

**IMPACT OF ROAD INFRASTRUCTURE ON RURAL
ECONOMY OF ASSAM: A STUDY IN NAGAON DISTRICT**

A THESIS

**SUBMITTED TO GAUHATI UNIVERSITY FOR THE DEGREE OF DOCTOR
OF PHILOSOPHY IN ECONOMICS IN THE FACULTY OF ARTS**



**SUBMITTED BY
GANGA RANI DAS**

2015

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GANGA RANI DAS

2015

DECLARATION

The work presented in this thesis entitled **“Impact of Road Infrastructure on Rural Economy of Assam: A Study in Nagaon District”** has been carried out by me under the guidance of Dr. Gopal Bardoloi. The findings embodied in the thesis are the record of the bonafide investigation conducted by me.

I further declare that this work has not been submitted in part or in full to any other university or institute for any research Degree or Diploma.

Date . 30.10.2015
Guwahati

Ganga Rani Das .
Ganga Rani Das

Candidate

Dr. Gopal Bardoloi

LATASIL,

Retired Associate Prof. of Economics

Handique Girls' College, Guwahati



65, BHUBAN ROAD

NEAR PLANETARIUM)

GUWAHATI-781001, ASSAM

Ph.0361-2632612, 94350-41401

Ref.

Date... 30/10/15

CERTIFICATE OF THE SUPERVISOR

This thesis entitled “**IMPACT OF ROAD INFRASTRUCTURE ON RURAL ECONOMY OF ASSAM: A STUDY IN NAGAON DISTRICT**” is submitted by Ganga Rani Das, M.A., M.Phil. in Economics, to the Gauhati University for the award of the Ph.D. Degree in Economics under the Faculty of Arts. She has worked under my supervision and guidance and has fulfilled all the requirements under the Regulation for the Degree of Doctor of Philosophy of the University.

The findings embodied in the thesis are the record of the bonafide investigation conducted by Ganga Rani Das. To the best of my knowledge and belief, no part of the thesis or the thesis as a whole have been submitted to any other University or Institute for any research Degree or Diploma. Further, she has incorporated the suggestions/ recommendations made at the pre-submission seminar presentation.


(Dr. Gopal Bardoloi)

Research Supervisor
65 Bhuban Road, Latasil
Guwahati-781001, Assam

ACKNOWLEDGEMENT

The present work is the result of the cooperation and help I received from several quarters. It gives me immense pleasure to thank every person who have cooperated with me during this period and provided me with immense help, advice, necessary information and encouragement.

At the very outset, I would like to express my sincere gratitude to my guide Dr.Gopal Bardoloi for his valuable guidance during the entire period of my research work. Success of this research work is a result of his continuous inspiration which always encouraged me with stronger motivation. I feel myself fortunate enough for getting the opportunity to work under his supervision. I am really indebted to him for all his humble support and encouragement. Without his inspiration and support, his expertise, knowledge and valuable research insights my work would not have been a reality.

It is a privilege to offer my thanks of the Departments of Economics, Gauhati University for their guidance and necessary help in every instance of my approaching them. I humbly thank Dr. Nivedita Goswami for her patient hearing and help at times of the many hurdles that I came across during the time of my work. I humbly thank Prof. M.P.Bezbaruah, for his valuable suggestions and explaining to me some fundamental aspects of my study when I approached him.

I also offer my sincere thanks to Dr. Shariff Uddin Ahmed, Principal, ADP College for his enthusiastic support, encouragement and most importantly the facilities provided to carry out the research work. I am also very grateful to all my esteemed colleagues for their constructive support.

I thank the officials of the public works Department (PWD) Govt.of Assam Guwahati, Chandmari for their advice and providing me valuable information for my work.

I offer my gratitude to W.S.Debnath, Librarian and Coordinator for SG, KKHL, Gauhati University for screening my thesis through anti-plagiarism software and provide me favourable report.

I received specific help and encouragement from number of people. Among them I feel proud to remember the scholarly help I received from Late Dipen Handique (expired on 1st Dec, 2014), Nandita Goswami, Tinku Bora and Bipul Das. I acknowledge their support with deeper appreciations.

I am glad to appreciate the constant inspiration and support that I received from my husband Paban Kr. Hazarika, who has always extended all possible help untiring. I am very much thankful to my daughter Swabhilasha Hazarika and my son Aarush Hazarika for withstanding the hardship and hard times during the period of my study.

I express my heartfelt thanks to my mother, mother-in-law, my sister Dipali Deka, my brother-in-law Late Bhupati Deka (expired on 21st Dec.2014), my brother Hemen and other family members for their constant inspiration and support during the tenure. Because of their support only I could carry out the entire research work smoothly without any sort of inconvenience.

Least but not the least I am thankful to all the non-teaching staff of the Department of Economics, Gauhati University for their help and support I received during the study period.

Ganga Rani Das
Ganga Rani Das

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LIST OF ABBREVIATIONS & END NOTES

MDG-Millennim Development Goals

G.O.I. - Government of India

G.D.P. - Gross Domestic Product

PMGSY- Pradhan Mantri Gram Sadak Yojana

PRI- Panchayati Raj Institutions

PIU- Project implementation unit

NLCPR-Non Lapsable Central Pool of Resources

RIDF- Rural Infrastructure Development Fund

PWD-Public Works Department

GP- Gaon Panchayat.

UNDP- United Nations Development Programme

End Notes

Transect Walk: A walk along the suggested alignment by PIU with the communities PRI and key informants to observe, to listen and to ask questions which would enable identification of problems and collectively evolve solutions.

Grievance redressal mechanism: Grievance redressal is a management and governance related process used commonly in India. While the term 'Grievance redressal' primarily covers the receipt and processing of complaints from citizens and consumers, a wider definition includes action taken on any issue raised by them to avail services more effectively.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Road infrastructure constitutes one of the important parameters of economic development. Generally, the terms 'road' and 'highway' means those travelled ways on which wheeled vehicles, carriage animals, and men on foot moved throughout recorded history. In modern usage, the term 'road' describes primarily those travelled ways on which goods and services are carried from one destination to another destination. Hence, the success of any development programme in rural areas depends a lot on the availability of good road network. Thus, the provision of rural road network is a key component for any rural development programme as it enables the rural people to have access to schools, health centers and markets etc. Studies (Steven 1991, Guimaraes 1997, Bardhan 2004, World Bank 1994) have shown that rural roads serve as an entry point for poverty alleviation and reduce production cost. Rural roads act as an a facilitator to promote and sustain agricultural growth, improve basic health, provide access to schools and economic opportunities and thus holds the key to accelerated poverty reduction, achievements of Millennium Development Goals(MDG), socio-economic transformation, national integration and breaking the isolation of village communities and holistic and inclusive rural development. Realizing this fact, our planners and policy makers have been emphasizing on the improved road connectivity in rural areas. The present study intends to examine the present status of rural road network and its impact on rural economy of Assam, one of India's relatively more rural and economically less developed provinces.

It is essential to define the term 'Rural Area' and 'Rural Road' in order to understand the importance of rural road network or connectivity. Generally, the term 'Road Network' in a Block or District comprises of all categories of roads, such as National Highways, State Highways, Major District Roads, Other District Roads and

Village Roads, which facilitate the essential movement of persons and goods in an area. "The rural areas consist of the villages which are the smallest unit with a definite surveyed boundaries and it generally the limits of a revenue village which is recognized by the District Administration. The revenue village may comprise of several hamlets/para/chaks etc.but entire village is treated as one unit under a revenue village for presentation of census data" (www.censusindia.govt.in/2011). Till today, what part of the total road network constitutes the rural road network is not clear. In India, village roads together with other District Roads form rural road network and link villages with the nearest village, or to the market centre or to a National Highway, State Highway or Major District Road. Volume of traffic on these roads is low comprising mainly of slow moving vehicles and pedestrians who are generally cultivator of abutting land.

A major part of the rural road network is maintained by local bodies including Panchayat Unions, Panchayat Samities, Panchayats and Community Development Blocks etc. Roads maintained by these agencies are generally unsurfaced and narrow, mainly a foot path or cart track. The method of classifying a road as village road, cart truck or footpath is differs from state to state. Generally, local bodies enlarge the list of such roads just to obtain more grants. Therefore, there is an urgent need to provide standard norms for classifying a road as a village road, especially in case of earthen roads.

There are other types of road known as farm roads traversing the agricultural fields. These are generally unsurfaced and they link agricultural farms with the main village. In Uttar Pradesh these roads are called chuck roads. These roads should also form part of the rural road network.

The Department of Transport (G.O.I, 1977) defined a non-built up road as having a speed limit over 40 mph (excluding motorways), and this definition was used to differentiate between rural and urban areas. However, this definition did not take into account whether the road was in an urban or rural area and excluded villages with lower speed limits. More recently, the Department defined rural roads as major roads and minor roads outside urban areas and having a population of less than 10 thousand. Again motorways are excluded from the definition of rural roads.

Thus, a rural road is an ill defined phrase. Roads classification varies across the region depending on whether roads are described by type or by function. However, there is rarely a full definition of rural roads. Indeed they are generally put together as those that are not primary or secondary roads. In this study we have defined rural roads as the part of the public road network that directly serves the rural areas.

1.2 Conceptual Framework: understanding the Impact of Rural Road Investment Investments in rural road contributes to economic growth and raises the quality of life. These roads increase the economic growth by reducing the cost of production, making other factors of production more productive. There is empirical evidence at the macroeconomic level of a positive correlation between rural road network and GDP per capita or growth rates. Quality of life can be improved by creating amenities in the physical environment and by providing outputs which are valued in their own right.

At the household level, rural roads increases the agricultural production and open up non-farm employment, resulting higher level of earnings and more diversified sources of income. These roads reduce the transportation cost and thereby make labour market more efficient.

Rural road has the potential to confer important consumption benefits by virtue of the increased personal mobility and communication made possible by it. Such roads can be expected to free up women's time for employment opportunities and improved child care. In the poor rural areas, lack of roads can penalize households pursuing cash crop farming, diminish non-farm employment opportunities and access to social services. Therefore it is argued that rural road helps in reducing poverty by removing major constraints faced by the poor. Investment in rural road can improve access to economic opportunities by reducing transport cost. when markets are competitive, this can result in low freight and passenger services, which lead to lower prices for product and consumer goods and higher level of socio-economic activities.

Local farmers are also benefited from roads as the cost of transporting agricultural products to markets is reduced and also the distance to market. The ultimate effect is increased net farm gate prices and increased farm income. An all-weather road not

only increases income from farming, but also makes it more stable and thereby facilitates increases the management of risk.

Social effect includes the increased enrollment in schools due to better access and thus improved school quality. Access to other social services often improves health services. Moreover it has been argued that those better qualified teachers are willing to work in areas where there are good paved road. Again, two possible gender effects can be highlighted. When rural road improves, access to school, enrollment rate for girls increases, which was lower than boys before the project. Secondly, women are eager to participate in road work opportunities.

Lastly, it can be pointed out that rural road don't solely have positive effects, it has also some negative effects. Inappropriately designed projects can harm residents. The negative effects that have been noticed are increased traffic accidents, environmental effects such as deforestation and erosion etc.

As observed in the World Development Report 2000-2001, rural road contribute the following facilities-

- **Opportunity:** - Better access to market increases economic opportunities for the poor to sell their labour and products. Better transport facilities increases access to schools and hospitals.
- **Empowerment:** - Rural roads can empower the poor people by facilitating their access to information, social and political participation, making it possible to hold public consultation in poor communities and by making it easier for constituents to get to meeting places and town centers. Better access for government officials may provide the same facilities. If the roads are designed and implemented by local communities, the process may build up community capacity overall.
- **Security:** - A better road system may enhance security by making it possible to respond better to economic and natural shocks. At micro level, access to transport facilitates job search and make it easier for diversification of income and reduce vulnerability of household to external shocks. Roads also improve access to health care facilities and make it easier to respond to medical emergencies.

Development of road network has always occupied a prominent place in the growth and development of both rural and urban industries. At present the length of rural roads in India is 27, 49,805 kilometer (Basic Road Statistics of India, 2012). It was empirically proved by Hoover (1948) and Greenhut (1956) that transport should be treated as primary factor for the establishment of industries. Further, the provision of bus services in an economy depends on a number of variables like i) public and private responsibility, ii) vehicle supply, iii) productivity of bus services, iv) cost recovery and traffic conditions. Rural road transport system breaks the isolation of villages and thereby promotes rural industries like dairy farming, bee-keeping, poultry farming and other village and agro-based industries owing to its flexibility, extensive network, freedom of movement and door-to-door service. The present study also attempts to analyse the flow of funds and the procedure for allocation and release of funds for rural road construction. Since a major portion of the road construction and maintenance work had started under the 'PMGSY' (Pradhan Mantra Gram Sadak Yojana), the study also look into at the flow of funds data from PMGSY along with other various state and central govt.scheme.

The study also makes an attempt to investigate the institutional structure of the 'Panchayati Raj', the local self government system in India, and the implementation of rural development programmes in the context of a participatory approach. Although the panchayati raj institutions (PRI) have existed for many years, owing to inherent weakness in the system they were not very effective in the implementation of rural development programmes. The study assumes significance from the change in rural governance pattern through empowerment of the panchayati raj institutions as per the 73rd Amendment of the constitution of India. Whether this change has had any significant impact on the improvement of rural roads in Assam is of special interest of this study.

1.3 Statement of the problem:-

The present study is an attempt to gauge the role played by the rural roads in rural economy of Assam. Rural roads are vital to accelerate development process in the rural economy of Assam. Rural roads are the lifelines to the rural people in their economic pursuits. But there are a large number of problems associated with the

development of rural roads in Assam. Some of the problems of rural road of Assam are identified as follows:-

1. There has been depletion of roads, constructed under rural development programme like NLCPR, RIDF and PMGSY etc. due to poor maintenance.
2. There is inadequate number of rural roads including cluster roads in the rural areas of Assam.
3. The rural roads which were constructed 10-20 years ago become unfit for commuters because of poor or non-repairing or improvement.
4. Many of the pucca and metalled PWD roads in rural areas have become unusable.
5. The gaon panchayats are financially not sound to construct new roads and to maintain already constructed roads.
6. The wooden bridges constructed decades ago are in dilapidated condition and no efforts have been made to repair or to convert them concrete bridges.
7. The ranges of mountains and hills within the state and on its border made road construction extremely difficult task.
8. The cost of road construction per sq.km. in Assam is high in comparison to other states of the country because of the presence of high rainfall, flood and seismicity.
9. Village local politics have played a negative role in the construction of new roads of villages.
10. Encroachment of rural road lands by the villagers is a major problem.
11. The road conditions in many field survey villages are far from satisfactory. The contractors have heaped soil and boulders at the sides of rural roads for many months, the heap were not spread over the roads, such heaps of soil and stones were lashed and taken away by the rain but neither the concerned Government Departments nor the contractors ever felt the need to complete their tasks in time.
12. Due to shortage of culverts and bridges in the rural areas, it is frequently observed that the roads are submerged in the rain and floodwater and if not submerged then there are much water logging to trouble the travelers.
13. One of the most important disadvantages of rural roads is that vehicle cannot be driven at higher speed.

14. In executing rural road developmental programs road maps of complete state is essential, but the same is not available in any level of concerned administration.
15. There is no proper check and balance system of expenditure whatsoever.
16. There is gross mis-appropriation of funds in various rural road development programme from the top to the bottom- for which the development in question remains standstill in most of the rural areas of Assam.

1.4 Utility of the study:-

To achieve economic prosperity and self-sufficiency, it is pre-requisite to accelerate a higher growth rate in rural sector. But the growth rate in rural sector depends primarily on the nature and conditions of rural roads. The farmers in rural economy may increase production and productivity to a higher level in agricultural sector and may receive better prices for their crops if and only if the rural roads are suitable for them to export the surplus to the urban areas. The perishable commodities of village economy like fruits and vegetables can be transported to urban markets without much delay and the economic loss could be minimized if there is all weather road connectivity to urban areas from rural sector. According to the Guidelines of Pradhan Mantri Gram Sadak Yojana 2000, rural road connectivity is not only a key component of rural development by promoting access the economic and social services thereby generating increased agricultural incomes and productive employment opportunities in India, but also a key ingredient in ensuring any sustainable poverty reduction programe. There is a relationship between rural roads and agricultural development. This relationship is a basis for economic prosperity and thus the economic development of rural sector is largely dependent upon this relationship. It is true in a rural set up that majority of the people are familiar to the conventional methods of agriculture and allied activities. Still it is assumed that most of the people in villages in Assam are simple, less educated in concerned fields and traditionally agrarian in nature. Therefore, it is hoped that the rural roads will overcome all the problems faced by the rural people.

1.5 Objectives:-

The specific objectives of the study are the following:

- i. To analyze the status of rural roads in Assam.
- ii. To assess the government funding and utilization pattern for the construction of rural road.
- iii. To find out the level of people's participation in the construction of rural roads through local bodies.
- iv. To examine the socio-economic impact of roads in rural areas.

1.6 Research Questions:-

Since the study is exploratory in nature, it is started with no prior hypothesis. None the less, the study seeks answers to the following research questions:

1. Whether construction of rural road generates any livelihood opportunities?
2. Whether rural road has any impact on agricultural income or not?

1.7 Materials and Methods:-

1.7.1. Sources of data:

The study is based on both primary and secondary data. Basic secondary data has been collected from the Directorate of Economics and Statistics, Government of Assam. Data on the status of rural roads in different parts of the state has been explored from statistical handbook, Assam, state P.W.D.s available reports. Data on funding for rural road construction has been collected from the office of the chief Engineer (PWD), Guwahati, Assam. All India level data has been drawn from Ministry of Road Transport and Highways, Government of India. The secondary data, however, are not sufficient to fulfill all the objectives. Hence, primary data have also been collected to supplement the secondary data base.

1.7.2 Sample Design and Size:

In order to collect primary data, Nagaon District has been selected purposively. Keeping in view the objective and scope of the study as well as time and resource

constraints, it is decided to analyze rural road connectivity on the basis of representative sampling instead of taking the whole district. Study has been conducted in three sub-division viz. Nagaon, Hojai and Kaliabor. A Multi stage sample design with judicious blending of random and purposive techniques has been used for collecting field data. In the first stage, 3 community development blocks, one from each sub-division, has been selected on the basis of level of connectivity – better connectivity (more than 150 km. of pucca rural road), moderate connectivity (between 150 and 100 km. of pucca rural road) and less connectivity (less than 50 km. of pucca rural road). In the second stage, one gaon panchayat (GP) from each development block have been selected purposively on the basis of existence of paved road, existence of market and no road and no market. Under this approach two categories of villages were selected-(i) villages from having paved road and market and (ii) villages without the road and market. The second category is designated as the ‘control’ villages. Villages with the road and market were further categorized into (i) villages with better connectivity and (ii) villages with moderate connectivity. This was done to make the control villages more comparable with the villages with better connectivity and villages with moderate connectivity in terms of socio-economic characteristics. Finally, 9 villages (3 from each) and 5 to 40% households from each village have been randomly drawn on the numbers of households in the villages. Thus three gaon panchayat and 265 households have been surveyed.

1.7.3 Data collection: Tools and Techniques

For collecting primary data from the selected Gaon panchayats, villages and household, two different structured interview schedules comprising of both open ended and close ended questions have been used after pretesting. The data on gaon panchayats/village development council level have been collected from GP functionaries. The village level data have been collected from village headman and other informed sources. Household data have been collected directly from the head/member of the selected households. Important information has also been collected through personal interview and consultation.

1.7.4. Methodology and Analytical structure:

With regard to the first objective, the status of rural road in Assam has been documented. The quality and quantity of rural road have been measured in terms of length of rural roads per hundred square kilometer of rural geographical area and per lakh of rural population, percentage of rural road length to total road length. To get a clearer picture of rural road across the district rural road index has been formulated following the principle outlined in the UNDP Human Development Report (2010) for the construction of Human Development Index which is discussed in the relevant chapter. The status of rural road in Assam has been compared with the other states of India. To assess the funding and utilization pattern for the construction and development of rural roads, percentage and average method has been used.

To find out the level of people's participation in the construction and development of rural roads through local bodies, descriptive method is used. Then the analysis has been done with the help of bar diagram. For the 4th objective 'double difference' and 'regression model' is used to ascertain the socio-economic impact. The construction of the model is discussed in the relevant chapter. The broad analytical structure of the study has been summarized in the table: 1.1.

Table .1.1: Analytical Structure

Objectives	Methods
1. To make an assessment of the status of rural road in Assam.	A. Ratios B. Designed Index & Radar diagram
2. To assess the government funding and utilization pattern for the construction of rural road.	A. Percentage B. Tabulation C. Bar diagram
3. To find out the level of people's participation in the construction and development of rural roads through local bodies.	A. Ratios B. Bar Diagram
4. To examine the socio-economic impact of roads in rural areas.	A. Double-Difference Method B. Regression Analysis C. Ratios

1.8 Rationale for selection of Nagaon District:-

Out of 27 district of Assam, Nagaon district is selected for the study because of the following reasons:-

1. Nagaon is a centrally located and one of the largest district in terms of geographical area in the state of Assam.
2. As per 2011 census, Nagaon is the highest populated District of Assam.
3. 86.97% of people live in rural areas which is again highest among the district.
4. The length of rural road constructed under PMGSY in Nagaon district is highest (9.34%) in the districts of Assam.

