors affecting social sustainability in highway projects in Missouri
http://www.sciencedirect.com/science/article/pii/S1877705816300480

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Social sustainability promotes the concepts of respect, awareness, diversity, vitality, and responsibility toward the workforce and the society by keeping them healthy and safe from harm during the different phases of a project. Highway projects are one of the most critical infrastructure projects in the construction industry. This is due to their high budgets, frequent occurrences, and the inevitable disturbance they cause to the existing communities and environment. As such, a comprehensive study was conducted to analyze the performance of highway projects with respect to the social dimension of sustainability.

The comprehensive study of : 1) defining social sustainability for highway construction, 2) identifying the major factors contributing to social sustainability, 3) assessing the importance of the identified factors and the likelihood of their implementation in highway projects in Missouri, 4) testing the consent in experts' opinion about the importance of the identified factors, and 5) providing performance measures for each factors in highway construction projects. This paper focused on the first and second objectives of this study. Ten factors were identified through the comprehensive studying of the previous literature. The ten factors collectively provide a comprehensive plan for implementing and social sustainability in highway projects. They also serve as basis for establishing a system to evaluate the social dimension of sustainability in different types of construction. Each of the identified factors was thoroughly discussed with live examples in highway projects to clarify their purposes. The discussion also showed interdependency between these factors, which were proven using statistical analysis.

SIA and public participation in China: A case study of land requisition in Guangzhou

In China, SIA does not have an independent legal status. It is currently a planning activity subsumed under environmental impact assessment (EIA). Although EIA has made some progress in development planning in China during recent decades, it remains a rather new planning tool to the authorities. A comprehensive and enforceable legal framework to support the implementation of EIA/SIA is still wanting. As many local governments are adamant in support of economic development and progress, the influence of impact assessment results on actual policy decision making appear to be limited. In many circumstances, for the sake of administrative convenience and bureaucratic expediency, local authorities simply sweep aside the formality of impact assessments in their development projects. Some assessments have been undertaken simply to defend project decisions rather than evaluate project options. This has led to a further weakening of the overall credibility of all independent and rational attempts to assess environmental and social impacts in China.

However, it would be wrong to suggest that the Chinese authorities are not interested in assessing the potential social impacts of their development programmes and projects. With reference to the Guangzhou case study, this paper has shown that the local government had sought to engage the affected community in a completely different manner when compared with Western processes. The diversity is expressed not only in the process of assessing social impacts and involving the public, but also in their ultimate objectives, core values and principles. However, it would be wrong to suggest that the Chinese authorities are not interested in assessing the potential social impacts of their development programmes and projects. With reference to the Guangzhou case study, this paper has shown that the local government had sought to engage the affected community in a completely different manner when compared with Western processes. The diversity is expressed not only in the process of assessing social impacts and involving the public, but also in their ultimate objectives, core values and principles.

Success Criteria of road Projects: Indonesian toll road projects

It describes the social sustainability application in Indonesian toll road projects. In Indonesia major tall road are failed due to ignorance of Social concerns towards tall roads. Here they have talked about the Project social benefits to the community (people who reside near the toll road and who are also toll road users)This was because this community feels positive and/or negative effects of the toll road development so they could provide balanced perceptions about the project's existence. Main stakeholders are government, private and community sectors.

Project Success criteria: The success criteria for any project is not only cost, time and quality. Community satisfaction is a very important criterion for success of any project. PPP road infrastructure projects success is a actually related to how they become sources of value creation to the community. So, incorporating project social benefits in the success criteria can potentially provide the success perspective with respect to community satisfaction.

Project social benefit: The project social benefit concept in this research is adopted from social sustainability as part of the three sustainability dimensions. Evidently, social sustainability has been linked to corporate social responsibility as the ethical responsibilities in the social dimension due to performing corporate economic activity. But still Social sustainability concept is not clear in road projects. So in this study they have tried to fill the gap by focusing on project social benefit to the community as part of the toll road project success criteria, in Indonesia.

The research design is attribute identification, preliminary survey, pilot test, and main survey and data analyses. The questionnaire had closed-ended questions using a 1-5 Likert Scale with 1 representing "Strongly

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Disagree" and 5 as "Strongly Agree." The questions using positive statements aimed at comprehensively measuring the toll road project performance for the toll roads, connecting roads and supporting facilities. A connecting road is one that connects the highway with main arterial roads while supporting facilities include guardrails, median barriers, and underpass or overpass crossing bridges.

Major Variables are:

- Improve the quality of life and community engagement
  - Deliver economic benefit to the community
  - Provide an available open space
  - Less polluted environment
  - Reduce travel time
  - Involve the community in decision-making process
  - Provide safe public facility
  - Community support
- Provide good service quality of public facility
  - Convenience public facility
  - Affordable tariff
  - Equal access for all community
  - Provide adequate toll road services
- Provide peace of mind
  - Secure public facility
  - Maintain social cohesion
- Present smooth and regulation compliance environment
  - Adhere to regulation compliance
  - Smooth traffic along the toll road and its
  - connecting roads

Major stakeholders are those who do have a comprehensive understanding of how the project was built and how it performs during the operational stage. Second, they must know the toll roads' condition during the operation stage and have been toll road users.