1.9 Profile of the study area:

1.9.1. Area and Location:

Nagaon, one of the largest district of Assam, sprawls across almost 4000 sq. kilometers of fertile alluvial plains and thickly forested hills. The district extends from 250-45^I to 260- 45^I North Latitude and 920-33^I-6^{II} East Longitude. Nagaon is bounded by Sonitpur district and the river Brahmaputra in the north, West Karbi Anglong and North Cachar Hills in the South and East Karbi Anglong and Golaghat district in the east. The major tributaries of the Brahmaputra flowing through the district are Kolong and Kapili. The Nagaon district shares a vital corridor linking the Upper Assam districts of Sonitpur and North Lakhimpur. The district covers an area of 3,831 sq.km.

Situated in central Assam, the eastern, western and southern segments of the newly organized district were once ruled by different small-time feudal kings or their agents. The residual effects of the rule of the Bara Bhuyan were imaginatively utilized and reorganized by Momai Tamuli Barphukana, an intrepid officer of the Ahom king Pratap Singha in the first half of the seventeenth century. This area, until then, was more of strategic than administrative concern. Newly organized village system therefore called "Nagaon", 'Na' means new.

Sankardeva, the great saint of the Bhakti movement era, was born at Bordowa, at a distance of fifteen kilometers from the district headquarter. The main places for

tourist attraction are Bratodrava, Champavati waterfall, Kaziranga and Lawkhowa wildlife sanctuary.

1.9.2 Administrative Division:

Nagaon district consists of 3 sub divisions- Nagaon, Kaliabor and Hojai with 10 revenue circles and 18 development blocks. The district has seven towns and Nagaon town tops the list with highest population of 1,26,115. It has 240 gram panchayats in 1519 inhabited villages with 21 police stations. The district has two National Highways, N.H.-36 and N.H.-37. The administrative division of Nagaon district is shown in table 1.2

Table 1.2: Administrative Division of Nagaon District

Type	Number
No. of civil Sub Division	3
No. of Towns	7
Revenue Circle	10
No. of Development Block	18
No. of Gram Panchayat	240
No. of Inhabited Villages	1519
No. of Community Information Centre	18
National Highways passing through the district	2
Police Station	21

Source: Statistical Hand Book, Assam, 2011

1.9.3 Demographic characteristics:-

The district has been the meeting ground of diverse ethnic groups, cultural streams since time immemorial. More than half of population of the district is Muslim; other major religious groups are Hindu and Christian. A sizeable portion of the Hindus are Vaisnavite. According to 1991 census, the total population of the district was 1893171 with sex ratio 920/1000. The population has increased to 2826006 with sex ratio 929/946, as per 2011 census. The density per square km.is as high as 711, higher than the all Assam average of 397 as per 2011 census. The literacy rate has

also increased from 54.74(Male-62.49, Female- 46.30) in 1991 to 73.78(Male-78.19, Female 69.21) in 2011 but the increment is less than the all Assam average.

1.9.4 Occupational pattern:-

Out of 727,641 workers, 641,273 are engaged in rural sector and remained 86,368 are in urban sector. Participation of female worker is encouraging in both rural and urban sector. The percentage of female worker in rural sector was 20% and 13% as per 2001 census.

1.10 Natural Resources:-

1.10.1. Land use pattern:

Nagaon district is rich in natural resources. Geologically the soil is sandy new alluvium. Almost 21% of the total area is covered by forest of different intensity. The percentage of net sown area to the total geographical area is 23,5,625 hectare and witnessing a low cropping intensity. Due to high population density, the percentage of fallow land in the district is low.

Table 1.3: Total Area and classification of Area in Nagaon.

(Area in hectare)

Total Geographical area	411030
Forest	88024
Area not available for cultivation	21659
Other uncultivable land excluding fallow land	18457
Fallow land	4383
Net area sown	235625
Total cropped area	291339
Area sown more than once	55713

Source: Statistical Hand Book, Assam, 2011

1.10.2 Plantation and Horticulture:-

The topography, agro-climatic condition, prevalence of fertile soil and long tradition of growing plantation and horticulture crops has enabled commercial cultivation of several crop varieties in the district. The main agricultural crops grown in the district

are paddy, potato, mustard, jute, sugarcane, wheat and other vegetables. The district also produces various types of horticultural fruits like banana, papaya, litchi, pineapple, lemon etc. Other plantation crops such as coconut, areca nut are also produced in the district. Tea cultivation is done mostly in organized sector. Sericulture is an important activity practiced in the district. This is an important source of income and employment particularly to the rural people. The craft is mostly practiced in the tribal areas of the district. Eri is extensively raised, followed by Mulbery in the district.

Horticulture could be one of the strong features of the economy of Nagaon because of its congenial agro-climatic and soil conditions. The district has advantages in producing potato, banana, chilies, areca nut, coconut etc. Bamboo grows abundantly in all parts of the district. Presently, a large quantity of bamboo grown in the district is consumed by Hindustan Paper Corporation Limited as one of the major raw material. Besides these, other crops like guava, mango and oranges are also grown in the district.

1.10.3 Minerals:-

Major minerals found in the district are granite and quartz. Minor minerals are railways ballast, road metal, sand and brick clays. The granites and gneisses are being quarried for railway ballast and road metal. The clay found in the alluvial tract of the district is suitable for the manufacture of bricks and earthenware.

1.11 Economic Characteristics:-

The economy of the district is basically agrarian. Next to agriculture, handloom and weaving is the main activity.

1.11.1 Agriculture:

Agriculture is the pre-dominant economic activity of the people. The main income source of the people is paddy cultivation. Rice, wheat, jute, maize and sugarcane are the major crops grown in the district. The district has 2, 17,805 hectares of net cropped area and 41728 hectares of gross cropped area. About 63.5 percent areas out of net cropped areas are put under multiple cropping with an average cropping intensity 192% as against 152.43% for the state. Besides rice, jute and sugarcane,

mustard seed and vegetables are the other important agricultural products of the area.

1.11.2. Industry:

The Nagaon district is purely agriculture based and has not yet assumed a dominant role in the industry. Tea manufacturing is the dominant industry in the district. Nagaon is one of the major jute growing district of the country. Cottage and household industries for producing jute bags, jute carpet and wall hangings can be set up for encouraging local prospective artisans with definite marketing arrangements. Agro-based industries in the district are found around Nagaon town. Forest based industries are also concentrated in and around Nagaon town. Forest based units like saw mills have their dominance. Agarbatti, wooden furniture, cane and bamboo products manufacturing units are the other forest based industries in the district.

1.11.3. Livestock and Dairy:

Animal rearing also provides supplementary income to a large number of rural households. Poultry, duckery, goatery and piggery are major activity of the rural people for food and nutrition. Pig rearing is taken as a subsidiary income source by the small and marginal farmers and agricultural labourers of the tribal community. Pisciculture is major allied agro enterprise in Nagaon district. The Brahmaputra as well as the large water bodies like beels and low lying swamps are the natural breeding places for large variety of fishes and provide large capture for markets the district. The district has also large number of fisheries mostly ponds.

1.12. District Income:-

In Nagaon agriculture has been the largest contributor to the district income. Now, the service sector is also coming up along with manufacturing and other industrial activities. Yet, the primary sector is the largest contributor followed by the tertiary (service) and secondary (manufacturing industries) to the District Gross Domestic Product (DGDP) in 2000-01.

Table: 1.4 Sectoral Composition of DGDP

(Rupees in crore)

Area	Primary sector	Secondary sector	Tertiary sector	Total DGDP	Per capita DGDP
Nagaon	101742	50677	103240	255659	10919

Source: Statistical Hand Book of Assam, 2007

1.13 Infrastructure and Connectivity:-

1.13.1 Transport and Communication:

Nagaon district is well connected by road links. Nagaon, the district head quarter town is 123 kilometers away from Guwahati. The North-East Frontier railway has its divisional headquarter in Lumding. Lumding is connected with all important centers in the district. The conversion of the meter gauge track to broad gauge from Guwahati to Lumding has eased the transportation problem of the region. The Haiborgaon railway station is located in Nagaon town. Nearest Railway Junction is at Chaparmukh which is around 28 kilometer from the Nagaon town. The Brahmaputra River offers tremendous scope for water ways. The Jamuna, Kapili and Kolong are used for water transport.

The Communication sector in the district is in its take off stage with 60 telephone exchanges, 34333 telephone connections, 2 WLL base stations and 981 WLL telephone connections. The density of telephone connection in the district is 1.5 per 100 populations. (www.nagaon.nic.in)

1.13.2 Banking:

Banks have an important role to play in stimulating development process of an economy. In Assam the networks of schedule commercial banks have widened the horizon of social banking policies and programmes, which support all the vital sectors of the economy. In Nagaon, the total number of banks stands at 15 and total number of bank branches is 97. The credit deposit ratio of the banks operating in the district is very low at 25 percent and therefore, there is opportunity for availability of finance for new investment in the district.

1.13.3 Basic Amenities:

There are some other basic amenities which are important for sustainable development and equal growth of the society. These are safe drinking water facility, facilities for basic education and health, and social security etc. For health, the district has only one civil hospital, nine primary health centers and 25 state dispensaries. Considering the size and population density, the government health care service providers in the district is quite inadequate. In terms of educational facilities too, the infrastructure for primary education is sound, but the same for high and higher education, especially for technical education is poor. There are only 55 higher secondary schools and 25 colleges in the district besides one Polytechnic institute and one fishery college. Thus, the district is lagging behind in terms of basic amenities. To raise the living condition of the masses, infrastructure facilities should be developed further.

1.14 Layout of the thesis:

The study has been organized in seven chapters. The relevant theoretical and empirical literature of the study has been discussed in the chapter II. A brief history of rural road has been discussed in this chapter. Chapter III has been designed to provide the status of rural roads, district wise status, and state wise status of rural road and comparison of rural roads in Assam with the other state of the country. The funding and utilization of rural roads under different scheme are the main contents of chapter IV. Role of Panchayati Raj Institutions in rural roads construction has been discussed in chapter V. Chapter VI highlights the different impact of rural roads along with a brief profile of the sample villages. The concluding chapter summaries the findings of the study and discusses the policy implications of the findings.

CHAPTER TWO

THEORETICAL FRAMEWORK AND REVIEW OF LITERATURE

The literature on the different aspects of rural roads and its implications for economic development is extensive. This chapter attempts to present the conceptual issues and theoretical background of rural roads as is evident from the survey of existing literature.

This chapter has been organized in four sections. The notion of rural road network with a brief history of road development in India have been discussed in section one. The impacts of rural roads on various sectors have been discussed in section two. The importances of funds for rural road have been elaborated in section three. The next section has been devoted to study the peoples' participation in the development of rural roads.

2.1 Road Network in Historical Perspective:

The importance of improved transport facilities have been recognized by economist since Adam Smith. To him good roads, canals and navigable rivers, by diminishing the expense of carriage, put the remote parts of the country nearer to with those in the neighbourhood of the town. (Schroeder, available online). It was empirically proved by Hoover (1948), Greenhut (1956) and Isard (1956) that transport should be treated as a primary factor for the establishment of industries. Common sense would suggest that road infrastructure positively influences economic activity. As the roads are developed, the other infrastructure facilities like power, schools, colleges, water, sanitation, telecommunication, and irrigation also takes place in that area. According to World Bank (1994), a 1 percent increase in the stock of infrastructure is associated with a 1 percent increase in Gross domestic product (GDP) across all countries. This means there is a positive correlation between infrastructure and development. The report further reveals that developing countries generally invest \$200 billion per annum in new infrastructure which constitutes 4% of their total national output and 1/5th of their total investment. As a result of such investment in

new infrastructure, transport, power, water, sanitation, telecommunication and irrigation are increasing dramatically in those countries.

Road connectivity plays a crucial role in promoting economic, social and cultural development of a region. Their importance has always been recognized and found from the history that once road communication is given the development of civilization, their quality and quantity have improved significantly. History dates back to the dawn of recorded history and behind. Its beginnings are almost instructive with man's first quest in search of food, water, plunder or sheer adventure. It develops with man's advance; it retrogrades with the break-down of a social order. A people without roads would be a people without intercourse with the outside world without the attributes of civilization (Verma, 1980).

2.1.1 Global History of Road Development:

It is believed that pioneering road builders had selected the area for road construction in Southern-Asia, bounded by the Black Sea, Caspian Sea, Mediterranean Sea and the Persian Gulf. It can be traced from archaeological evidence that the wheeled vehicle existed prior to 3000 B.C. Etruscan and Greek traders used 'Amber Routes' to transport amber and tin from the North of Europe to points on the Mediterranean and Adriatic between 1900 and 300 B.C. As per the information available from archaeological and historical sources, it was believed that several methods of roads construction were known to India by 75 A.D. There was a road network to Northern and Western India between 300 to 150 B.C. The Silk Road from China to Asia Minor and India existed for about 1400 years. The Roman Empire built 53,000 miles (85,000 kilometers) of roads connecting the capital with the frontiers of the far reaching empire (Bhandari, 2008).

2.1.2 Road development in India (Pre British Period):

From times immemorial, it has been recognized in India that the provision for efficient road system was one of the primary duties of the ruler. There are innumerable references to the road policy and road construction in vogue in different periods in the Indian history.

The excavation at Mohanjodaro in Sindh and Harappa in Punjab have revealed that in these cities which existed in 3,500 and 2,500 B.C., there were broad streets with proper drainage system. Kautilya's 'Arthashastra' written near about 300B.C.,

records that during the Mauryan age, the breadth of chariot roads, royal roads and roads leading to country parts and pasture grounds were 24 feet. The history also reveals that during the period of Chandra Gupta, roads were built with convex surfaces, like the back of tortoise, having drains on both the sides. Emperor Ashoka recognized the importance of highways in the fourth century B.C. for building up the strength and prosperity of his realms. He gave the country a good network of roads. Over the centuries that rolled past thereafter, road development was slow and chequered, depending chiefly on the spurts of energy of some rulers. However, in subsequent periods, the kings and rulers realized that roads were essential for promoting agriculture, stimulating trade, facilitating pilgrimage, warding off famines and retaining control over the country (Methew, 1964).

During the early Aryan Period, the then important cities like Takshasila in the North-West, Hastinapur near Delhi and Kausambi near Allahabad were all connected by a good road network system. During the hey days of Buddhism, a number of new cities like Rajagiri, Vaisali and Saravasti were added to the road routes of the country. Ujjai the capital of Avanti, became an important traffic point in central India (Methew, 1964).

2.1.3 Road Development during British Period:

With the advent of the British rule in India, road development was started on a large scale. But roads were mostly constructed from the strategic and administrative point of view, little attention being paid to their civic and economic aspect. The introduction of railways in India, however, retarded the extension of roads, because the entire financial resources of the Government were almost invested in construction of rail road. Later on, however, stimulus was provided to road construction by the granting of local self government. But the Central Government never took any serious interest in developing the road system in the country. In any case, till the end of the World War 1, the road system in India was totally inadequate and haphazard and inconsistent with the economic needs of the country. Conditions were further aggravated by increasing modern transport on Indian roads and fast deterioration of the existing roads. This gave rise to a public demand for better and more roads in the country (Gururajachar, 1974).

2.1.4 Road Development during Modern Period:

In 1927, the Indian roads development committee (RDC) was appointed, to advise the Government on the road construction policy and its financial aspects. But the responsibilities of actual construction were again passed on to the provinces and local bodies. Naturally, progress in road construction was tardy and was not consistent with the expectation.

In 1943, for the first time, British Government convened a conference of road engineers at Nagpur to prepare a blue print for the road development in the country, popularly called the 'Nagpur plan', this plan clearly classified the roads in the country, assessed the needs of roads for 20 years and laid down ambitious construction targets for ten years. The responsibilities of central, provincial and local bodies were also clearly indicated with this modern era of road development in India commenced.

The Nagpur plan recommended the immediate setting up of a Central Road Board with adequate authority and powers to deal with the policy and day to day administration of road planning and to serve impartially the interest of the central and the state Government. The objective underlying the Nagpur plan was that no village in a well developed agricultural area should remain more than 5 miles from a main road, while in a non-developed agricultural area; no village should remain more than 20 miles from a main road. It was the fundamental basis of this programme that no road should be considered by itself but as a part of a national network.

Although improvement in road infrastructure is highly essential because of the positive influence of road services on economic activities, most of the developing countries find it difficult to make provision of this service in sufficient quantity as the cost of investment in this infrastructure is very high. **Kumar (1997)** suggested adoption of the facility-based approach to rural road planning in less developed countries. One of the important contribution of the study is its findings about the rural travel characteristic derived from an extensive survey data obtained from rural areas. It was observed that 92.79 percent trips terminate either at market center or education center. Therefore it was suggested that a network which provided connectivity to market center and educational institution in a correlated with their

accessibility from different road types. **Khanna et al. (1982)** used the concept of settlement interaction, link efficiency, route efficiency and network efficiency to generate, analyze and evaluate alternative rural road linkage patterns. Integrated area development approach was applied to arrive at a road network which serves the area in a balanced manner. Gravity hypothesis was used to qualify inter settlement interaction using level of socio-economic development, population and spatial in terms of centrality scores and the interaction between two settlements was considered proportional to the difference in their centrality scores. Alternative networks were generated using various criteria like maximum link efficiency, minimum total link length, minimum total operating cost and fully developed network. These alternative networks were tested for their total cost, to arrive at the optimal network. This theory is based on the most scientific and rational way to tackle the rural road planning in a country. It represents an attempt at integrating the rural road network planning process with the overall development of the area.

Swaminathan, et al. (1998) used the concept of minimum spanning tree for connecting the villages to existing nearby roads or to the market center. Various link options for connectivity were analyzed by considering the flow circuit. Market centers and existing roads were considered as high intensity concentrated electric charges, which attract smaller charges situated at unconnected villages. The weight of each link option was taken as the ratio of electric charge situated at the already connected village or to market centre or the nearby road and distance between them. The option giving by highest weightage was chosen for providing connectivity using minimum spanning tree concept. In this method it was assumed that the network generated is the optimal, but no analysis for optimality was done. The charges assigned to market centers and main roads were chosen arbitrarily. The logic of the assigning charges to the road and the finding it for other villages is a misconception. For an unbiased linkage scheme, the road should receive charges from the village and not vice versa.

Kumar, et al. (1985) proposed a methodology for the rural road network planning which minimizes the road construction and travel cost. The villages were considered as 'Unconnected nodes' which were to be connected to 'root nodes', situated either on market centers or on the existing main roads connecting the market centers. The minimum construction cost network was generated first by using minimum spanning

tree concept. So the unconnected villages were connected to the market canters or the main road and proceeding towards interior by connecting the nearest unconnected village with the already connected ones. Alternative networks were generated from a set of predetermined road links using different link options. The optimum network was obtained on the basis of minimum construction cost. In this method it was assumed that all the functions of a village are satisfied if it is connected to a market centre, which is not true. The set of link options, from which the alternative networks were generated, were a predetermined few. Whereas, if there are 'n' nodes in network then the maximum possible numbers of link options are $n(n-1)/2$. Not all these link options were considered in generating the alternative network. The method suggested did not consider an integrated area development approach, and therefore, its overall functional utility was questionable.

Xie and Levinson (2006) investigated the measurement of road network structure. Existing measures of heterogeneity, connectivity, accessibility and interconnectivity were reviewed and three supplemental measures viz measures of entropy, connection patterns and continuity were proposed. The measures were applied to 16 test networks, which were derived from 4 idealized base networks: 90 degree, 45-degree, and 30-degree and completely connected. The results show that the differentiated structures of road networks can be evaluated by the measure of entropy; predefined connection patterns of arterial roads can be identified and quantified by the measures of ringness, webness, beltiness, circuitness and treeness.

2.2 Rural roads and the Economy:

The economics of investment in road infrastructure are based on the argument that roads yield benefits to those using the roads by decreasing the costs of transporting goods and persons. For local rural roads in developing countries, these benefits generally accrue to producers of agricultural products and the transporters of such products. Two different methods are available for estimating such benefits viz consumer's surplus and producer's surplus (Schroeder , available online). The former focuses on the savings in transport cost attributable to improved road facilities. By lowering the price(cost) of transport, users of roads enjoy additional benefits and, if there is a responsiveness of demanders to this new lower price,

additional travel will also be generated. The consumer's surplus approach, therefore, focuses on the demand for transport.

The producer's surplus approach maintains that improved transport facilities, by lowering the cost of transportation, effectively lower the costs of production including the costs of marketing the producer. Hence even though the market price of the good may not change at least in the short run, the lowered costs of production increase the profitability of production and assuming some responsiveness of production to prices, can encourage greater production of the good. Equivalently, the lowered transport cost can be treated as an increase in the 'farmgate' price obtained by the producer.

Beenhakker and Lago (1983) demonstrate that under a certain set of assumptions, both the consumer's and producer's surplus approaches to estimating the benefits of roads will lead to identical findings. The consumer's surplus approach is considered more appropriate where analysts have information on road usage and estimates of transport cost savings associated with improved roads. The producer's surplus approach is preferable where production data are available for the area anticipated to be affected by the road improvements. While actual application of either of these approaches has potential weakness (Devres, 1980), each of them suggest the economic impacts that are most likely to accrue from improvements in road services. That is, investments in roads are expected to produce one or more of the following effects:

- 1) Reduced transport prices and increased use of roads,
- 2) Increased farmgate prices of produce,
- 3) Increased agricultural production and cropping intensity,
- 4) Lowered prices of agricultural inputs.

The study by **Binswanger et al. (1993)** is also pioneering in the effort of constructing counterfactual scenarios to study the welfare impact of rural infrastructure. Using time series information in a random sample of 85 district from 13 states in India, it shows that road infrastructure investment fostered agricultural output growth, higher usage of fertilizers and a larger credit supply. The study presents a conceptual framework that is helpful in overcoming simultaneity

problems created when assessing the causal relations between infrastructure investment and other variables of interest.