Data analysis method used of this study is factor analysis and reliability analysis. Exploratory Factor Analysis they have touched because even though project social benefit attributes have been investigated in the built environment, they have not been explored with regard to toll road projects, so it is still necessary to understand their meaning in this context. Meanwhile, reliability is recommended to examine scale reliability after conducting EFA for validating the questionnaire. Reliability is defined as the extent to which sets of variables are consistent with what is intended to measure.IBM SPSS version 22 was employed for the analyses.

Factor analysis: Principal component analysis was used for factor extraction method for summarize the information represented by the attributes using a small numbers of factors.

This research contributes to providing a comprehensive framework to view PPP toll road project success from the social benefit perspective and classified the attributes into several main factors to easily understand the meaning. It is worth mentioning that if the PPP toll road projects could deliver social benefits to the community, it is expected could minimize the problem of stakeholders' opposition and raise the community's support for the project development and will be promoting the project success not only in short-term, but also in the long-term over the project lifecycle. Providing these criteria should result in the community's better integration in decision-making process and drive long-term success of toll road projects in a social context.

So from this study, i can take a factor analysis technique for my study and also they have talk about benefits of the toll plaza, but i will focus both on the cost and benefits.

Cost Benefit Analysis

(CBA or Benefit Cost Analysis — BCA) is an evaluation tool that state transportation agencies can use to compare infrastructure project options across transportation modes and gauge if the discounted value of benefits exceed the costs.CBA lets policymakers compare alternative project proposals to a baseline scenario, or status quo case, under which no investments are made. Alternative proposals can also be contrasted with one another. CBA is used to select which proposal is most sensible — ideally, the project that maximizes benefits while minimizing costs should be chosen.

CBA is useful for evaluating transportation projects that meet the following criteria:

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- "The potential project expenditure is significant enough to justify spending resources on forecasting, measuring and evaluating the expected benefits and impacts.
- The project motivation is to improve the transportation system's efficiency at serving travel and access-related needs, rather than to meet some legal requirement or social goal.
- Environmental or social impacts that are outside of the transportation system efficiency measurement are either: (a) negligible in magnitude, (b) measurable in ways that can be used within the benefit-cost framework, or (c) to be considered by some other form of project appraisal outside of the benefit-cost analysis.

While conducting CBA, the selection and valuation of appropriate benefits and costs is critical to the process. Failing to identify all relevant costs and benefits may produce inaccurate results. The FHWA lists common benefits and costs that are often investigated when conducting CBA.

Benefits

Travel time savings, a reduction in vehicle operating costs, improved safety, and reduced emissions).

These benefits are other often bracketed as externalities because they are not part of travel decision making. Assigning values and developing accurate data and measures for these potential benefits is often difficult, and many times they are not included in CBA.

Valuation of travel time

An hour of travel associated with a business trip or commerce is usually valued at the average traveler's wage plus overhead—representing the cost to the traveler's employer. Personal travel time (either for commuting or leisure) is usually valued as a percentage of average personal wage based on estimates of what travelers would be willing to pay to reduce their travel time.

Cost

Initial costs (acquisition, planning, design, engineering, and construction), Continuing costs (operations, maintenance), Rehabilitation costs, End of project costs (residual value, salvage value).

Initial costs are incurred from the design and construction phases. If resources already in use — such as engineering staff — are diverted to a project, a CBA should include the opportunity cost of those resources. Sunk costs (i.e., resources that are already owned and lack any opportunity cost) should be excluded from calculations. After construction is finished on a project, there are continuing costs, which may encompass traffic management, tolling operations, maintenance, and rehabilitation (e.g., resurfacing or major repairs that general maintenance would not cover). When 17the project reaches the end of its lifecycle, a residual or salvage value may exist. This value will vary among projects and is partially offset by final costs associated with project closeout.Costs must include those related to construction and future maintenance (Minnesota DOT, 2012).

As such, capital, major rehabilitation, and annual maintenance costs should be factored into CBAs. Costs generally appear straightforward, including initial construction costs and maintenance costs over the life of the project.(*DOI: http://dx.doi.org/10.13023/KTC.RR.2016.04)*

Marcus R. Wigan, (1994),"The reliability of the Potential Benefits of smart Vehicle-highway Systems. The Influence of Public reception", Information Technology & People, Vol. 7 Iss 4 pp. 48 - 62

Road transport is starting to take benefits by the combination of infrastructure, information and control. Many new technologies are harnessed to improve the links between the road, vehicles and the users to make the system work more efficiently. Many of these technologies involve identification, observation, and locality. Many of these technologies involve the data collection which can be used to monitor and trace individuals. The technologies used for transportation known as a Intelligent Vehicle- Highway System (IVHS).