To explain the impact of infrastructure, **Capello (2007)** mentions about the growth theories like theories of balanced growth, stages of development, the export base and growth-poles and concludes that infrastructure enhances export, the production system's competitiveness and an area's capacity to attract new activities.

Jetli et al. (2007) point out that infrastructure development influences economic activities, and hence economic development, in various multiple and complex ways creating lots of spillover effects. They find that better infrastructure services enhance productivity of factors like labour and capital. The authors insist that lack of access to reliable infrastructure services causes under-utilization of productive capacity of an economy leading to less short run production efficiency and output growth. Improvement of transport infrastructure makes flow of commodities smooth from production units to the market places. At the same time, it makes people's access to the market easier. **Jimenez (1995)** is of the view that infrastructure has direct positive influence on consumption.

Although rural roads in developing countries generally yield benefits, the literature is less clear on the extent to which these benefits can alleviate poverty. **Howe (1984)** has conducted perhaps the most comprehensive review of the poverty alleviation effects of roads. In spite of the difficulties in gleaning income distributional implications from a variety of studies, He was able to reach a number of 'robust' **conclusions** that are sufficiently important to recapitulate here. Among the **conclusions** reach by him are the following-

- 1) Local circumstances are extremely important to the outcomes from road investment. Extrapolating from experiences gained in one instance to other locations is dangerous.
- 2) The evidence does not warrant optimistic predictions concerning the ability of road investments to alleviate poverty, at least in the short run.
- 3) Although new roads may result in considerable increases in traffic, road improvements seldom decrease cost sufficiently to result in significant increases in traffic.

4) Factor such as regulation of crop prices or transport services and the relative importance of transport in the final cost of a product are likely to constrain the benefits of road improvements even if the improvements lead to substantial decreases in vehicle-operating costs.

5) Because they essentially ignore personal travel, marketplace-oriented methods of estimating road improvement benefits are over simplistic.

6) Road benefits are generally skewed towards large land owners unless coordinated public policies and actions complementary to road investments are undertaken.

7) Land tenancy condition play a key role in determining the degree to which landless or land-poor participate in the benefits of road investments; where land ownership is relatively equally distributed, lower-income groups are most likely to derive benefits.

This set of conclusions is, therefore, quite pessimistic concerning the degree to which poverty-reduction objectives can be achieved from rural-road improvement projects.

Ahmed and Hossain (1988) in their study reached the opposite conclusion. In a comparison of Bangladesh localities characterized by well-developed versus underdeveloped infrastructure, they found agricultural incomes were significantly higher in those areas with improved infrastructure and that these benefits also improved the situation of the poor in these communities.

Sengupta, et al. (2007) investigated empirically the impact of a highway development on the poverty status and socio-economic conditions of the people living in its proximity, through greater connectivity and transport mobility. They analyzed the connection between the road development and the individual welfare maximizing choices with the help of a micro economic rural household model. The study showed how the value of the various household level well-being indicators tend to decline as the approach distance of a household from the highway increases and tends to disappear beyond a threshold distance. They further uses propensity score matching cum differencing method to estimate the partial effect of the highway on those welfare indicators and illustratively show how the highway has significant impact on the rural economics in India through which it passes.

Bryceson et al. (2008) attempted to investigate the effectiveness of the poverty reduction programmes in addressing mobility and social-service accessibility in rural areas. Their findings indicate that, in extremely remote areas, road improvement may catalyze the expansion of social service provisions as evidenced in Ethiopia. However, given the poor's relative lack of motor vehicles and ability to pay for public transport, they are, by no means, a sufficient condition for enhancing the mobility of the rural poor.

Gibson et al. (2003) support the argument that poor areas have the least access to infrastructure and people in those areas may benefit the most from new investments. They examined how rural roads played an important role in reducing poverty in Papua New Guinea (PNG). They found that increasing access to roads has an independent effect on decreasing poverty.

A less direct measure of the economic impact of roads can be observed in changing value of land. As the profitability of agricultural land is enhanced through lower costs of transporting inputs and outputs, the price of land increases. Thus another probable indicator of benefits from road improvements are land value increments. Other factors, however, have been found to affect the degree to which these anticipated effects actually occur or to whom the benefits of road improvements accrue. If the road transport sector is not competitive, suppliers of transport services, rather than agricultural producers, will derive the benefits in the form of monopoly profits. Similarly, **Jahan (1989)** observed that where input prices are administered without accounting for transport costs, farmgate prices of agricultural inputs, e.g. fertilizer and seeds, may not be influenced by improved road transport.

Since transportation is but one factor affecting the profitability of agricultural production, it is not surprising to find that the direct economic benefits of roads can be significantly affected by the availability of other complementary inputs to the agricultural production process. For example, if credit is not available to farmers, there will be no realization of the decreased costs of transporting such inputs as seeds and fertilizer since the farmers may be unable to purchase these factors without adequate credit.

Beenhakker and Chammari (1979) observed that in the World Bank's experience, the main reason for not achieving forecasted economic returns (ERs) of road

improvements in the past is the absence of a complementary agricultural development program. While such conclusions are not surprising, they do complicate the process of determining the extent of benefits directly attributable to road investments. In addition to the availability of complementary inputs, the general policy environment may also affect the degree to which benefits are actually realized from road investments. Lack of incentives due to price controls, and inappropriate import and production restrictions on vehicles and/or spare parts all may decrease the economic impact of rural roads.

There are numerous other impacts of roads including increased accessibility to other social services, such as health, education and other infrastructure **Khandker et al. (2006)** found that average school participation among boys is about 20 percent higher in areas influenced by rural road investments. **Walle (2007)** found an increase in primary school completion rates in Vietnam following the construction of rural road. **Levy (1996)** carried out another study on the socio-economic impacts of road rehabilitation based on a sample of four rural roads in Marruecos, comparing pre-existing and post-rehabilitation conditions. He compared the data on the performance of these four rehabilitated rural roads with that of two non-rehabilitated roads and identifies very clear causal linkages between rehabilitated road infrastructure and access to education, particularly for girls, as well as a substantial increase in the use of public health services.

Bravo (2002) discussed the impact of improved rural roads on gender relations in Peru. According to her, road rehabilitation has led to an increasing number of women visiting markets, either to sell their produce or buy other products. Increased travel by women also means improved access to information. Improved roads can also have an effect on women's participation in community organizations. Women tend to place a high value on safety following the rehabilitation of roads and paths.

According to **Zhirui Ye (2000)** rural transportation network plays an important role, when hurricane evacuations occur, the recommended safe distance was 150 miles from the immediate coastline. Evacuees are expected to drive 150 miles or more, and they may use primarily rural roads. Thus, rural roads have a larger role in evacuation than is currently recognized. Further, rural roads may substitute for interstates and other major highways in the event they become functionally impaired

(congested or damaged). It was observed that it is critical to begin identifying and addressing the gaps in evacuation planning and operation relative to critical rural transportation issues.

Nadkarni and Deogirikar (1972) examined the demand for roads in Maharashtra as determined by economic factor such as density of population and production activity. A cross-section study was done for this purpose of all districts in Maharashtra through a multiple regression analysis. With the help of the parameters governing economic factor, the authors estimated the demand, identified the districts deficient in roads and estimated the magnitude of the deficiency. The authors, however, stressed that such an approach cannot substitute an intensive survey of each region, which alone can reveal facts such as areas not developing due to lack of roads, the nature and adequacy of the access to each village, seasonal viability of roads, and economic feasibility of reducing roundaboutness.

Limao and Venables (2001) used quotes from a shipping company and other sources of data to estimate the impact of inter-country transportation costs on trade flows. They concluded that much of the low trade volume in Sub-Saharan Africa is due to high transportation costs that results from poor quality infrastructure.

Among the studies that focus their attention on quantifying time savings and the reduction of transport costs, mention may be made of contributions of **Guimaraes and Uhl (1997)**. They assessed how transport mode, quality of the road and distance to markets affect agricultural production costs in the federal state of Para, Brazil. **Liu (2000)** carried out a study of production and transport costs, comparing villages with permanent access to roads to those with only seasonal access in the state of Andhra Pradesh, India. They found that in the unconnected villages, the poor road condition, seasonal road closure, lack of motorized access and the high cost of freight delivery are among the major problems of village accessibility. Moreover, road closure during the rainy season causes produce spoilage, delay of freight delivery, labour unemployed and lower school attendance.

Rawat and Sharma (1997) analyzed the development of a road network in a high altitude, remote location in the Indian Central Himalaya. According to them the distribution of primary education units and postal services was not affected by road development but the impact of a road was clearly visible. The major human and

animal health care facilities were concentrated at a few easily accessible points, and the location of other facilities was determined by distance from the road. Drinking water supplied by government agencies and an electricity network were initially introduced along the road network and then extended where as telecommunication facilities and financial institution were established only along the road.

Although most of the theoretical studies stress upon the favourable impact of infrastructure, these services may not always affect the development process positively. Apart from injecting positive externalities, as **Jimenez (1995)** finds, infrastructure may also create negative externalities like congestion and pollution. Such an externality associated with roads is the damage caused by a user to other users.

Richard et al. (1998) found that huge road network with traffic noise has a greater ecological impact, subdivides population with demographic and probably genetic consequences. Road networks crossing landscapes cause local hydrologic and erosion effects. Chemical effects mainly occur near roads. Road network interrupt horizontal ecological flows, alter landscape spatial patterns, and therefore inhibit important interior species. Thus, road density and network structure are informative landscape ecology assays.

To sum up, road infrastructure has positive influences on economic activities. Rural road, to some extent, helps in raising productivity of inputs, improves marketing facilities, makes access to goods and services easy, reduces poverty and thus enhances standard of living. In addition, the general policy environment may also affect the degree to which benefits are actually realized from road investments. Lack of incentives due to price controls, excessive regulation of the transport industry, and inappropriate import and production restrictions on vehicles and/or spare parts all may reduce the economic impact of rural roads (Carapetis et al., 1984).

2.3 Financing Road Development:

Mobilizing the resources necessary to finance road maintenance is of paramount interest in most developing countries. As with finance question in general, this topic can be considered from both a conceptual or theoretical view and from the standpoint of what has worked or might work in a developing country.

Unfortunately, as the review finds very few studies on local funding of roads and road maintenance. As outlined by **Ostrom, et al. (1990)**, it is desirable that the instruments used to finance development and maintenance infrastructure yield adequate and growing revenues, be equitable in their impacts, be relatively economical to administer fairly, be politically acceptable, and affect economic choices in as neutral a manner as possible. Economically efficient mechanisms are likely to be deemed equitable on benefit financing grounds and therefore, are unlikely to face extreme political opposition. Unfortunately, these financing instruments may be incapable of achieving revenue yields that meet the full costs of road provision, at least if rural roads are considered independently from the full array of rural and urban roads. Thus, theoretical discussion on road financing, centers round the issue of ascertaining how an adequate amount of revenues necessary to meet these costs might be mobilized.

In order to achieve an efficient allocation of resources, the price for using a road should be equated to the marginal costs of road usage. But not all of the costs of road provision are encompassed in marginal costs. Costs include both fixed and variable costs; fixed costs, by definition, are not affected by an additional vehicle passing over a road. Fixed costs include the costs of construction the road as well as maintenance costs that are necessary regardless of the use of the road. There are several types of external costs that are theoretically relevant; these include pollution costs associated with motor vehicle use, accident costs, congestion costs, and the additional road use costs imposed on other users as one's use of the road hastens its deterioration and, hence, the costs other users must bear. Analysis of road transport in developing countries has generally ignored pollution and accident costs despite their potential significance, especially in urban areas. Congestion costs are obviously of paramount interest in many major cities of the developing world, they are however, generally irrelevant, in respect of little-traveled rural roads. The one exception to this concerns non motorized vehicles that may significantly impede the flow of motorized traffic on narrow rural roads or contribute to accidents. Even without any congestion, one vehicle's use of a road can affect road-use costs for subsequent users since the first vehicle can add to the deterioration of the road.

Newbery (1989) observed that since vehicle operating costs increase with roughness, the passage of an extra ESAL (equivalent single axle load) over a road

has two effects. First, it advances the date at which maintenance will be required and hence raises the costs borne by the highway authority (the traditional pavement costs), and second it raises the vehicle operating costs of subsequent vehicles, thus creating a road damage externality for subsequent road users'. He goes on arguing that the increased vehicle operating costs due to others' use of the road are substantial and may be comparable in importance to the costs of the pavement. Hence, efficient financing mechanism should capture such externalities so that the vehicle user is forced to recognize the full costs of his or her actions.

This argument can be a bit misleading since it implies that efficient pricing of roads would require that vehicle operator's pay for the costs of the additional maintenance that their use of the road requires plus bear the additional costs that lack of this maintenance would impose on subsequent travelers. If no additional maintenance would be forthcoming, an obvious externality would be imposed on subsequent users of the road. On the other hand, if a maintenance worker was assigned to follow each and every vehicle and put the road back into the condition it was in prior to the vehicle's passage, the costs of this maintenance should be borne by the road user. This cost is not an externality in the classical sense of the term; instead, it is analogous to efficient pricing of a good or service, i.e., price equal to marginal cost. Furthermore, if applied, no externality would be imposed on subsequent users of the road.

At the same time, it must be stressed that the theorem applies only to the additional maintenance costs attributable to road use and does not include maintenance costs associated with nonuse factors such as weather. Since weather and natural aging may influence both routine and periodic maintenance costs, mobilizing resources simply on the basis of additional maintenance costs associated with road use will be insufficient to meet the total costs of maintain a road. Newbery further notes that the theorem does not apply to unpaved roads where predetermined maintenance strategies are imposed without regard for the condition of the road.

The theory of efficient user charges has implications for decentralized financing of rural roads. Since road deterioration differs by the type and condition of the road surface as well as weather conditions, local time and place information can promote efficient outcomes that are not achievable under nationwide policies. Finding an

instrument capable of reflecting these localized marginal cost levels is, however, highly problematic.

According to **Postigo (2008)** China and India have used very different instruments for road financing while China mobilises substantial resources through directed credit by state owned banks, India heavily rely on international institutions and fuel taxes. However, current modalities of road financing will be insufficient to meet future investment needs, so both countries should explore new mechanisms to attract private capital and expand the fiscal space of central and sub-national governments. Facilitating the participation of the private sector in road development would require, inter alia, strengthening of regulatory frameworks and deepening and broadening of domestic financial markets. But given the strong public good characteristics of large segments of the road networks in China and India, most of the funding for road construction and maintenance would need to come from the establishment of efficient and sustainable systems of earmarked road-related charges, including a fuel tax in China.

Ahmed et al. (2007) analyzed the process of the formulation of the Cambodian Rural Road policy and strategic plan. Their study highlights the process of identification of main issues for improving rural access by developing low volume roads. They provide examples of the policy directions and how these directions have been used in the formulation of the strategic plan. The authors also highlights the involvement of the academic institutions in the development and dissemination of the outputs including the updating of the relevant policy and strategy related course module that is being taught as a part of the under-graduate level engineering curriculum.

Rajaraman (2005) analysed variations in utilization by sub national state governments in India of a recent non-concessional lending facility for financing rural infrastructure projects. Contrary to prior expectations that only states in a robust fiscal situation would voluntarily approach a non-concessional window, a fixed effects panel regression establishes that the scheme was accessed in years of fiscal stress. A second exercise on irrigation funding in a low rainfall state shows allocations to higher rainfall rather than low rainfall districts within the state. This is not an efficient allocation, in the light of empirical findings for India and China of

higher returns to rural infrastructure in low-potential rainfall areas. Together, the results points to the need for fiscal conditionalities on the borrowing government, going beyond default guarantees. Lending has to be made conditional on upfront evidence of sectoral or general fiscal recovery mechanisms, linked to the sectoral pattern of use, with the time pattern of disbursement dictated purely by project considerations. Poorer states, and less endowed regions within states, will need technical assistance to identify financially viable projects, since projects readily available off the shelf are typically available for better endowed regions, where the demands in terms of technical complexity and community involvement are lower.

According to **Jaarsma and Dijk (2002)**, the benefits from minor rural road infrastructure can be very individual, when a road is important for reaching a farm, serving little or no inter-local traffic. Rural road maintenance, therefore, calls for a specific taxation model that distributes costs according to benefits involved for the individual taxpayers used by local government is often poorly founded. They developed a new model for two local road maintaining governments in the Netherlands. The model emphasizes that the basic facilities for reaching buildings and parcels along a road should be paid by the rural real estate owners. Extra facilities (like additional pavement width and plantings) enable inter-local traffic. Therefore, maintenance of these extra facilities should be paid by all inhabitants of the community.

Hide and Keith (1979) studied the relationship between road improvements and vehicle operating costs, showing how the costs for operating different types of vehicles (cars, light commercial and heavy commercial vehicles) declined with bituminous road surface improvements in st.vincent. When combined with the cost of routine annual maintenance and periodic resealing. The results indicated that rehabilitation costs could be recouped within one year on roads carrying more than 300 vehicles per day, while extremely low volume traffic roads would require considerably longer time to recover the costs, e.g. five years for roads with only 100 vehicles per day and twelve years for those handling 50 vehicles daily.

Anderson and Vandervoort (1982) concluded that at least for rural road construction, the incentives both within USAID (United States Agency for International Development) and within host country institutions often resulted in a

lack of implementation of labour-intensive techniques even though such methods had been originally planned.

Beenhakker (1987) mentions that community organizations such as villages, tribes, religious groups, or nonprofit organizations can be potential suppliers of road maintenance. Allowing such groups to bid against normal private contractors may increase the degree of competition. Similarly, if some governmental organizations continue to provide maintenance, they too may bid for the right to maintain roads in another geographical area.

Singh (1962) suggested that annual vehicle miles traveled on local rural roads and fixed annual user imposts on local rural vehicles and urban vehicles operating primarily on local rural roads should provide the basis for distribution of state user revenues. The road costs not recovered by user taxes can be equitably recovered by specific ad valorem real property taxes. Special assessment of farms abutting dead-end roads and tolls at high-traffic bridge will recover costs in these situation.

Steven et al. (1991) found that over 50% of cost may be unnecessarily incurred because of input use inefficiency. Correlation between output measures and the efficiency measures suggests that larger jurisdictions are more efficient than smaller jurisdictions. In addition, 84.5% of the townships exhibit technology characterized by increasing returns to scale. These results suggest that jurisdictional consolidation of production-related responsibilities may yield substantial cost savings.

Gwillian and Zmark (1999) argue that road funds must be viewed as a provisional, case specific intermediate step in the direction of one long-term solution. The role and nature of road funds should be assessed not on general principles but on a case by case basis through the analysis of likely micro and macroeconomic effects. They recommend indicators for use in specific cases to determine whether a road fund should be introduced, continued or abolished.

Using evidence on new road funds in Africa, **Gwillian and Kumar (2003)** found that second generation road funds financed by fuel levies and managed by boards representing the interest of road users have not undermined fiscal flexibility. Moreover, they have improved the administration of road funding (in terms of execution capability) and its output (in terms of road conditions). So, although

criteria for assessing road funds remain relevant, the funds should not automatically be considered temporary mechanisms.

2.4 Peoples Participation in rural road development:

Working with local people gives good result when it is done well. Some organizations and outside agencies can run into difficulties, and often find that they are unable to pursue their projects, if they do not carry local people along with them, if they do not develop the trust that is required to work with local communities, if they impose ideas based on their own interpretation of requirements rather than establishing those of the community themselves. Therefore, Participatory approaches have been evolving since the 1980s and are now well established and respected in mainstream development theory and practice. Participatory approaches are based on shared ownership of decision-making. This approach is a response to 'top-down' approaches to development, in which power and decision-making is largely in the hands of external development professionals. The top-down approach used to be the conventional style of development. However, this had many flaws and was not effective. It also raised questions about whether 'outsiders' had the right or the knowledge to set the development agenda of local people. In the 1980s, development workers began to seek more participatory alternatives that avoided some of these problems. They drew an alternative method of learning and action that, at the time, represented a radical change. In general, this change has been embraced as a positive shift in development practice.

In the context of rural development, participation is concerned with how to bring about some meaningful involvement in development on the part of those who live in rural areas and who depend upon the rural sector for their livelihood. In such very general terms, participation is seen as 'a means for a widening and redistribution of opportunities to take part in societal decision making, contributing to development and in benefitting from its fruits'. **Alagh (2000)** examines the institutional structure and the implementation of rural development programmes in the context of participatory approaches in a decentralized framework. According to him these institutions ought to have adequate autonomy as units of self-government so as to decide on the local needs and priorities and design and implement the necessary action. The challenge of making this new phase of democratic decentralization

successful depends on the commitment of the political leadership, bureaucracy and the people themselves. The state governments have the responsibility of transferring schemes as provided in the 11th schedule of the constitution and also of transferring corresponding funds to the panchayats. Similarly, the staff available for the implementation of schemes related to these subjects should also be placed under the control of the panchayats.

Mpolokeng (2003) examines the prevalence of people's participation in all the stages of the rural development projects, in four rural areas in Mafikeng in the central District. The main argument in the paper was that though people's participation renders projects more effective and successful, the stages at which involvement can occur are varied. Examples of two very successful and two less successful projects in the district are cited to support the central argument. In conclusion, the study makes recommendations to the rural development agencies in the North-West to practice meaningful and realistic people's participation in their projects.

Isotalo (1992) observed that maintenance of rural roads is a major concern in many countries, which has proved very difficult to resolve through conventional approaches. He studied the community participation in rural road maintenance in Finland and find that rural people can be mobilized to maintain their access roads if some financial incentive and an appropriate legal framework are made available by the government. The implication is that more focus should be shifted from the local Government level further down to the actual users and beneficiaries of the roads.

Rashid and Sen (2010) examined the level of people's participation in panchayat activities and level of people's awareness about rural development programs. The study was done against the background of the constitution (seventy-third Amendment) Act, 1992, and Bihar panchyati Raj Act, 1993 and 2006, both of which aim to empower the rural people by strengthening the Gram Sabha. The study was entirely based on primary survey conducted in four villages of Arti Block in Gaya District of Bihar, which is among the least developed and most backward district of India. They found that participation of rural people in Gram Sabha is very low because of strong caste segregation; class difference and gender divide in the villages of Bihar.

Bardhan and Mookherjee (2004) examined poverty alleviation efforts of West Bengal Panchayat, comprising implementation of local reforms and pro-poor targeting of credit, agricultural minikits, employment programmes and fiscal grants. They included 89 villages and covered four successive panchayat administrations. While average levels of poverty alleviation efforts were high, there were significant variations both across and within villages over time. Poverty alleviation efforts within villages improved when land was distributed more equally, the poor become more literate, there were fewer low caste households and local elections were more contested.

Although the above literature identifies many of the areas where the positive impacts of such investment are foreseen (i.e. agricultural production, employment, income, health or education) there are only few studies that have made progress in establishing a clear causal link between infrastructure provision and any welfare indicator. Most studies have limited their attention to document in more or less detail the role of accessibility to infrastructure facilities by the rural poor, in terms of reductions of time and costs involved in accessing product and factor markets or accessing social services, like health or education. Literature available regarding people's participation in the context of India is few. Therefore, attempt will be made to cover the areas which are not studied earlier in the context of Assam.

CHAPTER THREE

RURAL ROADS IN ASSAM

This chapter makes an attempt to present a brief description of the rural road network in Assam vis a vis along with road network in India. Attempt has also been made to compare the status of rural roads in Assam with those of other states in India.

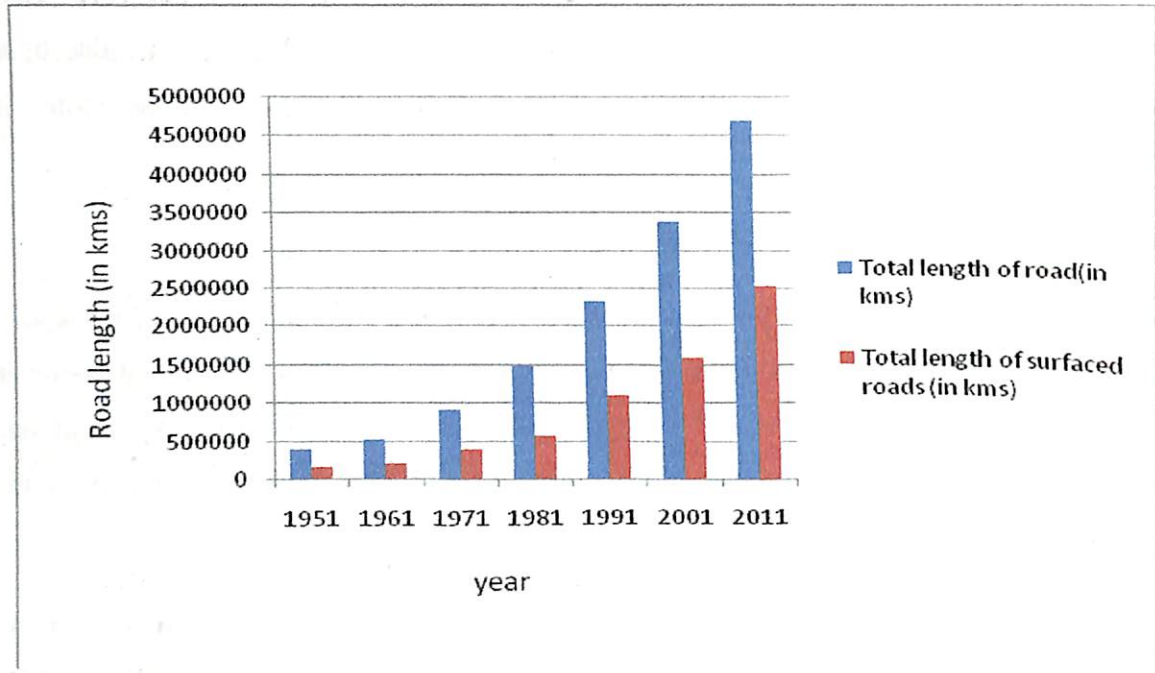
3.1 Growth of Road Network in India:

Road network in any economy plays an important role by facilitating trade, transport, extension of markets, social integration and economic development. Road network is used for smooth conveyance of people and goods. Transportation by road has many advantages over other means of transport due to its easy accessibility, door-to-door service, flexibility of operations and reliability.

Roads are like the wires and cables of transport network of any modern economy. No one can deny the importance of road in promoting economic growth of country. Improved roads can create opportunities for economic growth and poverty reduction. By reducing transport cost, roads can increase productivity and demand for labour in farm and non-farm activities and thus leads to increase income and consumption. Improved roads also have meaningful social impacts, in particular those associated to household investments in health and education. Srinivasan (1984) observed that rural roads facilitate better goods distribution, promote the development of market centres, and provide an incentive to farmers to generate more marketable surplus. It is the rural road that delivers fertilizers, pesticides, seeds and other agricultural inputs to farmers to improve both production and productivity. A good rural road network would be able to move marketable surplus efficiently and effectively to consumption centers and promote agro-businesses.

The total road length in India has increased more than 11 times during the last six decades between 1951 to 2011. From 3.99 lakh km. as on 31st March 1951, the total road length increased to 46.90 lakh km.as on 31st March 2011. The growth of road length in India during the past six decades since 1951 is shown in figure 3.1

Figure: 3.1 Total and Surfaced Road Lengths in India: 1951-2011



Source: G.O.I. Ministry of Road Transport and Highways Transport Research Wing, New Delhi, August 2012.

The surfaced road length in India has increased from 1, 57,351 kms in 1951 to 25,25,000 kms in 2011. The corresponding figures in 1961, 1971, 1981, 1991 and 2001 were 2.15, 3.98, 5.72, 10.92 and 15.98 lakh kilometers respectively.

3.1.1 Category wise growth of Roads in India:

The roads are generally classified into the categories of National Highways, State Highways, Other PWD roads, rural roads, urban roads and Project roads. The length of National Highways in India increased from 19,811 kilometers in 1951 to 70,934 kilometers in 2011. The category wise growth in road length for the past six decades since 1951 is shown in the table: 3.1

Table-3.1 Road Network by categories in India (in '000 kilometers): 1951 to 2011

Road category	1951	1961	1971	1981	1991	2001	2011	Annual compound growth rate
1	2	3	4	5	6	7	8	9
National Highways	19.8	23.8	23.8	31.7	33.6	57.7	70.9	2.1
State Highways	173.7	257.2	567.6	943.5	1273.1	1321.1	1638.9	2.6
Other PWD roads	□	□	276.8	421.8	509.4	736.1	1005.3	3.2
Rural Roads	206.4	197.1	354.5	628.8	1260.4	1972.1	2749.8	4.4
Urban Roads	0	46.3	72.1	123.1	186.7	252.1	411.8	4.5
Project Roads	0	0	130.9	185.5	209.7	223.6	288.5	2

Source: G.O.I. Ministry of Road Transport and Highways Transport Research Wing, New Delhi, August 2012.

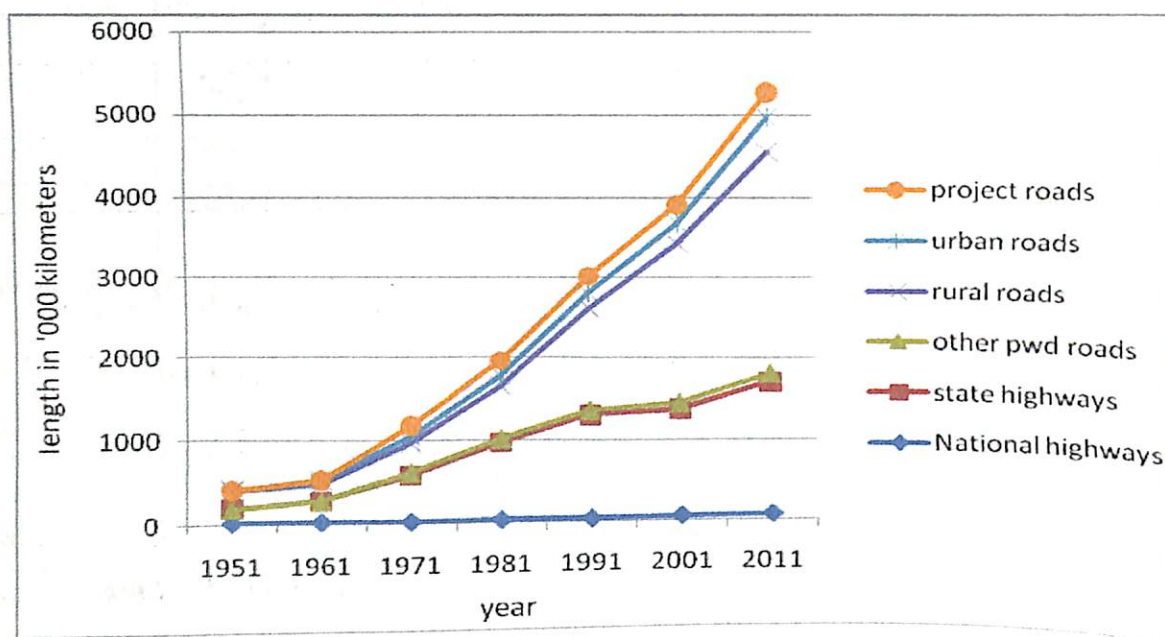
Note: □ Included in State Highways.

An attempt has been made at computing the Compound Annual Growth Rate (CAGR) of different categories of roads in India over time. It has been found that the length of National Highways during 1951 to 2011 grew annually at the compound growth rate of 2.1 percent. The length of State Highways during 1951 to 2011 and Other PWD roads during 1971 to 2011 registered an annual compound growth rate of 2.6 and 3.2 respectively. The highest compound annual growth rate of 4.4 percent during period 1951 to 2011 was registered by rural roads which comprise panchayati roads, roads constructed under Jawahar Rozgar Yojana (JRY) and Pradhan Mantri Gram Sadak yojana (PMGSY). The rural roads length increased more than 13 times during this period. Urban roads registered by a growth rate of 4.5

percent between 1961 to 2011. The Project roads showed growth rate of 2 percent from period 1971 to 2011.

The trend in the category-wise growth of road length is depicted in figure 3.2

Figure: 3.2 Trend growth in Road length by categories: 1951 to 2011



Source: Table 3.1

3.2 Road network in Assam

The construction and repairs of roads, bridges, culverts in Assam are under the responsibility of Public Works Department (PWD) which was established in the year 1880 under British rule. At the beginning the department had the full responsibility for all public infrastructures' development, construction and maintenance work. In 1956, the Embankment and Drainage wing came out of the parent Department and later on the department has been divided into two wings viz Roads and Building wings in August 1977. At present, the Roads wing section under Assam P.W.D. has the responsibility for construction and maintenance of roads, bridges and culverts. Presently, more than 40000 km road network including 1948 km National Highways are under the control of the state PWD.

Excluding National Highways, the remaining roads in Assam are divided into four categories- state highway, major district road, urban road and rural road. Most of the

roads in the state are in the rural areas (77%) while urban roads share only 3% of the total road network. Data presented in table 3.2 and 3.3 depicts the status of road network in Assam in 2012.

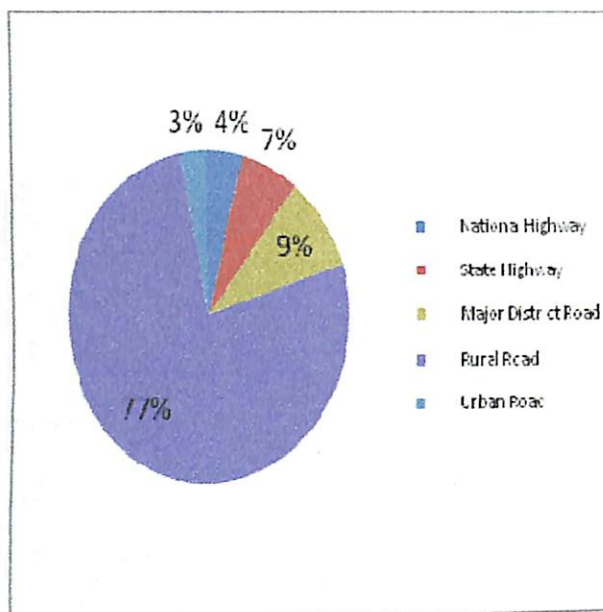
Table: 3.2 Road Network in Assam (Length in kms), 2012

Sl no	Item	2011-12	Surfaced	Unsurfaced
1	State Highway	3134	N.A.	N.A.
2	Major District Road	4413	N.A.	N.A.
3	Rural Road	36544	N.A.	N.A.
4	Urban Road	1409	N.A.	N.A.
	Total	45500	21200	24300

Source: G.O.A., Office of the chief Engineer. P.W.D. (Roads) Assam.

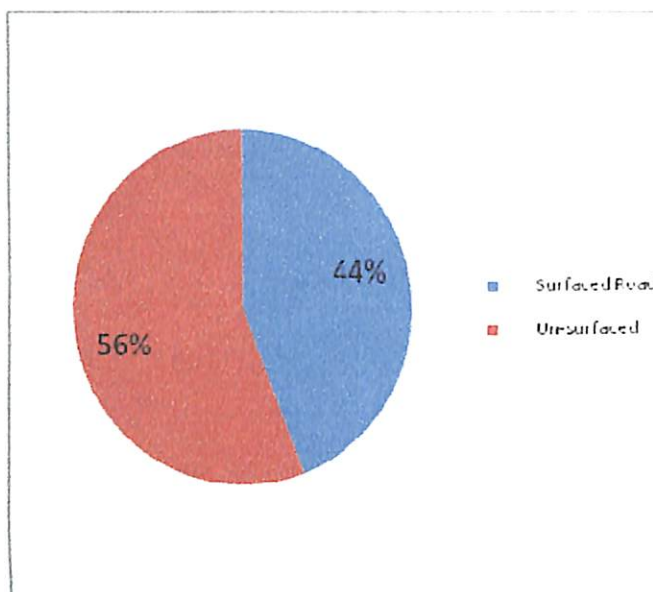
The road length in Assam in 2012 excluding National Highways was 45500 kms of which 21200 kms (44%) were surfaced and remaining 24300 kms (56%) were un-surfaced (figure 3.4). The density of surfaced road works out at about 24 kms per 100 sq km of area and 61 kms per lakh population as against 58 kms per 100 sq km area and 145 kms per lakh population in respect of un-surfaced road. The total road length also reflects dominance of un-surfaced roads in the network in the state. Not only that the length of surfaced roads compares unfavourably with un-surfaced road length, overwhelming large portion of the surfaced road (more than 96 percent) consists of single lane; intermediate lane and double lane and above accounts for a meager less than 4 percent of the surfaced road length. The un-surfaced (earthen graveled) roads, which occupies a larger share in the total network, are essentially fair weather roads. Moreover, the large numbers of submersible stretches and nearly 4000 semi permanent wooden bridges have hampered all weather road communication in the state.

Figure: 3.3 Road Network in Assam, 2012



Source: Table 3.2

Figure:3.4 Type of Road in Assam, 2012*



***Excluding National Highway**

From the above discussion, it may be informed that the state's road network is qualitatively inferior which stands in the way of economic development. Though can't be considered as sufficient, the length of rural road in Assam has increased considerably over the past few years. In fact, construction of roads under the PMGSY has led to improvement in recent years.

3.2.1 Recent Growth of Rural road network in Assam:

The rapid increase in the length of rural roads has been observed over the past few years in Assam. In fact, after the construction of roads under the PMGSY scheme, the scenario of the rural road network of Assam has changed significantly over past few years. The growth of rural road network in Assam is depicted in table 3.3.

Table: 3.3 Growth of Rural Road lengths in Assam

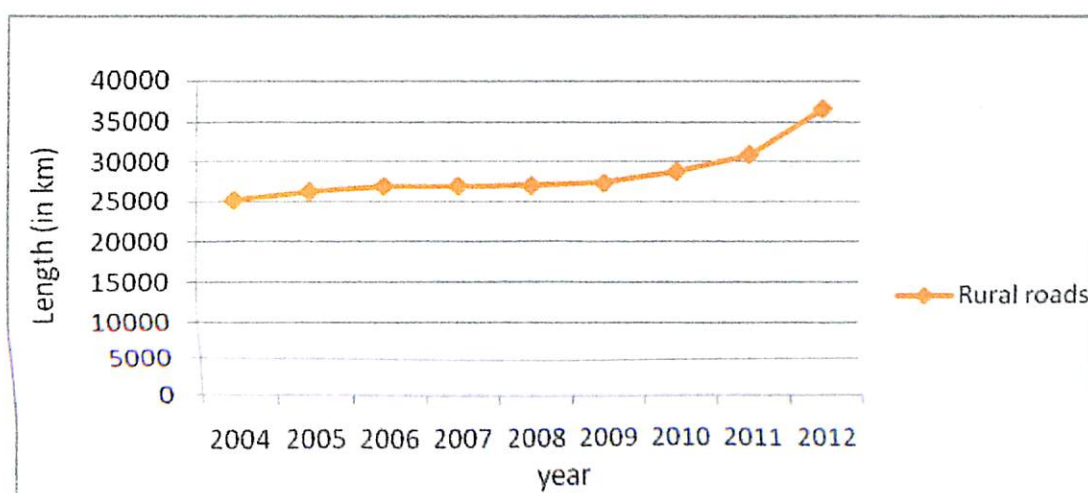
(in km)

Year	Rural roads	Rural roads per lakh of rural population	Rural roads per '00 sq. km of rural geographical area
2004	25148	108.32	32.45
2005	26221	115.82	34.70
2006	26890	115.89	34.72
2007	26907	116.19	34.81
2008	26976	112.94	33.84
2009	27283	117.51	35.21
2010	28753	123.84	37.11
2011	30844	115.17	39.32
2012	36544	136.45	46.58

Source: G.O.A., Statistical Hand Book of Assam, 2004-2012

In the past eight years, from 2004 to 2012, the rural road network in the state increased by 11396 kilometers, from 25148 kilometers in 2004 to 36544 kilometers in 2012. The largest increase of 5700 was in the year 2012. The growth rate of rural roads over the period was 3.5.

Figure: 3.5 The growth rate of Rural roads in Assam



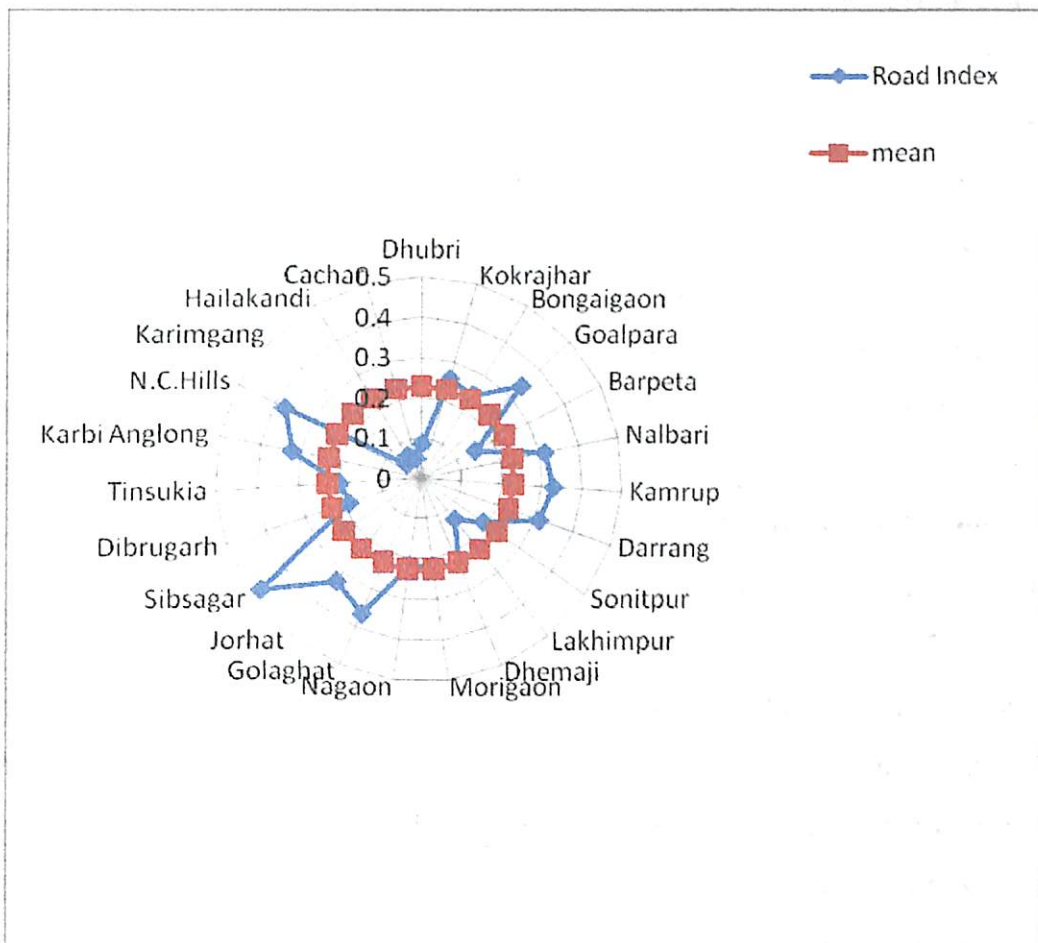
The district wise rural road development indicators such as rural road length per lakh of rural population, rural road length per hundred sq km of rural area, percentage of rural road length to total road length and road index presented in (Annexure: 3B) reveal that the rural roads accounts for about 77 percent of the total road network in Assam and considerable inter district differences exists in terms of the road development indicator. The availability of rural roads per lakh of population is highest in the N.C.Hills (961 km), followed by Karbi-Anglong (463), Sibsagar (254), Golaghat (246) and lowest in karimganj (only 57 km). Such differences can also be seen in availability of rural roads per hundred square kilometer of total rural geographical area which ranges from 92.20 km in Sibsagar to 22.60 km in Cachar. Percentage of rural roads to total road length is found the highest in Kamrup district followed by, Kokrajhar, Bongaigaon, Dhemaji and lowest in karimganj district. It may be mentioned here that in the two hill districts of Assam where more than 65% roads are rural roads, length of rural roads per lakh of population is highest but that per hundred kilometer of rural geographical area is very low. This is because of scanty population and existence of vast areas without roads in the two districts. To get a better picture of rural roads across the district, the rural road index has been constructed as done by Sarma (2013), following the principles outlined in the UNDP Human Development Report, 2010 for construction of the Human Development Index. For this purpose, districts are given scores for any attainment out of the scale of difference between the minimum attainment and maximum attainment among the districts recorded in the period 2004 and 2012. During this period the minimum and maximum attainment of rural road per lakh of rural population was 45 km. (Annexure: 3C) and 961 km (Annexure: 3D) and rural road per '00 sq.km. of rural geographical area was 14.45 km(Annexure:3C) and 92.20 km(Annexure:3D). Here, the status of rural road has been measured by rural road per lakh of rural population and rural road length per hundred square kilometer of rural geographical area. While the rural road per lakh of rural population will overstate the rural road availability in thinly populated areas, and the rural road length per hundred square kilometer of rural geographical area would understate the rural road density in thickly populated areas. Hence, the final index has been calculated by taking the geometric mean of the two road indices based on rural roads per lakh of rural population and rural roads per hundred square kilometer of rural geographical area in the district.