This initiative of linking between the technical capabilities, operational practicalities and social needs has not yet been worked out with the local community. Only goods systems and public transport operate within surveillance a rule which also has been negotiated amongst stakeholders. In some countries, the community has rejected these aspects of some technologies which are supposed to represent identification aspects. To achieve these goals, it is necessary to negotiate with the public with regard to what types of surveillance and organized system principles are suitable.

They have considered Social impacts are:

- improved use of existing road facility
- better safety
- private drivers time savings

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- public transport better service
- lower cost for the transport of goods
- Reduced pollution and GHG emissions.

IVHS offers very significant benefits, including a responsible public transport, reduced congestion, easier travel and safer vehicles. The increasing benefits of IVHS are to maintain a considerable level of mobility even under the pressures of rising jamming and also we can control or reduce the GHG emission from transport vehicles.

None of these steps will be workout unless the trust in government and administrative bodies can be maintained and improved. The more transparency is required in these method then ususal social impact assessment procedures.

Morisugi, H., 2000. Assessment methodologies of transportation projects in Japan. Transport Policy 7 (2000) 35±40.

Here the study is for the assessment and evaluation of system and manuals for different transportation projects in Japan such as, transportation modes, railway, road, airport and seaport. The main aim of manual is to evaluate the social impacts of transport projects from the point of view of effectiveness and equity. They have evaluated the manual by applying a method of multi-criterion analysis, even though applying the simple cost benefit analysis as a basic method to estimate social impacts. The conclusion of these review shows that there are several conflicting points among the key components of the evaluation methods have observed such as forecasting demand, environmental aspects, value of time, and local development impacts. So this inconsistency in existing methods reveals the complexity of developing a common assessment framework.

Details of confliction points:

1. **Value of time**: Road classified the value of time is dependent on the holiday or working day. The manual assumes that the per holiday travel value of time is 10% (which is on higher side of holiday working wage) higher than that of working day.
2. **Local Development impacts**: The traffic safety benefit is defined by the decrease in total accident loss particularly with and without the road.
3. **Environmental aspects**: Environmental benefits are the reduction of NO x, CO2 and noise. These pollutions are defined by the total emission volume after change in total environmental damage cost is multiplied by unit damage cost of emission.

Japan have two types of road, toll roads and non- toll (ordinary) roads. The main financial sources for the road are debts which can be later reimbursed by the toll road revenues with small subsidies for interest payments by designated fund from road tax. The central and local governments are managed and financed non toll roads; the source of finance is the assigned road tax and the general tax revenues.

The toll road operators are collected actions of Japan High- way Public Corporation. Their responsibility is to networking the interurban trunk, Honshu-Sikoku Expressway Public Corporation, four Urban Expressway Public Corporations, and more than 30 of one- route toll road civic companies. Here each corporation has a self-independent financial system with a cross-subsidy, except the one-route toll roads. So for toll tax each corporation has to apply a same tariff in terms of route length in its domains. However they can charge different level of tax for different types of vehicles. So they can repay its debt by the toll tax. Therefore it is very important to carry out economic analysis (cost benefit analysis) and financial analysis for toll road interventions.

Transportation Access: A Key Employment Barrier for Rural Low-Income Families, Cynthia Needles Fletcher, Steven B. Garasky , Helen H. Jensen & Robert B. Nielsen (2010)

The main objective of the study is to promoting work among low income populations. So here they will study the number of barrier to obtaining the job. This study is conducted in one state IOWA. The study more focused on the importance of transportation in employment for rural low income HH. In this research they have conducted three studies over 3 years in a chronological order for 35 families.

First study was to observe the family wellbeing in multiple dimensions including the role of transportation in economic outcomes. The second study based on the first study findings and it explore transportation is the strategy for moving rural welfare community into the labor force. They have used multiple methods to identify the transportation resources, need to access transportation, barrier facing for access transportation. For this they have done analysis of commuting patterns, vehicle ownerships. The third study is analysis of association between the transportation and employment from first two studies.

The findings from first study are 1. Owing and driving a car is a barrier for low income rural families, 2. Most of the people have old and unreliable vehicle, even cost to repair the car is also very high, 3. The ways of transport

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used by respondents are by walking, car pooling with families friends and neighbors, vehicle hiring, 4. Unreliable transportation is a major barrier to employment, 5. Lack of transportation is also barrier for other everyday life such as child care, school and health.

The second study was analyzed by the two FGS among the respondents. The major findings are: 1.Transportation is the major problem for employment for rural low income families, 2. many transportation facilities are not available to poor families, 3. Most transportation facilities are restricted to poor communities, 4. Also have lack of communication between service providers, so most of the recipients are not getting proper facility for daily commuting for private or public transport, 5. So for commuters only private transport is the option to meet their needs, 6. Coordination of transport with work, home, health, school is also a big challenge, 7. Community need a easy access to private or public transportation.

For third study they specially designed the survey instruments for analyze the rural transport barriers for income generation among the poor communities. The major findings are: 1. Almost 40% people faced the lack of vehicle and transportation problem for financial difficulties, 2. Access to health is low due to lack of transportation which impact on the employment status of individuals.

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