Road Index

$$= \sqrt{\frac{\text{Index of Rural Road per Lakh of Rural Population} \times \text{Index of Rural Road per '00 Sq.km. of Rual Geographical Area}}{}}$$

Rural road availability, as indicated by the Road Index (Annexure: 3B)) is the highest in Sibsagar district and lowest in the district of Cachar. Comparative picture of road index among the districts of Assam are shown in figure 3.6

Figure: 3.6 Comparison of Districts wise rural roads in Assam in terms of Road Index.



Source: Annexure: 3B

As the diagram shows, rural road connectivity in Upper Assam districts is relatively better except in Lakhimpur district. Sibsagar district is occupying higher rural road connectivity as indicated by the diagram. Goalpara district depicts a better picture

among the lower Assam districts. The rural roads in the two hill districts are in a good position, while the Barak valley district Karimganj, Hailakandi and Cachar are lagging far behind than the other districts of Assam.

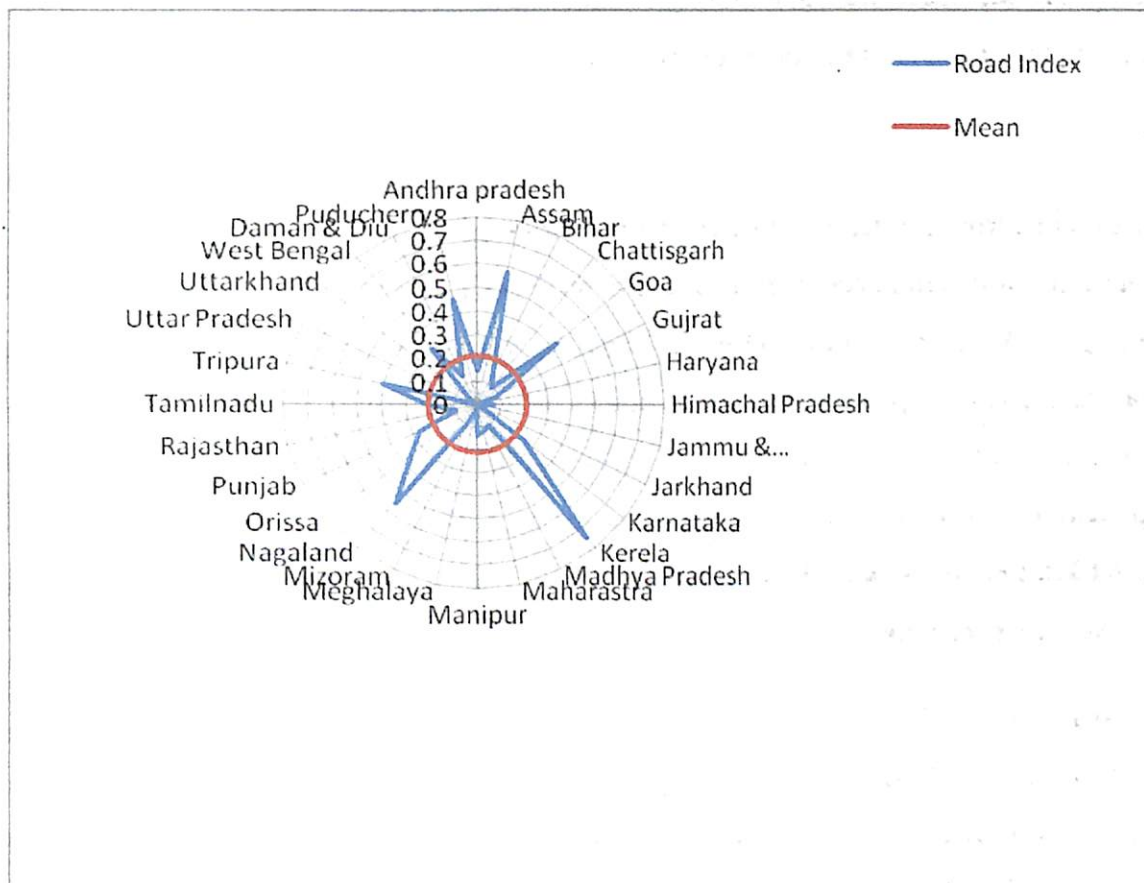
3.3 Rural roads in other states of India- A comparison

It is evident from the data presented in (annexure 3E) that availability of rural roads in Assam compares favourably with many states of India in terms of length of rural roads per lakh of rural population, rural roads per '00 sq km of rural geographical area, rural roads as percentage of total roads and road index. Assam is having 47.22 kilometer rural roads per '00sq km of total geographical area, 157 km per lakh of population, 77% of rural roads to total roads in 2012 as against the national average 88.184 km per '00 sq km, 371.76 km per lakh of rural population and 58.63% km to total road respectively.

The availability of rural roads per lakh of rural population is highest in Nagaland which is 1341.32 kms, followed by Assam (813.43), Kerala (751.11), Orissa (610.41) and lowest in Haryana which is only 28.58km. Such differences can also be seen in availability of rural roads per hundred square kilometer of total rural geographical area which ranges from 434.96 km in Kerala to 2.08 km in Jammu & Kashmir. Percentage of rural roads to total road length is found the highest in Meghalaya followed by Kerala, Assam, Bihar and lowest in Uttarkhand.

A better comparison of the States in terms of road index has been shown in the figure 3.7

Figure: 3.7 State wise availability of rural roads in terms of road index



Source: Annexure 3E

Kerala is occupying highest rural road connectivity as indicated by the diagram followed by Assam and lowest in Jammu & Kashmir. The other states of the North-East are lagging behind Assam.

3.4 Sum up

The analysis presented in the preceding sections of the chapter reveals that the total as well as category-wise road length in India increased manifold between 1952 and 2011. The length of surfaced road also increased but not to the extent of unsurfaced roads.

The rural road alone accounts for more than three-fourth of the total road length in Assam; the length of all other categories of roads together amounted to less than a fourth of the total road length. The unsurfaced road constitutes bulk of the total road length in the state.

The length of rural roads in Assam reveal marked intra-state disparity. The length of rural roads per lakh of rural population is highest in N C hills district and lowest in Karimgang district. Rural road per hundred square kilometer of total rural geographical area is highest in Sibsagar district and lowest in Cachar district. Percentage of rural roads to total road length is highest in Kamrup district and lowest in Karimganj district. In terms of road index When, Sibsagar district is found to have highest connectivity and lowest connectivity is observed in Cachar district. In general, the road infrastructure in Upper Assam districts are better compared to those of lower Assam districts. Intra state comparison of rural roads using the same road development indicators reveal that the availability of rural roads per lakh of rural population is highest in Nagaland and lowest in Haryana, rural roads per '00 sq km is highest in Kerela and lowest in Jammu & Kashmir, percentage of rural roads to total roads is found highest in Meghalaya and lowest in Uttarkhand and availability of rural roads in terms of road index has been highest in Kerela and lowest in Jammu & Kashmir.

ANNEXURE: 3A

TECHNICAL NOTES:

Compound annual growth rate:

The category wise growth of Roads in India has been calculated by using the Compound annual growth rate equation

$$\left(\frac{\text{Ending value}}{\text{Beginning value}} \right)^{1/60} - 1$$

For instance, to calculate the CAGR of National Highways from the period 1951 to 2011 we use the above equation

National Highway	Beginning value	Ending value
	19811	70936
	(Year 1951)	(Year 2011)

$$\begin{aligned} \text{CAGR of National Highways} &= \left(\frac{70936}{19811} \right)^{1/60} - 1 \\ &= 2.1 \end{aligned}$$

Again, the growth rate of rural road in Assam over the period 2004 to 2012 has been calculated by using the equation given below-

$$\ln Y = a + bt$$

Where,

Y is the Road length

t is the time period

Index construction

The Rural Road index has been calculated as a composite index of two dimension indices- rural roads per lakh of rural population and rural roads per hundred square kilometer of rural geographical area. In the first step, dimension indices have been calculated by taking the actual maximum and minimum attainments among the districts in the reference period of 2004 and 2012. The maximum and minimum values in the two dimensions in the referenced period are as follows:

Dimension	Maximum value	Minimum value
1. Rural roads per lakh of Rural population (in km)	961 (N.C.Hills, 2012)	45 (Dhubri, 2004)
2. Rural roads per '00 sq.km.Of Rural geographical area (in km)	92.20 (Sibsagar, 2012)	14.45 (Dhemaji, 2004)

Then the dimension indices of rural road per lakh of rural population and rural roads per hundred square kilometer of rural geographical area have been constructed by applying the following equation-

$$\text{Dimension Index} = \frac{\text{Actual value} - \text{Minimum value}}{\text{Maximum value} - \text{Minimum value}} \dots\dots(1)$$

The geometric mean of the two dimension indices has been taken as the final rural road index. The '0' and '1' values in the indices have been replaced by 0.001 and 0.999 respectively to make them comfortable for calculation of road index using geometric mean. For instance, the actual values of the dimensions in the Dhubri District in 2012 are:

Dimension	Actual Value
1. Index of rural roads per lakh of Rural population (in km)	69
2. Rural Roads per '00 sq.km.of Rural geographical area (km)	36.37

Using equation equation (1),

Index of Rural road per lakh of

$$\text{Rural population (km)} = \frac{69-45}{961-45} = 0.026$$

Index of Rural road per '00 sq.km

$$\text{Of Rural geographical area} = \frac{36.37-14.45}{92.20-14.45} = 0.281$$

Rural Road Index = Geometric Mean of the above two Dimension indices

$$= \sqrt[3]{0.026 \times 0.281}$$

$$= 0.085$$

ANNEXURE: 3B

District- wise availability of Rural Roads in Assam, 2012 (in km)

District	Rural Roads Per Lakh of Rural Population*	Rural Roads Per '00 sq km of Rural Geographical Area*	Rural Roads as Percentage of Total Roads	Road Index
Dhubri	69	36.37	87.26 %	0.085
Kokrajhar	193	46.36	88.64 %	0.257
Bongaigaon	148	55.60	88.44 %	0.243
Goalpara	179	75.02	87.35 %	0.337
Barpeta	108	45.53	80.20 %	0.149
Nalbari	155	77.58	80.00 %	0.312
Kamrup	180	71.41	90.00 %	0.328
Darrang	169	69.93	73.63 %	0.310
Sonitpur	141	40.43	80.00 %	0.187
Lakhimpur	100	36.61	75.89 %	0.130
Dhemaji	219	36.24	87.16 %	0.230
Morigaon	123	59.23	79.00 %	0.221
Nagaon	118	61.80	77.21 %	0.220
Golaghat	246	61.40	85.89 %	0.364
Jorhat	207	61.82	83.56 %	0.328
Sibsagar	254	92.20	85.89 %	0.477
Dibrugarh	141	40.74	78.00 %	0.188
Tinsukia	159	39.60	83.79 %	0.200
Karbi Anglong	463	32.13	77.53 %	0.322
N.C.Hills	961	25.42	65.93 %	0.375
Karimgang	57	29.83	57.58 %	0.051
Hailakandi	70	26.66	74.20 %	0.065
Cachar	68	22.60	72.91 %	0.051
Assam	157	47.22	77.49%	0.648

Source: Statistical Hand Book of Assam, 2012

*Population and area are as per 2001 census.

ANNEXURE: 3C

District wise Rural Road length in 2004

District	Rural Road	Rural Roads per lakh of rural population	Rural road per '00 sq. km. of rural geographical area
Dhubri	658	45	23.76
Kokrajhar	1252	148	35.57
Bongaigaon	766	96	36.06
Goalpara	751	99	41.61
Barpeta	1013	66	31.53
Nalbari	1033	92	46.05
Kamrup	1869	115	45.77
Darrang	1525	106	43.99
Sonitpur	1780	118	33.76
Lakhimpur	923	112	40.81
Dhemaji	466	87	14.45
Morigaon	603	81	39.29
Nagaon	1467	72	37.63
Golaghat	1300	150	37.45
Jorhat	1226	148	44.22
Sibsagar	1193	124	45.36
Dibrugarh	1017	106	30.53
Tinsukia	799	86	21.39
Karbi-Anglong	2972	411	28.58
N.C.Hills	1069	830	21.96
Karimgnj	538	57	29.94
Hailakandi	317	63	24.07
Cachar	621	49	16.55

Source: Statistical Hand Book of Assam, 2007

ANNEXURE: 3D

Road index 2012

District	Rural Roads Per Lakh of Rural Population*	Rural Roads Per '00 sq km of Rural Geographical Area*	Rural Roads as Percentage of Total Roads	Road Index
Dhubri	69	36.37	87.26 %	0.085
Kokrajhar	193	46.36	88.64 %	0.257
Bongaigaon	148	55.60	88.44 %	0.243
Goalpara	179	75.02	87.35 %	0.337
Barpeta	108	45.53	80.20 %	0.149
Nalbari	155	77.58	80.00 %	0.312
Kamrup	180	71.41	90.00 %	0.328
Darrang	169	69.93	73.63 %	0.310
Sonitpur	141	40.43	80.00 %	0.187
Lakhimpur	100	36.61	75.89 %	0.130
Dhemaji	219	36.24	87.16 %	0.230
Morigaon	123	59.23	79.00 %	0.221
Nagaon	118	61.80	77.21 %	0.220
Golaghat	246	61.40	85.89 %	0.364
Jorhat	207	61.82	83.56 %	0.328
Sibsagar	254	92.20	85.89 %	0.477
Dibrugarh	141	40.74	78.00 %	0.188
Tinsukia	159	39.60	83.79 %	0.200
Karbi Anglong	463	32.13	77.53 %	0.322
N.C.Hills	961	25.42	65.93 %	0.375
Karimgang	57	29.83	57.58 %	0.051
Hailakandi	70	26.66	74.20 %	0.065
Cachar	68	22.60	72.91 %	0.051
Assam	157	47.22	77.49%	0.648

ANNEXURE: 3E

State wise availability of rural roads in India, 2012

SL	State	Rural roads per lakh of rural population	Rural roads per '00 sq km of rural geographical area	Rural roads as percentage of total roads	Road Index
1	Andhra Pradesh	263.56	54.02	61	0.149
2	Assam	813.43	243.75	77	0.576
3	Bihar	136.19	109.62	77	0.150
4	Chhattisgarh	222.06	27.72	39	0.096
5	Goa	721.17	153.07	45	0.429
6	Gujarat	162.53	27.03	33	0.080
7	Haryana	28.53	10	10	0.014
8	Himachal Pradesh	179.19	17.7	20	0.067
9	Jammu & Kashmir	60.62	2.08	17	0.006
10	Jharkhand	29.40	7.90	25	0.012
11	Karnataka	454.03	84.89	56	0.250
12	Kerala	751.11	434.96	77	0.741
13	Madhya Pradesh	211.09	31.09	47	0.099
14	Maharashtra	216.76	40.25	29	0.166
15	Manipur	396.33	28.43	32	0.132
16	Meghalaya	84.14	7.06	79	0.025
17	Mizoram	440.60	9.62	20	0.076
18	Nagaland	1341.32	134.46	64	0.550
19	Orrisa	610.41	124.897	73	0.355
20	Punjab	369.17	123.120	70	0.272
21	Rajasthan	213.55	27.45	37	0.094
22	Tamil Nadu	301.89	89.69	55	0.208
23	Tripura	618.62	158.64	48	0.404
24	Uttarakhand	54.07	6.47	7	0.018
25	Uttar Pradesh	65.94	37.04	22	0.056
26	West Bengal	296.64	200.53	57	0.310
27	Daman & Diu	110.05	126.13	47	0.143
28	Puducherry	374.54	352.60	44	0.466
	All-India	371.76	88.184	58.63	0.154

Source: G.O.A. Infrastructure Statistics, 2013

ANNEXURE: 3F

District wise rural geographical area and rural population as per 2001 census

District	Rural geographical area	Rural population
Dhubri	2768.71	1444901
Kokrajhar	3519.74	841823
Bongaigaon	2123.92	795053
Goalpara	1804.68	755133
Barpeta	3212.67	1520333
Nalbari	2242.80	1121338
Kamrup	4083.17	1614107
Darrang	3466.14	1429492
Sonitpur	5272.45	1505719
Lakhimpur	2261.26	823857
Dhemaji	3222.77	533112
Morigaon	1534.60	738268
Nagaon	3897.72	2036342
Golaghat	3470.48	865141
Jorhat	2772.15	827901
Sibsagar	2630.04	954557
Dibrugarh	3330.36	956634
Tinsukia	3734.68	926105
Karbi-Anglong	10397.01	721381
N.C.Hills	4866.23	128644
Karimgnj	1796.81	934126
Hailakandi	1316.46	498787
Cachar	3751.37	1243534
Assam	77476.23	23216288

Source: *Statistical Hand Book of Assam, 2007*

CHAPTER FOUR

FINANCING RURAL ROAD DEVELOPMENT IN ASSAM

An attempt has been made in this chapter to discuss the schemes under which road development activities in Assam are financed. The utilization of such funds is also analyzed and a comparison of Assam with other states of India is also attempted.

4.1 Need for public funding of Rural Roads

Economic and human developments are strongly determined by the existing infrastructure development scenario. Rural infrastructure in terms of its roads is woefully short compared to demand for it. Construction and maintenance of road infrastructure is totally publicly funded and both the Centre and State governments have many budgetary constraints. In India more than seventy percent of population lives in villages and therefore, road infrastructure is a key determinant of rural development and economic and social well-being.

As more than 70% people lives in rural India, Indian planning has a history of focusing on the problems of the rural sector. It was around the 1970s that the concept of basic minimum needs came into the policy frame with an aim to reduce the worsening rural poverty and large scale of unemployment. During the 6th plan, issues relating to basic infrastructure were sought to be addressed in more cohesive and direct manner than before under the Minimum Needs Programme. To invest in rural infrastructure was traditionally state support as such investment was viewed economically unattractive and too complicated for the private sector to consider. Development of roads necessitates a huge financial investment. It also requires a long period of time for completion of road project. Generally, resource for the development of road is mobilized through two sources, viz, external source and internal source. The external source includes the World Bank, the International Monetary Fund, Asian Development Bank etc. The internal source of resources are generated through taxation, profit from public transport system, vehicular taxes, governments revenues etc.

4.2 Funds for Rural Road Development:

The fund for rural road development in Assam mainly comes through schemes like PMGSY (Pradhan Mantri Gram Sadak Yojana), Non-Lapsable Central Pool of Resources (NLCPR), Rural Infrastructure Development Fund (RIDF), Mukhyamantri Pakipath Nirman Achari (MPNA), Mukhya Mantri Paki Dalong Nirman Achari (MPDNA) under State and Central Budget allocation. Rural road development funds are also received from the World Bank and Asian Development Bank. Now-a-days, road development is undertaken by Central Government, State Government, Co-operative Agencies, Public-private partnership etc.

4.3 Inter Governmental fund transfer:

Inter governmental transfers of funds from the Centre to the States takes place through three channels viz Statutory and other transfers mandated by the Finance commission, formula-based transfers for state plan schemes through the planning commission, and other discretionary transfers by the planning commission/ various Central Ministers (Gupta, et al. 2011). The rest of the transfers are generally not formula determined and for the bulk of the amount, are often conditional upon various actions at the state level including putting up the matching amounts. Thus, while the block grants (for state plan and other block grants) by definition are unconditional transfer and therefore the issue of their utilization is not a major concern, for the other grants the actual utilization can be different from the allocation made; if the gap is large, then it can be a cause for concern (Gupta, et al. 2011).

4.4 The Central government Schemes for Road Construction:

4.4.1. Pradhan Mantri Gram Sadak Yojana (PMGSY):

The Government of India launched the PMGSY on 25th December, 2000 with an objective to provide connectivity to rural habitations through construction of / up gradation to all weather roads, provide all weather connectivity to all habitations having population of 500 or more in plain areas and all habitations having population of 250 or more in Hill areas, Tribal areas and Desert areas. The programme has been implemented by the Ministry of Rural Development (MORD), Government of India. The District Rural Road Plan (DRRPs) have been formulated

for all the districts of the country and Core Network has been drawn out of the District Rural Road Plan to provide at least a single connectivity to every target village. For prioritization of the yearly project proposals, the Comprehensive New Priority List (CNCPL) and Comprehensive Up gradation priority list (CUPL) are used. The CNPL and CUPL have been developed from the Core Network data. This exercise has been carried out with the involvement of the Panchayati Raj Institutions. As an important step towards quality output, every road under the scheme should have proper survey and adequate investigations. Detailed project report is pre-requisite for the clearance of the project. The time frame for the completion of the scheme was perceived to be 2007, but, because of some constraints in the capacity of implementation in States and availability of funds, the targets of the scheme have not been achieved so far.

MoRD is the nodal Ministry for implementation of the programme at the Central level. PMGSY is funded mainly from the accruals of diesel cess in the Central Road Fund. Recipient States have to identify an autonomous agency with a distinct legal status under the control of Ministry of Rural Development that would be selected by the State Rural Roads Development Agency. The State Rural Roads Development Agency (SRRDA) is the authentic recipient of the funds which is transferred by the central government. The SRRDA is the executing agency at the state level. The state government has the full responsibility of providing funds for the proper functioning of the SRRDA. Funds are made available to SRRDA in two installment. However, the entire annual assistance may be provided to some specified districts like Leh and Kargil in a single installment. Apart from meeting the general conditions of the scheme, the release of the first installment does not have any other precondition. However, for the second installment many conditions regarding utilization of available funds, physical progress, utilization certificates, and audited statement of accounts for the previous year and certificate of the Bank Manager etc. have to be met. The second installment is usually equal to balance due on the approved cost of awarded works. Works which are cleared but not awarded at the time of release of the second installment are considered as lapsed.

The following chart depicts the exact flow of funds from centre to state.

Chart 4.1 Funding Process

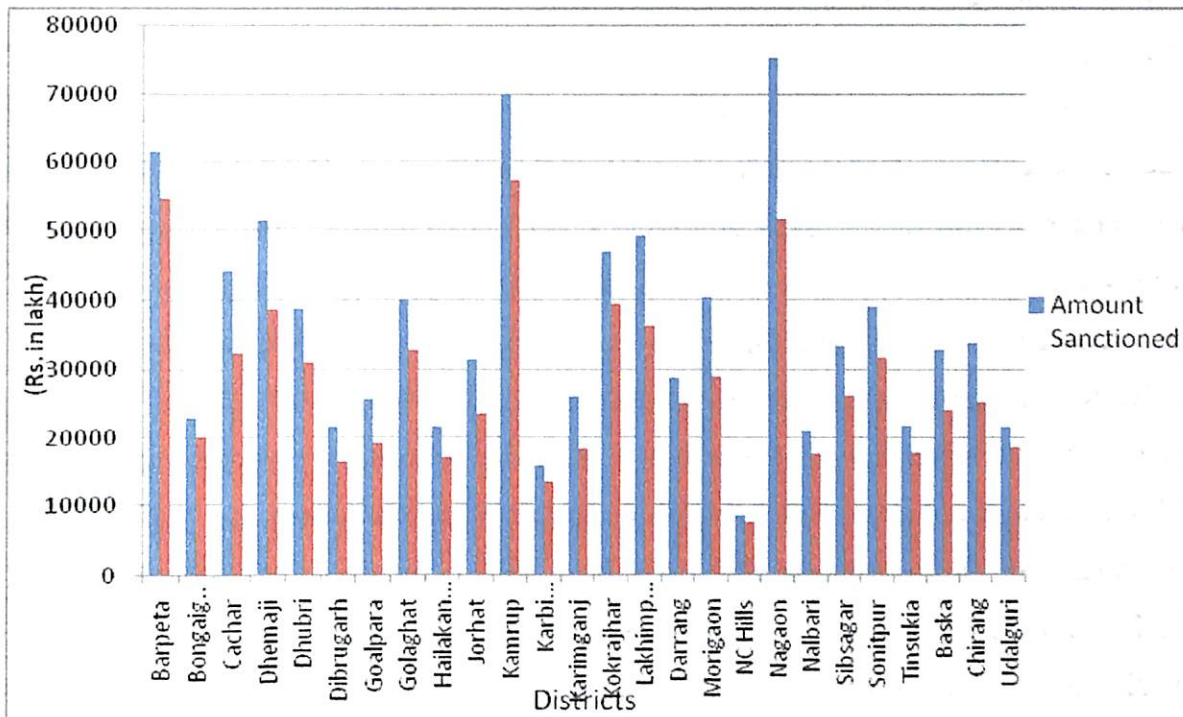
Opening the PMGSY account	MORD/NRRDA's Role	Fund flow from state Government.
<p>1. SRRDA selects a bank branch with internet connectivity at state HQ of and public sector Bank of Account and maintenance Account.</p> <p>2. SRRDA communicates to NRRDA and Ministry the Accounts details.</p> <p>3. MORD releases the programme funds, administrative and travel expences and quality control funds respectively into the programme and administrative account.</p>	<p>1. The Bank, SRRDA and NRRDA enter into tripartite MOU.</p> <p>2. PMGSY adopts a project approach where road works have to be completed within a specific time.</p> <p>3. Funds for the cleared projects will be made available to SRRDA in two installments.</p> <p>4. The first installment (50% of the cleared valued of projects) of annual allocation to be released on fulfillment of condition, if any earlier.</p>	<p>1. State government credits the administrative accounts with funds for the proper functioning of SRRDA. Funds for administration of maintenance contracts of PMGSY roads are credited to the maintenance account of SRRDA.</p> <p>2. The state government credits the programme account with funds in order to meet works related expenses not funded under PMGSY, and to meet cost escalation, tender premium and other programme expenses which are the responsibility of the state government.</p>

Source: www.swaniti.in

4.4.1. A. Utilization of Funds under PMGSY in Assam

The information on utilization of fund reveals that 70 to 80 percent of the funds are utilized for road development in Assam (Annexure: 4A). The extent of utilization of available fund in the districts doesn't reveal any major cause for worry.

Fig. 4.1: District wise Utilization of fund under PMGSY (as on 31st March, 2013)



Source: Annexure 4A

But in Nagaon district, which occupies 1st position in terms of the length of road under PMGSY scheme, shows only 68.42% utilization of fund. The reason behind it is that some contractors didn't submit their bill till March, 2013. Under BMS (Basic Minimum Service) only gravel roads are constructed on the basis of demand. But now the scheme has been discontinued. Percentage of utilization under the BMS was 100%. Data presented in annexre 4A reveals that the overall utilization in the state was 78.59% which is not very satisfactory. The slow progress of PMGSY in Assam indicates that there are several problems that arise in the construction of roads such as land acquisition, forest clearances, seasonal stoppages and labour related problems among them.

4.4.1. B. Utilization of Funds under PMGSY in other States of India:

Data available on State share, release and expenditure of funds under the PMGSY scheme by the other states in the country (**Annexure: 4B**) shows that utilization is measured against release of funds rather than state share. State shares being usually much smaller than the releases, utilization should be measured with respect to available funds that are release, funds carried over from previous year and whatever state shares are made available. However, since carry-over of balances and the state share are small, utilization of funds can be examined against releases in absence of information on available funds.

Utilization of funds released under the scheme in most other states in the country up to March 2013 has been quite high except in the state Goa and Puducherry, where the percentage of utilization of released funds were only 52.41 and 29.37. On an average and in case of most of the states like Arunachal Pradesh, Bihar, Chattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Odisha, Punjab, Rajasthan, Uttarakhand, Uttar Pradesh and West Bengal expenditure was more than 100 percent of the releases. Thus, it seems to be little problem in respect of releases and utilization of funds under this programme. Based on the CAG's performance Audit Report No. 13 on the scheme, actually the biggest issue was that the objective of the scheme of providing connectivity to all unconnected habitations with population of 1000 and above by 2003 was largely defeated, because only 11,509 habitations against the initial target of 50,782 could be connected. The total number of habitations connected till March 2005 was only 33,875 against the target of 1,41,085 (Gupta, et al. 2011). However, it has now been extended, but the percentage of implementation has not achieved as much as was hoped for.

The same performance audit note indicates that in 14 states, 143 works were remained incomplete after spending Rs.43.85 crore and 149 works costing Rs. 54.71 crore were not taken up in 12 states because of non-availability of land, roads were already constructed by other agencies, want of forest clearance etc.

There is, of course difference among states and the utilization amount is considerably depressed because of the relatively low utilization in the states Goa, Puducherry and Assam. However, the problem appears to be state specific problem and not generic, since there are also other states with much higher utilization.

Therefore, when we compare our state Assam with the other states of the country, we found that our state is lagging behind in case of length of PMGSY road, though the release of funds are more than some of the other state.

4.4.2. Non Lapsable Central Pool of Resources (NLCPR):

The Non Lapsable Central Pool of Resources (NLCPR) was created in 1998 for accrual of the unspent balances out of the 10% earmarked for North-Eastern Region in the budget of various Ministries/Departments. Ministry of Development of North-Eastern Region (DoNER) is provided budgetary allocation for the NLCPR scheme for sanction of infrastructure development projects to the North-Eastern States out of the NLCPR. NLCPR is meant to supplement state funds for infrastructure development, but not normal plan programmes. The broad objective of the NLCPR scheme is to ensure speedy development of infrastructure in the North-Eastern Region by increasing the flow of budgetary financing for new infrastructure projects/schemes. Both economic and social infrastructure sectors such as power, roads & bridges, education, health, water supply and sports etc are considered for providing support under the central pool. This scheme is project-based, with the system requiring each state to submit a list of proposals for consideration by November 30, to be taken up next year. These projects should not be funded from any other external source, and should preferably be part of a long-term strategy for identified priority sectors. The proposed project should also benefit a large number of people and not for individual beneficiaries. The cost for each project should be at least Rs. 3 crore and at least 25 percent of the project costs should be for those in backward areas/Sixth Schedule Areas/ Autonomous District Councils.

Funding under Non Lapsable Central Pool of Resources is on 90:10 basis. 90 percent of the project cost is granted by central government and the remaining 10 percent to be provided by the state. The first installment of 40% released after project approval. Remaining support is released in two further installments of 40 and 20 percent of the total grant. The second installment is released after completion of at least 40 percent of the project and submission of utilization certificate of at least 80 percent of funds released in first installment. The last installment is similarly contingent upon at least 80 percent utilization of the last release and full utilization of previous installment(s) along with commensurate physical progress. After the first

installment, subsequent installment is also conditional upon requisite documentation like utilization certificates, quarterly progress reports, photographs and inspection reports. All central pool releases are to be utilized within 12 months and the state government must release funds received to the implementing agency within 15 days of receipt.

For identification of projects under the scheme, States are required to submit projects before the beginning of the financial year. The priority accorded by the state to the projects in the 'priority list' is only a suggestive and the committee scrutinizes the projects in the lists in order to identify and finally retain the suitable projects for detailed examination. In examining the priority, the committee is, inter-alia, guided by the following considerations:

- Project of economic infrastructure is given priority,
- In the social sector, priority is given to drinking water supply and other health and sanitation projects,
- Projects in autonomous district council gets priority,
- Past performance of a state in implementing projects in the particular sectors to which the projects belong is also considered,
- The overall utilization and absorption of funds by a particular state in the past years also guide the overall quantum of projects to be undertaken for that state in a year.

Detailed project Report(s) for such retained projects are then prepared by the state concerned. These project proposals are there-after examined in consultation with the concerned central Ministry/Department. The recommendations/views, thus received are place before the committee to administer the Non-Lapsable Central Pool, which considers the proposal and accords approval.

Projects sanctioned under this programme are implemented by the state governments. The timely completion of projects along with good quality of works is necessary for desired benefits to percolate to the intended beneficiaries. Therefore, emphasis has been laid on 'Effective Monitoring' which is the key to the successful utilization of resources. Ministry of DoNER has been focusing on close monitoring and evaluation of projects being implemented in the NE Region under the NLCPR

scheme. In order to ensure this, the Ministry has evolved a comprehensive system of Monitoring and Evaluation of the implementation of NLCPR projects.

All projects are continuously monitored through periodical progress reports received from the state governments, depicting both the financial and physical progress of the projects and also through review meetings with State Government Officers and inspections by officers of the Ministry. The procedure adopted for release of funds to the states for implementation of various projects under the scheme stipulates conditions which ensure that the state government furnish utilization certificates and other documents to the effect that the funds have been utilized for the purpose for which they were sanctioned.

The Planning and Development department of each state, which is the nodal department for NLCPR projects, has been entrusted with field inspection of the projects through senior officers of the state and submission of inspection notes. For each new project, the state/implementing agency is to identify a Nodal officer, who is responsible for timely implementation of that project submission of progress reports. Besides, the State Chief Secretary has been entrusted with the responsibility of holding quarterly meetings for review of each of the projects and sending the proceedings to the Ministry.

The visits of senior officers of the Ministry of DoNER is an effective tool for monitoring as well as identifying problem areas and verifying physical as well as financial progress of the projects for prompt implementation of the projects.

4.4.2. A. Utilization of funds under NLCPR only for road construction in Assam

The information on utilization of available funds provided in table: 4.1 Shows that utilization was indeed low in 2010 at only 76.60%. In other years, such utilization remained between 99 and 90 percent. In the year 2011 and 2012, no releases were made from the government because of less utilization of fund of the previous year. In the periods, expenditure was made from funds carried over from the previous year. However, since there is an in-built check on carryover of balances, utilization of the funds can be measured against releases of previous year in the absence of information on available funds.

Table: 4.1**Utilization of funds under NLCPR in Assam till 31st, 2013**

(Rs. in lakh)

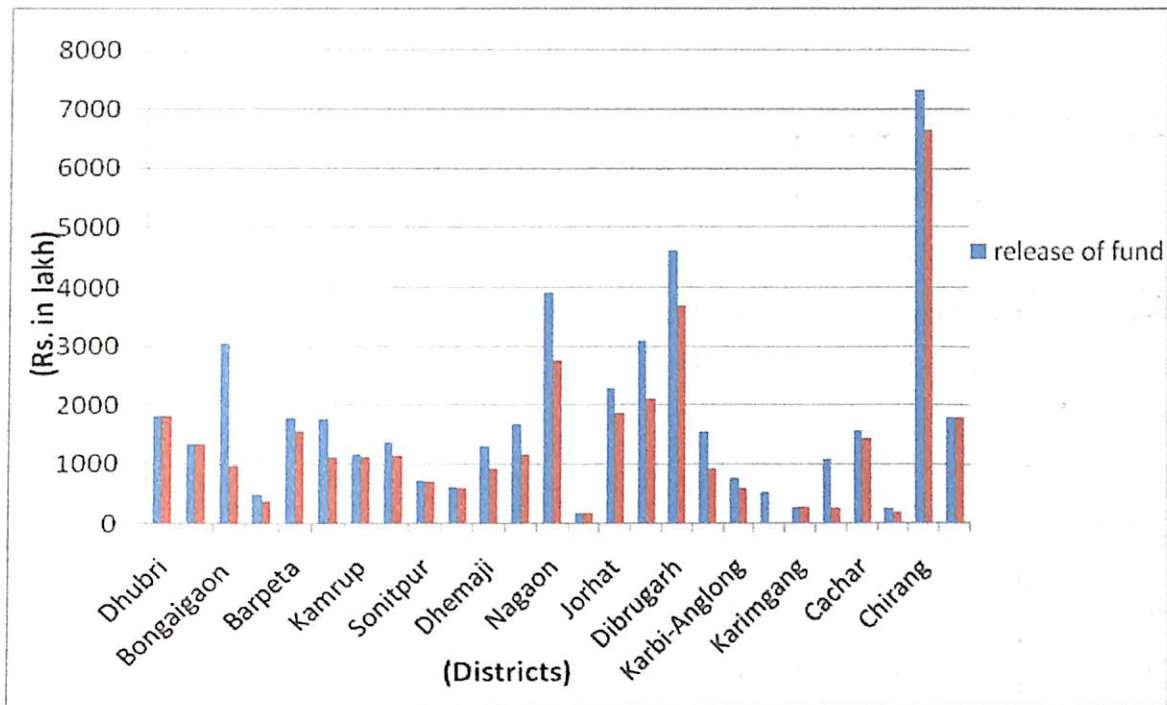
Year	Total release from GOI & State Share	Total fund Utilized/Expenditure incurred	Percentage of Utilization	Road length completed in k.m
2003	1206	1205.43	99.95	8.15
2004	5558.902	5346.12	96.17	17.59
2005	7471.42	7108.44	95.14	3.51
2006	4512.5	4196.48	92.99	21
2007	7780.4	7499.59	96.39	82.55
2008	3079.85	2617.84	84.99	10.03
2009	5723.282	3818.04	66.71	44.06
2010	12082.81	9256.18	76.60	35.41
2011	0	328.54	-	0
2012	0	666.48	-	0
1013	1722.4	0	0	0

Source: Office of the Chief Engineer, PWD (Roads)

4.4.2. B. District wise utilization of funds under NLCPR (road sector) in Assam:

The district wise data on actual utilization of available funds under NLCPR since 2003 presented in Annexure 4C clearly indicates a high level of utilization in the districts Dhubri, Kokrajhar, Sonitpur, Golaghat, Udalguri, Chirang, Cachar, Karimganj, Lakhimpur, Kamrup at 100%, 99.16%, 99.57%, 99.99%, 99.71%, 90.82%, 91.27%, 99.85%, 94.20% and 96.89% respectively. The utilization was indeed low in the district Halaikandi (23.29%) and Bongaigaon (31.93%).

Fig. 4.2: District wise utilization of fund under NLCPR in Assam (As on 31st March, 2013)



Source: Annexure 4C

As against the sanctioned amount Rs. 81477.8 lakhs till March 2013, only Rs. 46312.5 lakhs have been released from the fund. Clearly, there must be some problems with implementation of the approved projects, which holds up releases after the first installment.

4.4.2. C. Utilization of Funds under NLCPR in other states of North-East:

The utilization of funds in the other states of North-East presented in table 4.2 depicts that utilization was low till 2009-10 in all the states. As the scheme is project-based, there is time limit that the system is hoped to adhere to. The list of the proposed projects has to be submitted by Nov. 30, so that the Ministry can complete the assessment by the end of the financial year and can release first installment at the beginning of the next financial year.

Table: 4.2**Utilization of Funds under NLCPR in other states of North-East till 2009-10**

(In Rs. crore)

State	Released	Expenditure	Utilization
Arunachal Pradesh	1144.03	745.10	65.12%
Assam	2109.04	1533.98	72.73
Manipur	981.67	655.37	66.76%
Meghalaya	601.66	420.63	69.91%
Mizoram	667.80	540.29	80.90%
Nagaland	1023.17	751.27	73.42%
Sikkim	664.85	511.57	76.94%
Tripura	1069.09	853.45	79.82%

Source: GOI, Ministry of DONER, Annual Report 2009-10

But in practice, this does not happen, going by the data on release. Much of releases take place in the second half of the financial year, which could be contributing to implementation delays after approved.

CAG report (2010-11), has pointed out the problems that plague its implementation. There is problem in physical implementation of the projects because of many reasons like non-release of funds by states for a long time and non-release of state share of funding. The report suggests a serious reassessment of the continuation of the scheme particularly in view of its marginal impact and failure to meet its objectives.

4.4.3. Rural Infrastructure Development Fund (RIDF):

Developing countries are pre-dominantly rural in nature and with globalization; the rural-urban gap is increasing in a number of countries. In India, while the importance of rural has been well recognized, adequate measures to improve the same are not forthcoming. Amongst many other constraints, the poor financial health of the states is the major cause for the state of affairs we observe today. Not only rural infrastructure development projects are inadequate in number, many projects sanctioned and many that were even started remain incomplete due to various

reasons. Noting these problems, in the Union Budget Speech of 1995-96, the Union Finance Minister announced that, 'Inadequacy of public investment in agriculture is today a matter of general concern. This is an area, which is the responsibility of states. But many states have neglected investment in infrastructure for agriculture. There are many rural infrastructure projects that have been started but are lying incomplete for want of resources. They represent a major loss of potential income and employment to rural population'.

In an attempt to provide required resources for rural development, the possibility of creating a fund for rural infrastructure development was conceived at that time. Therefore, during the period 1995-96, a corpus was created by the Reserve Bank of India in NABARD with contributions from commercial banks. This fund is known as the Rural Infrastructure Development Fund (RIDF), which was developed to provide fund for the projects that are remained unfinished. Later the fund extended to new projects as well. RIDF-I was launched in 1995-96 with Rs.2, 000 crores through contributions from both public sector and private sector banks. Except for a period of break, the funding provision has been continuing till today. After more than 15 years of its inauguration, it is useful to scrutinize the status of the RIDF, its coverage and the extent to which it has helped the states in rural infrastructure development.

RIDF-I was introduced in 1995-96 with an initial amount of Rs. 2000 crores through contributions from public and private sector banks. It is important to notice that previously both public sector and private sector banks are often failed to meet priority sector norms for lending (RBI reports). Even after the enlargement of the scope of priority sector, though banks are currently meeting the overall norms of priority sector lending, they still fail to meet the target for agricultural lending. Later, from 1996-97 i.e., start from RIDF-II, deposits from commercial banks in RIDF have been made broad-based by including shortfalls either in direct finance to agriculture and/or shortfalls in priority sector lending (Rajeev Meenakshi, 2008).

Once the total of RIDF fund for a year is decided by the Central Government, states are asked to submit project proposals. State government then request to the relevant departments to turn up with the proposals. After that the cabinet sub-committees of the particular states scrutinise the proposals, considering among other things the

financial strength of the government, fix project limits for each department. The departments again revise their proposals, which are then sent to the regional offices of NABARD (NABARD Annual Report, 2000). At the beginning only state governments could borrow under this fund, though now, it has been decided to extend loans to Panchayat Raj Institutions, Non-Governmental Organization and Self-Help Groups etc. from 1st April, 1999. This is done under the assumption that only local government would know the local needs better and would implement projects more efficiently. The state governments are the guarantors of such loans. The repayment period of the loans was five years that include two-year grace period and this was provided under RIDF-I to RIDF-V. The repayment period has been extended to seven years later on including a grace period of two years from RIDF-VI onwards. Once the project is cleared, loans are released on installments, on a reimbursement basis by the Regional Offices of NABARD. The finance department of the state is nominated as the nodal department to operationalise the RIDF. All projects are therefore routed through the finance department.

4.4.3. A. Funding for rural roads:

Creation of irrigation facilities and construction of rural roads for better connectivity are two major activities which are taken up through the RIDF. In the beginning, the RIDF concentrated only on providing minor irrigation facilities. Financing of rural road and bridge projects was started during RIDF-II. Subsequently coverage of RIDF was enhanced in each tranche (A terminology used by NABARD. Here it means year-wise) and at present, activities such as Primary Schools, Primary Health Centers, Village Hats, Joint Forest Management, Rural Markets, Rain Water Harvesting, Fish Jetties, Mini Hydel and System Improvement Projects in the Power Sector, Rural Drinking Water Supply Schemes, Citizen Information Centers, Anganwadi Centres and Shishu Shiksha Kendras are also being brought under the RIDF. Though over time a large number of areas have been incorporated under RIDF, roads and bridges remained the major infrastructures funded under the RIDF, which now constitutes the highest share in flow of funds across sectors. However, creation of road potential through the RIDF scheme is not uniform across region.

The data presented in Annexure: 4D clearly shows that as on March 31, 2013, the actual disbursement figure against the sanctioned amount is 73.11 percentages for

the states in the North Eastern Region but the average for the other state is near about 84 percentage. This figure goes up to a maximum of 106 percentages for Uttarakhand and the minimum figure is 49 percentages with Puducherry. It is cleared from the table that the disbursement pattern of RIDF tranches in terms of share percentage of different states revealed that the share of the states in the north eastern region received very less amount than the other states. This implies that the level of regional convergence of RIDF in different tranches almost not realized the objective of balanced regional disbursement of such fund, at least at state level.

Figure: 4.3 Sanction and disbursement of fund in different States

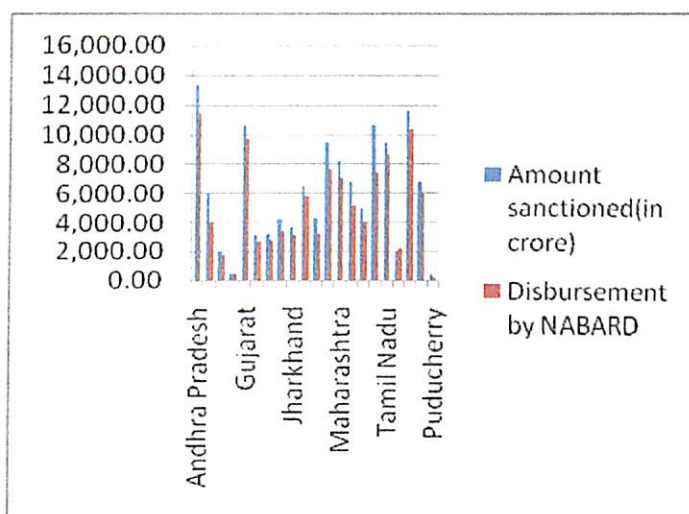
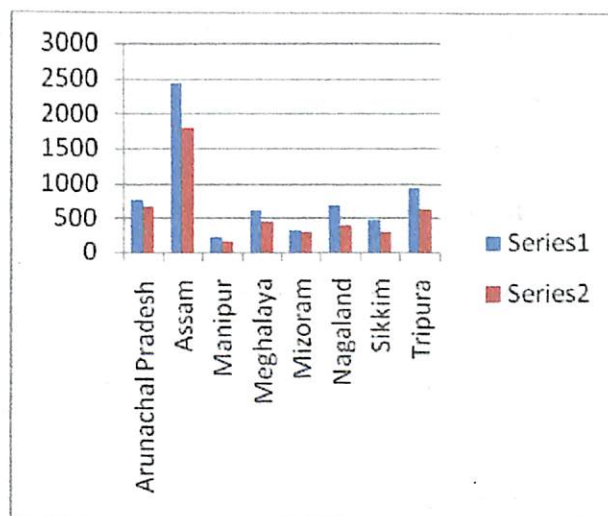


Figure: 4.4 Sanction and disbursement of fund in North-Eastern states



Source: ANNEXURE: 4D

Note: vertical axis amount sanctioned & disbursements (in Rs.crore); Horizontal axis States

The pattern of disbursement of such fund also revealed that among the states, Puducherry is lagging behind with a significantly low percentage of disbursement of RIDF. Ultimately, it creates the gap between the relatively rich states with the states which are suffering from infrastructural backlog, particularly in their rural sector, which is clearly visible in the figure: 4.3 and figure: 4.4.

4.4.3. B. District wise RIDF loan and released of fund by NABARD from 2003 to 2013.

The data presented in **Annexure: 4E** reveals that the district wise RIDF loan and released of fund by NABARD from 1995-96. The table indicates that among the different districts disbursement of fund in Kamrup district is highest at 95.95% followed by Morigaon, Jorhat, Udalguri, and Sonitpur district at 94.72%, 92.35%, 92.18% and 89.99 respectively. The table also reveals that the district Dhemaji, Golaghat, Karbi-anglong, Dibrugarh, and Tinsukia are lagging from the other districts with a significantly low of disbursement of RIDF at 16.99%, 22.78%, 30.45%, 32.71% and 41.68% respectively.

4.5. The state government schemes for rural road construction:-

Rural roads in Assam are also constructed under different state government scheme. The important among the scheme are Mukhyamantri Pakipath Nirman Achani, Mukhyamantrir Paki Dalang Nirman Achoni and Assam Agricultural Competitive Project (AACP). Mukhyamantrir Paki Path Nirman Achani was launched by the Assam government with the objective of providing connectivity to unconnected villages with all weather roads as in PMGSY. Under this scheme, 1039 kilometer of road has been sanctioned. Out of which 1006 km road has been completed till March, 2013 (Economic survy, 2012-13). Mukhyamantrir paki dalng nirman achoni has been introduced by the Govt. of Assam in the year 2006-2007. The main objective of this scheme was to replace existing wooden bridges in remote areas by constructing RCC bridges for improvement of connectivity. Under this scheme, 199 RCC bridges have been sanctioned out of which only 85 nos. of bridges have been completed (Economic survey, Assam, 2011-12). The Assam Agricultural Competitive Project is a World Bank funded project. The GOI has received a credit from IDA on behalf of the state Assam for AACP. This project includes rural road component along with agricultural and its allied farm sector. The rural road has to be constructed only in nine districts of Assam viz., Jorhat, Sonitpur, Nalbari, Dhubri, Hailakandi, Barpeta, Goalpara, Morigaon and Karimgang. Under the scheme 676 km. of road length and 173 no. of bridges have been sanctioned and the entire sanctioned road has been completed. Out of 173 no. of bridges 172 no. of bridges

has been completed. The total fund sanctioned and amount released under these three schemes has been shown in the Table 4.3

Table: 4.3 Utilization of fund under MPNA, MPDNA, AACP till 31st March 2013

(Rs. in crore)

Scheme	Amount sanctioned	Amount released	Utilization (%)
MPNA	320.64	310.00	96.68
MPDNA	119.93	79.67	66.43
AACP	502.45	455.00	90.55

Source: Economic survey, Assam, 2012-13

The extent of utilization of funds in these schemes does not reveal any major worry except in the MPDNA scheme which is only 66.43%. The reason behind this is that more than 10 nos. of bridges remained incomplete due to delay in fund release, extremists problem etc. Out of 119 sanctioned bridges only has been completed.

4.6 Utilization of fund under all schemes in Assam since its implementation

It is evident from the data presented in table: 4.3 that PMGSY clearly plays a specific role in the construction of rural road. PMGSY is occupying the 1st position with 78.25% of share, RIDF (8.78%), AACP (4.90%) NLCPR (3.83), MPNA (3.34%) and MPDNA (0.86%) respectively. In respect of the length of road constructed under all the schemes 84.86 % road is constructed under PMGSY scheme, 1.30% under NLCPR, 3.19% under RIDF, 6.36% under MPNA and 4.27% under AACP respectively.

Table 4.4 Fund Utilized under all schemes in Assam since its implementation

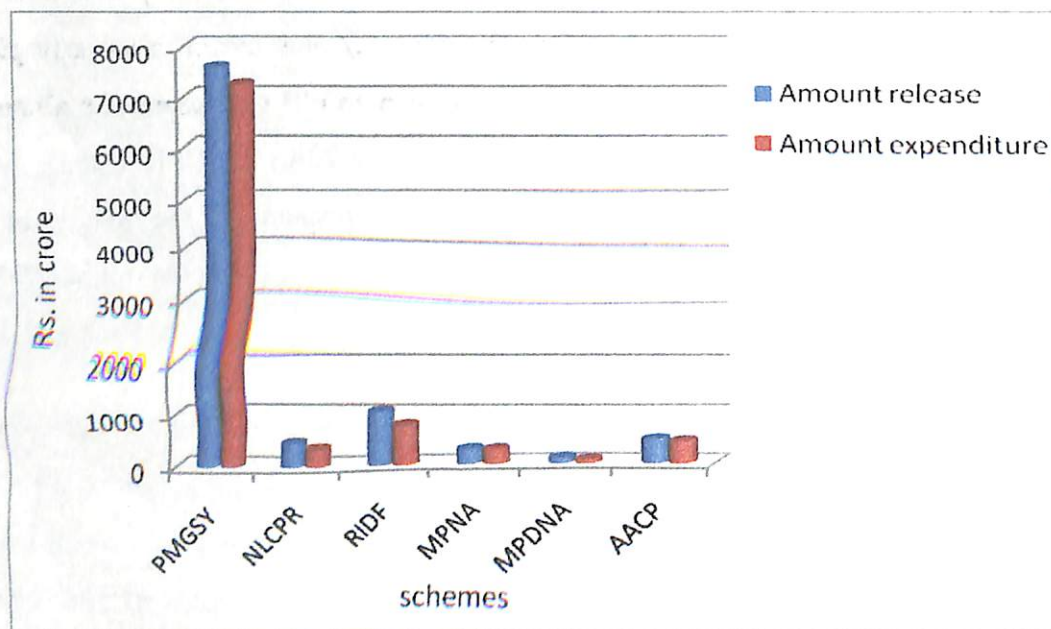
(Rs. in Crore)

Name of the scheme	Amount release	Amount expenditure	Length (in KM)	% of Share (from the total amount of expenditure)
PMGSY	7605.42	7248.9	13,415.76	78.25
NLCPR	463.12	355.36	207	3.83
RIDF	1077.95	813.88	507	8.78
MPNA	320.64	310.00	1006	3.34
MPDNA	119.93	79.67	-	0.86
AACP	502.45	455.00	676	4.90
TOTAL	10089.5	9262.81	15,811.76	100

Source: compiled by the author

The contribution of the different scheme will be clearer from the figure 4.5

Figure: 4.5 Fund Utilized under all schemes in Assam since its implementation



4.7 Sum up

Most of the rural roads in Assam are constructed under PMGSY scheme. Of the 6 schemes studied, utilization has been a real concern only in case of NLCPR. There are isolated cases of poor utilization in some districts due perhaps to district specific factors. Bu there is still scope for improvement. The problems can be solved by the district authority. All the projects under NLCPR were taken up without adequate planning and prioritization. Therefore, adequate planning should be there and project should be sanctioned according to priority. Regarding the RIDF scheme percentage of fund sanctioned in the north-eastern states are very low as compared to that of the rich states. As the RIDF is a demand driven funding facility, some states with poor infrastructure may not come forward to take loans. In such cases, it is necessary for central government, to persuade such states to use the funding facilities for the improvement of the condition of the rural people.

One of the most crucial problems in all the states in India are that maintenance rural road is not given adequate importance. Ultimately, the roads constructed under different schemes become vulnerable within a few years. To avoid this problem of negligence in maintenance to some extent, an agreement is generally made in PMGSY with the contractors that they would take the responsibility of maintenance of the roads constructed under the scheme for five years after completion. Involvement of panchyati raj institution may be helpful in subsequent maintenance of such roads.

Annexure: 4A

District wise Utilizations of fund under PMGSY in Assam (As on March 13)

(Rs. in Lakh)

District	Amount Sanctioned	Amount Expenditure	% of Utilization	Length (in KM)
Barpeta	61539.739	54573.295	88.84	799.308
Bongaigaon	22836.2686	20134.9075	88.17	407.491
Cachar	44187.293	32235.6744	72.95	567.382
Dhemaji	51415.0446	38633.7434	75.14	522.227
Dhubri	38761.9998	30973.1674	79.90	556.118
Dibrugarh	21332.196	16433.4575	77.03	461.969
Goalpara	25445.9117	19104.6615	75.07	389.639
Golaghat	39961.7328	32709.9984	81.85	751.168
Hailakandi	21336.484	17006.7904	79.70	194.933
Jorhat	31371.6774	23260.79	74.14	464.052
Kamrup	69850.8609	57260.8884	81.97	1161.487
Karbi Anglong	15674.254	13432.642	85.69	285.031
Karimganj	25876.2218	18293.1879	70.69	273.063
Kokrajhar	46993.3408	39335.5669	83.70	577.31
Lakhimpur	49161.0108	36245.615	73.73	513.401
Darrang	28518.1946	24986.511	87.62	500.905
Morigaon	40247.0691	28861.7749	71.72	458.56
NC Hills	8299.912	7446.371	89.72	201.373
Nagaon	75388.32	51577.99	68.42	1287.29
Nalbari	20920.231	17533.809	83.81	406.10
Sibsagar	33259.5323	25989.3	78.14	529.379
Sonitpur	38911.8829	31607.315	81.22	728.616
Tinsukia	21534.6231	17795.519	82.63	396.562
Baska	32645.3846	24038.707	73.63	445.27
Chirang	33602.422	25199.383	74.99	308.62
Udalguri	21459.1172	18496.921	86.19	228.51
BMS(Basic minimum service)	1722	1722	100	
Total	922252.72	724890.00	78.59	13415.76

Source: Chief Engineer, PWD(Roads), Assam, Chandmari, Guwahati-3

ANNEXURE: 4B

State wise utilization of funds under PMGSY in India

(As on March 2013)

(Rs. in crore)

States	State share	Fund release	Expenditure	% of Utilisation	Excess expenditure by states	Length completed
Andhra Pradesh	423.45	4,121.13	4,014.20	97.4	80.91	20,699.64
Arunachal Pradesh	1.78	1,777.52	1,804.84	101.53	0	4,227.86
Assam	305.90	9,222.52	7,248.90	78.59	202.69	13,415.76
Bihar	276.30	13,711.87	13,822.13	100.80	6.96	29,281.67
Chhattisgarh	58.09	5,743.63	5,826.55	101.44	3.66	21,778.34
Goa	0	10.15	5.32	52.41	0	158.70
Gujarat	166.53	2,007.35	1,953.95	97.33	100.72	8,664.60
Haryana	290.75	1,320.28	1,319.82	99.96	54.53	4,556.92
Himachal Pradesh	0.15	1,852.99	1,848.16	99.73	14.50	10,159.96
Jammu & Kashmir	3.17	2,701.14	2,549.70	94.39	4.75	5,186.66
Jharkhand	236.47	3,025.74	2,921.97	96.57	13.81	9,552.74
Karnataka	254.41	3,190.37	3,231.54	101.29	426.23	16,138.24
Kerala	3.71	696.01	742.68	106.70	3.50	1,789.11
Madhya Pradesh	360.43	12,620.96	13,149.30	104.18	0	55,205.31
Maharashtra	321.02	5,289.01	5,362.03	101.38	0	22,446.31
Manipur	0	865.30	876.20	101.25	4.87	3,921.15
Meghalaya	4.35	312.16	292.99	93.85	0	1,055.88
Mizoram	0	647.10	616.67	95.29	1.59	2,273.56
Nagaland	0	557.78	542.55	97.26	1.28	3,051.57
Odisha	415	10,512.84	11,325.65	107.73	24.74	28,545.14
Punjab	52.13	1,858.52	1,944.36	104.61	0.08	5,490.28
Rajasthan	0	9,120.86	9,195.17	100.81	0	53,047.67
Sikkim	0	805.59	675.87	83.89	0	2,549.26
Tamil Nadu	108.95	2,249.29	2,149.07	95.54	0	10,700.10
Tripura	15.17	1,817.60	1,721.82	94.73	12.54	2,871.05
Uttarakhand	5.17	10,341.63	10,354.36	100.12	74.24	41,216.36
Uttar Pradesh	283	1,282.18	1,378.27	107.49	0	4,913.18
West Bengal	0	4,853.64	5,431.12	111.89	0	15,758.59
Puducherry	0	49.32	14.50	29.37	0	68.53
Total		111704.51	112320.69	100.55		398,724.14

Source: NRRDA, Ministry of Rural Development, Government of India, New Delhi

ANNEXURE: 4C

District wise utilization of funds under NLCPR in Assam

(Rs. in Lakh)

District	Amount sanction by DONER Rs. in lakh	Total release from GOI& State share	Fund Utilized	% of Utilisation
Dhubri	2954.94	1823.66	1823.66	100
Kokrajhar	1507.03	1349.15	1337.95	99.16
Bongaigaon	6842.67	3049.48	973.72	31.93
Goalpara	1094	483.28	370.78	76.72
Barpeta	2407.65	1786.56	1574.74	88.14
Nalbari	3687.86	1774.85	1110.01	62.54
Kamrup	6921.6	1160	1123.95	96.89
Darrang	2515.65	1371.45	1144.48	83.45
Sonitpur	1681.7	708.47	705.47	99.57
Lakhimpur	664.27	608.69	573.4	94.20
Dhemaji	2256.9	1301.7	928.66	71.34
Morigaon	3415.96	1681.69	1169.03	69.51
Nagaon	6425.68	3920.85	2752.47	70.20
Golaghat	185.67	179.34	179.33	99.99
Jorhat	3634.26	2292.06	1864.64	81.35
Sibsagar	7425.13	3085.25	2098.94	68.03
Dibrugarh	6144.62	4616.75	3708.2	80.32
Tinsukia	3127.96	1543.85	909.34	59
Karbi-Anglong	848.66	769.85	584.21	75.88
N.C.Hills	1432.23	515	N.A.	-
Karimgang	354.26	278.3	277.91	99.85
Hailakandi	3044.93	1076.57	250.77	23.29
Cachar	2573.9	1561.61	1425.33	91.27
Baksa	264.01	236.26	190.08	80.45
Chirang	7883.68	7337.04	6664.17	90.82
Udalguri	2182.59	1800.77	1795.55	99.71
Assam	81477.8	46312.5	35536.8	76.73

Source: Office of the Chief Engineer, PWD (Roads)

ANNEXURE: 4D

State wise utilization percentage of RIDF (I TO XVIII)

(As on 31 March 2013)

	States	Amount sanctioned(in crore)	Disbursement by NABARD	Utilization (%)
1	Andhra Pradesh	13,386.39	11,435.13	85
2	Bihar	5,965.62	3,965.22	66
3	Chhattisgarh	1,950.60	1,705.41	87
4	Goa	470.45	485.01	103
5	Gujarat	10,564.86	9,646.97	91
6	Haryana	3,078.17	2,607.70	85
7	Himachal Pradesh	3,200.60	2,711.72	85
8	Jammu & Kashmir	4,202.28	3,401.26	81
9	Jharkhand	3,658.69	3,124.15	85
10	Karnataka	6,457.73	5,729.21	89
11	Kerala	4,309.02	3,160.97	73
12	Madhya Pradesh	9,422.60	7,603.73	81
13	Maharashtra	8,214.87	7,021.50	85
14	Odisha	6,802.14	5,088.48	75
15	Punjab	4,941.01	4,000.37	81
16	Rajasthan	10,633.42	7,377.61	69
17	Tamil Nadu	9,406.65	8,569.63	91
18	Uttarakhand	2,053.54	2,179.58	106
19	Uttar Pradesh	11,614.02	10,343.07	89
20	West Bengal	6,757.30	6,046.99	89
21	Puducherry	325.99	158.67	49
	Total	127,414.95	106,362.38	83.47
	North-Eastern states			
22	Arunachal Pradesh	759.93	670.94	88
23	Assam	2,428.05	1,787.96	71
24	Manipur	205.34	148.60	72
25	Meghalaya	596.73	450.87	76
26	Mizoram	309.67	300.55	97
27	Nagaland	680.46	386.56	57
28	Sikkim	462.21	299.17	65
29	Tripura	931.93	615.70	66
	Total	6374.35	4660.35	73.11

Source : Annual Report 2012-13, NABARD

ANNEXURE: 4E

District wise RIDF loan and released of fund by NABARD as on 31st March 2013

(in Lakh)

District	RIDF loan	Disbursement by NABARD	Utilization (%)
Dhubri	4601.43	2336.14	50.76
Kokrajhar	4730.61	2093.51	44.25
Bongaigaon	4824.47	3385.9	70.18
Goalpara	4988.31	3212.82	64.40
Barpeta	7908.53	5468.12	69.14
Nalbari	8589.3	4604.77	53.61
Kamrup	104755.11	100516.99	95.95
Darrang	3829.91	3050.99	79.66
Sonitpur	6471.36	5823.8	89.99
Lakhimpur	4152.79	3215.46	77.42
Dhemaji	2013.05	342.15	16.99
Morigaon	2092.54	1982.15	94.72
Nagaon	9205.78	6234.28	67.72
Golaghat	32405.39	7383.42	22.78
Jorhat	7108.5	6565.22	92.35
Sibsagar	5122.67	3907.05	76.26
Dibrugarh	4215.96	1379.12	32.71
Tinsukia	3282.6	1368.31	41.68
Karbi-Anglong	835.56	254.51	30.45
N.C.Hills	4957.3	3293.41	66.43
Karimgang	4116.81	2553.13	62.01
Hailakandi	3310.77	2842.22	85.84
Cachar	5614.66	3947.89	70.31
Baksa	648.74	538	82.92
Chirang	2011.9	1564.88	77.78
Udalguri	1011.34	932.33	92.18
Assam	242805.39	178796.57	73.63

Source: Office of the Chief Engineer, PWD (Roads), Assam

CHAPTER FIVE

PANCHAYATI RAJ INSTITUTIONS AND RURAL ROAD DEVELOPMENT

This chapter aims at examining the functioning of the new decentralized system with regard to rural roads planning and their execution. The chapter divided into three sections. The first section sets out a brief background of panchayati raj development in Assam and India. The second section illustrates the structure, roles and responsibilities of panchayat institutions as self governing local bodies and the third section discusses about peoples participation in rural road planning, development and role played by the sample GPs in road development. The study is largely based on secondary data.

5.1 Historical background of panchayats in India:-

The rural local government in India, called the panchayat, an assembly of five persons existed since time immemorial. These five nominated person were vested over the time with sacred authority, judicial and executive powers. Panchayats in India now has inherited though little, from those traditional institutions of village level local self governing institutions of the past. At that time, each village society had to frame their own customary laws due to isolation of each village from the neighbouring hamlets. Most of time, there were threats from the landlords, the invaders or the robbers. These intimidations strengthened the necessities of a village organization such as panchayat. These bodies took charge of all the matters of village including disputes and apportioned taxes.

During the struggle for freedom of India, Mahatma Gandhi stressed the need for village swaraj, that it is a complete republic, independent of its neighbours for its own vital wants, and yet interdependent for many others in which dependence is a necessity (Gandhi 1962). Gandhi's idea of village swaraj has had possibly the most powerful influence on the later debates and discussions on panchayats. In the post independence period, during the debates on the drafting of India's constitution, sharply divergent views on panchayats were expressed. At that time, one third of the villages of India had traditional panchayats and many of them were functioning poorly. In the constituent Assembly on November 4, 1948, Ambedkar B.R.,

chairman of the drafting committee called village community a sink of localism, a den of ignorance, narrow- mindedness and communalism (Malaviya, 1956). Panchayat did not find a place in first draft of Indian's constitution. But at the insistence of some Gandhians, a negotiation was arrived at and panchayats were included in the non justifiable part of the constitution. Article 40 of the constitution declares that the state shall take necessary actions to organize village panchayats and to endow them with such powers and authority as may be necessary to enable them to function as units of self government. The main aim was to encourage democratic participations involving villagers in the task of improvement of the community and to reduce the burden of higher level of administration. Although many steps were taken by the government to revive the system, Gramswaraj through village panchayats remained as a dream till 1992. Bureaucratic apathy, lack of political will, indifference of the people and lack of uniformity etc. were some of the factors behind the failure of the system (Alok, 2011).

Realizing the potential of the system, government of India initiated a procedure of constitutional amendment to give sanctity and uniformity to panchayati raj system so that it can be protected from political interference and bureaucratic apathy. The government introduced 64th constitutional amendment Bill in 1989. But the Bill did not turn up due to fall of the ministry. Finally, panchayati raj system was introduced in India through the 73rd constitutional Amendment in 1992.

5.2 Panchayats in Assam:

In Assam panchayats were there at the time of independence. The Rural Panchayat Act, 1948 was the first panchayati raj legislation in Assam that aimed at developing local self-government in rural areas. Panchayat institutions and the laws were reformed and amended as per guidelines of the Assam Panchayat Act, 1959 which assigned more powers and authority to these institutions. This Act introduced a three-tier panchayat raj in Assam- Mahakuma parishad at the sub-division level, Anchalik panchayat at the intermediate level and gaon panchayat at the village level. The Gaon Panchayat consisting of 9-11 members was the executive body of the Gaon Sabha.

The panchayat system in Assam got another modification with the passing of the Assam panchayat raj act, 1972 that abolished the anchalik panchayats and

introduced a two tier panchayati raj. Under the provision of the Act, gaon panchayats were formed at village level and mahkuma parishad at sub-divisional level. Though all the powers were assigned to the mahkuma parishad, the role of gaon panchayats for rural development was also recognized. Another special feature of the Act was that it extended the domains of the panchayati raj system to the tea gardens of the state.

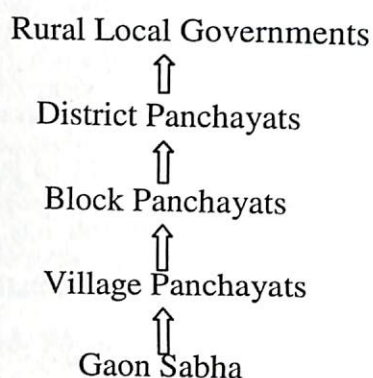
The Assam Panchayati Raj Act, 1986 re-introduced the three-tier system comprising of the gaon panchayat at village, anchalik panchayat at intermediate and mahkuma parishad at district level (Bhattacharjee & Nayak 2001). In this Act, provision was made for 33% reservation of seats for women in each tier. One seat was reserved for SC/ST people if 33.33% of the population in that panchayat area belongs to the SC/STs. In that case, the gaon panchayat president and the anchalik panchayat member were to be elected from the SC/STs and the president of the anchalik panchayat was to be also from SC/ST population.

The 73rd Constitution Amendment Act, 1992 has amazingly changed the whole picture of the panchayati raj system and provided such guidelines and directions that bring equality in the panchayat structure in the nation as a whole. The government of Assam has passed the Assam Panchayat Act, 1994 to pursue the new guidelines of the Constitution Amendment Act in the Panchayati Raj System in the state. As per the act, three-tier panchayati raj system has been created in the rural areas of the state comprising of Gaon Panchayat at village level, Anchalik Panchayat at block level and Zilla Parishad at district level. As many 29 subjects have been handed over to the Panchayati Raj Institutions under the eleventh schedule to empower the local self government. The Act has made provision of establishing gaon sabha for ensuring direct democracy at the village level and district planning committee for development of rural and urban areas at the district level. It also directed the state government to constitute State Finance Commission and state election as per guidelines of the Constitution Amendment Act, 1992. The state government has also been directed to make sure one third reservations of seats in all the panchayat institutions for SC/ST and women in new system (Sarma, 2013).

5.3 Structure of panchayat institutions:

In panchayat hierarchy, village panchayats are recognized as the lowest level of government in rural India. The village panchayat is consisted of a number of elected legislative body from the population that gram sabha officially covers. A gram sabha is a meeting of adults who live in the area covered by a panchayat. The gram sabha prevents the panchayat from doing wrong things like misusing money or favouring certain people. The next level of panchayt institutions at the rural areas is block panchayat. The chairman of the gram panchayat, also known as 'Sarpanch' in some states, becomes the representative at the block panchayat. The Zilla parishad is the uppermost institution of the local self government in panchayati raj system at the rural level. The chairman of the intermediate panchyat or block panchayat, is the representative in the zilla parishad. The following flow chart-6.1 shows the structure of panchayats at local level.

Flow chart 5.1 Structure of Panchayati Raj System at local level.



5.3.1 Gaon/ Gram Sabha:

The 73rd Constitution Amendment Act focuses the requirement for establishing gaon sabha in each village panchayat area as the foundation of the panchayat system. Members of the gram sbha, the permanent unit, are the adult persons registered in the electoral rolls of the area. The sabha guides the gaon panchayats in every step for the development of the areas and therefore, the success or failure of gaon panchayat depends on the effectiveness of these sabhas. The area of a gram sabha is needed to have a population between 6000 and 10000. It is compulsory for the gram sabha to meet at least once in every three months. The gram sabha meeting is arranged by the secretary of the gaon panchayat in consultation with the president and the Block

Development Officer concerned with large publicity before fifteen days of holding the meeting. The presence of one-tenth of the total members or one hundred numbers of voters of the villages whichever is less forms the quorum for such meetings. The main responsibilities of such gaon sabha are as follows-

- i. To consider the report in respect of the development programme of the previous year and development programme proposed to be undertaken during the current year.
- ii. To mobilize voluntary labour and contribution in cash as well as in kind for the community welfare programmes;
- iii. To identify beneficiaries for the implementation of development schemes pertaining to the villages; and
- iv. To promote unity and harmony among all sections of the society in the villages.

In every gaon sabha meeting, the gaon panchayats have to submit receipts and expenditures of the current year, the vouchers of all the purchases, works taken up, acquaintances, salary paid to the panchayat staff etc. for public scrutiny. The funds that are allocated to the gaon panchayats for development works should be checked in such meetings to examine whether those funds are properly utilized or not.

5.3.2 Gaon panchayat:-

A village or a cluster of villages with a population varying between 6000 and 10000 may be declared as a gaon panchayat by the state government. A gaon panchayat consists of 10 members elected by the voters of territorial constituencies. The president is directly elected by the voters and the vice-president is elected by the members among themselves in the first meeting which is convened by the Deputy Commissioner or an Officer authorized by the Deputy Commissioner. The secretary of the gaon panchayat acts as incharge of its office under the control of the president. In every panchayat, it is compulsory to reserve at least one-third of total seats for women. Seats are also reserved for the people belonging to SC/ST.

It is mandatory for a gaon panchayat to hold at least one meeting in every two months in the presence of one-third of the total members. The presidents of gaon panchayat, on any written request from at least one-third of members, can convene a

special meeting within fifteen days from receiving such request. Each gaon panchayats has the responsibility to work under its jurisdiction for the development of the villages. The important functions of a gaon panchayat are as follows-

- Preparation of plans for economic development and social justice.
- Implementation of schemes for economic development and social justice as may be entrusted to them including those matters listed in the eleventh schedule.

The matters listed in 11th schedule are as follows-

- I. Agriculture and extension
- II. Land improvement
- III. Watershed development
- IV. Animal husbandry, poultry and Dairy
- V. Fisheries, social forestry and small scale industries
- VI. Rural housing, Khadi, Drinking water and Sanitation.
- VII. Community Health etc.

To develop agricultural activities, a gaon panchayat can identify and execute schemes of amount not exceeding Rs. 50,000 with technical support from the concerned state government departments.

To develop the villages in a systematic way, each gaon panchayat constitutes three standing committees. The members of such committees are elected amongst the elected members of gaon panchayat. The standing committees' are-

- I. The development committee for discharging functions relating to agricultural production, rural industries, animal husbandry and poverty alleviation programmes.
- II. The Social Justice Committee which perform functions relating to promotion of economic, social, educational, cultural and other interests of backward classes, protection of SC/STs and other classes from social justice and from exploitation and welfare of women and childrens.
- III. The social welfare committee which perform functions relating to education, public works, public health and other functions of the gaon panchayat.

Each committee is consisted of at least three members. The president and chairman of gaon panchayat is ex-officio member of also included in *all the three committees*.

Gaon panchayat accounts are audited by the authority approved by the government and a copy of the audit statement is forwarded to the gaon panchayat within one month of the completion of audit. After receipt of the report, the gaon panchayat has to remove all the defects in its accounts as pointed out in the audit report and send the report to the Anchalik Panchayat and Director of Panchayat and rural development within the specific period.

5.3.3 Anchalik or District panchayat:

An Anchalik or district panchayat is formed for each development *block in a district* for five years. An Anchalik panchayat consists of:-

- I. One member from each panchayat to be directly elected from the territorial constituencies of the panchayat under the jurisdiction of the Anchalik panchayats.
- II. The presidents of gaon panchayat falls under the anchalik panchayat,
- III. The local members of parliament and the members of the Legislative Assembly of the state represent constituencies which comprise wholly or partly, the anchalik panchayat.
- IV. Every member has the right to vote whether or not chosen by election in the meeting of the Anchalik panchayat.

As in Gaon Panchayat, in Anchalik Panchayat seats are reserved for women and SC/STs. The elected members elect the president and vice-president of Anchalik Panchayat in its first meeting presided by the Deputy Commissioner or any Officer approved by him. It is compulsory for the anchalik panchayat to hold one meeting in every two months with presence of one-third of the total members. The general functions of anchalik panchayat are as follows:-

1. Preparation of Annual plan of schemes entrusted to it by the state government or the Zilla parishad and submission it to the zilla parishad for integration with the district plan.
2. Consideration and consolidation of the Annual plans of gaon panchayats under it and submission of consolidated plan to the zilla parishad.

3. Preparation of Annual Budget of the anchalik panchayat and giving it to zilla parishad for approval.
4. Performing functions as may be entrusted to it by the government and the zilla parishad and
5. Assisting the government in relief operations in natural calamities.

5.3.4 Zilla parishad:

As per the provision of the Constitutional Act, every district has a zilla parishad to administer the rural areas of the districts. A zilla parishad is consisted of –

- ✓ The members are elected from the territorial constituencies of the district.
- ✓ The presidents of anchalik panchayats of the district
- ✓ Local members of parliament and legislative assembly representing a part or whole of the district whose constituencies lie within the district.

Seats are also reserved in zilla parishad for women and SC/ST as in anchalik and gaon panchayat. The first meeting of the zilla parishad is called by deputy commissioner and the president and vice-president are elected from the directly elected members. It is compulsory for the zilla parishad to hold at least one meeting in every three months in presence of one-third of the total members. The proceedings of zilla parishad meeting have recorded in the minutes book kept in zilla parishad office under the custody of chief executive officer. The zilla parishad is only responsible for the preparation and execution of plans for economic development and social fairness in the district. These zilla parishads act as nodel agencies of rural development in the district. The role of panchayat institutions for Infrastructure and Rural Development is shown in **Annexure 5A**.

5.4 Present Status of Panchayat in Assam:

Rural local government is not the same across district of Assam. Panchayati Raj Institutions have been set up in 20 districts of Assam under part IX of the constitution under the provision of the Assam Panchayati Raj Act, 1994. Such institutions are not established in the sixth schedule areas of Assam which are outside the purview of 73rd constitutional amendment. The district wise numbers of panchayats in the state are shown in (**annxure: 5B**)

5.4.1 Panchayat Funds:

The local bodies are entrusted with the duty of overall development at the grass roots. To fulfill the assigned responsibilities, panchayats require sufficient funds. Major portion of the total revenue of the local bodies comes through transfer of funds from the state government as sharing of state taxes. Revenue realized from tax sharing cannot fulfill the revenue necessities of the lower governments. Besides too much dependence on the state finance of such bodies is also not desirable. Thus, such bodies have been empowered to impose certain local taxes that they can collect a part of revenue themselves. The most important tax base of rural local bodies is the immovable properties like non- agricultural land, building/ houses and non-motorised vehicles. The first state finance commission of Assam recommends imposition of user charges for services provided by local bodies on parks, public toilets, public health centres etc. Other sources of income for such bodies include tax on vacant land, tax on using marriage halls, community halls, food and lodging establishments, shops and factories, fees on daily/ weekly bazaars/ markets, tax on agricultural pump sets that provides ground water to the field, revenue from issuing birth and death certificates etc. Provisions are also made to entrust grants-in-aid to the panchayat institutions from the consolidated fund of the state. A panchayat window has been opened in the state budget and fund has been released by this window directly to the panchayats.

5.4.2 Panchayat Functionaries:

The Assam Panchayati Raj Act, 1994 has made provision for 20, 9 and 2 numbers of functionaries for Zila Parishad, Anchalik Parishad and Gaon Panchayat respectively. The functionaries of Zila Parishad consists of a chief executive officers, a chief planning officer, a chief accounts officer, office staff, a tax collector, a Junior Engineer, a driver and a grade VI employees.

The functionaries of Anchalik Parishad consists of a Secretary, 3 office staff, two tax collector and 3 grade IV employees while the Gaon Panchayat Staff consists of a Secretary and a tax collector.

The State Institute of Rural Development (SIRD) conducts various training and orientation programmes to train the elected representatives of the Panchayats from

time to time. Moreover, the elected legislative body and functionaries are also deputed to undergo training at different institutions of the country and take part at national level workshops. Special courses are held at state and zonal levels to train the women representatives. But, devolution of sufficient functionaries to panchayats is yet to take place in the state which is expected to occur soon after the finalization of the guidelines with the departments.

5.4.3 State Panchayat Election Commission:

As per the provisions of the Constitution Amendment Act, every state government has to set up a State Election Commission for conducting elections under its superintendence. Accordingly, the Assam Panchayat Act, 1994 has made the provision of constituting a State Panchayat Election Commission and assigned it the duty of supervise, direct and control the system of preparation of the electoral roll and the conduct of panchayat election in the state. The governor appoints the State Election Commissioner of the State Election Commission.

5.4.4 State Finance Commission (SFC):

Every state government is required to appoint a State Finance Commission for every five years to advice devolution of taxes and grants to the local governments. The Commission inspects the system of income sharing between the state and local governments. The state finance commission is also accountable to keep an eye on the entire subject connected with the financial health of the local bodies. Apart from assessing the receipts and expenditures of the state and the local governments, every SFC has to check fiscal capabilities and expenditure disabilities of the local bodies and calculate approximately their resource gaps (Omen, 2008)

The SFC, which consists of with the chairman and two members appointed by the governor, makes recommendations concerning the distribution of net proceeds of taxes,tolls,duties and fees imposed by the state government between the state and panchayats and among different levels of panchayat bodies. The commission recommends to the state government about the duties, tolls, taxes and fees to be assigned to panchayats.

Recommendations of the SFC, which are essential for successful and efficient fiscal decentralization to local levels are incorporated its reports. The third SFC of Assam

has also submitted its report for the period 2006-2011 and suggested measures to improve the financial independence as well as financial health of all the Panchayat institutions of the state. The SFC recommend horizontal distribution of Divisible Pool for panchayats in different districts on the basis of weighted average of three parameters, viz geographical area (25%), population (50%) and per capita district domestic product net of mining and quarrying (25%). The commission also recommends vertical distribution of funds between zilla parishad, anchalik panchayats and gaon panchayats in the ratio of 20: 30:50 respectively. It further recommended recovery of at least 50% of expenditure of service provision through imposition of user charges by the panchayats so as to generate additional income in addition to all fund transfers. The commission also suggested the appointing tax collectors on regular or on contractual basis and to combine DRDAs with zilla parishads and development blocks with anchalik panchayats.

5.5 Review of Panchayats' Functioning in Assam:-

The Panchayati Raj Act, 1994 provided for constituting three-tier panchayati raj system for rural development of the state. The Anchalik panchayats have some decision-making authority over the gaon panchayats. Zilla parishad has administrative authority over anchalik panchayats under its jurisdiction. Again the state government has the power to direct the functioning of all the three tier panchayats. It is nothing wrong in the interventions of higher bodies if not guided by politicians. But the panchayat functioning in Assam has been motivated by politics which has restricted the ability and sovereignty of the panchayats to function as self governing local bodies. Though the major part of functions for the development of rural areas has been assigned to different panchayat institutions, the exclusive functional part of these institutions is small. In order to convert the panchayats to self governing local bodies in true sense, a separate functional area should be created for them with transfer of sufficient fund and functionaries to release the assigned functions. But, there may be definite functional jurisdiction where panchayats and the state government work as equal partners.

Even though, functions relating to the 29 subjects (Annexure: 5C) listed in eleventh schedule have been handed over to the panchayats, they have not provided with adequate funds. The own revenue raising capacity of panchayat has also remained

imperfect because of insufficient and inefficient tax assignment, absence of supporting staff, less elastic nature of taxes, limited capacity of villagers to pay taxes etc. even taxes are also not levied periodically in fear of getting dissatisfaction. As result, the taxes imposed and tax collected by these institutions are not enough for fulfilling the fund requires consequently, these institutions have to depend on fund from higher order governments. Troubles have also been formed by the multiple channels of shifting funds from centre to state and to local governments. Although the activity mapping has been completed for all 29 subjects entrusted to panchayati raj institutions, it has not been accompanied by transferring of funds and functionaries entirely for the panhayats. Furthermore, District Rural Development Agencies in the districts are yet to combine with the zilla parishads and has been creating troubles of overlapping of functions done by District Rural Development Agencies and zilla parishads.

5.6 Pattern of Local Governance under the Sixth Schedule Areas:-

About one-third (32.63%) of the total area and 13.63% of the total population in Assam comes under the jurisdiction of the sixth schedule. The hill districts of Karbi Anglong and North Cachar hills and plain districts of Kokrajhar, Udalguri, Chirang and Baska of the State comes under the sixth schedule of the constitution. While the two hill districts are administered by Autonomous District Councils, the four plain districts constituting Bodoland Territorial Area Districts are administered by Bodoland Territorial Council. Moreover, six other autonomous councils in Brahmaputra Valley and one in Barak Valley have been constituted under the sixth schedule for some tribes. The Brahmaputra Valley autonomous councils are:

- I. Missing Autonomous Council ;
- II. Tiwa Autonomous Council ;
- III. Rabha Hasong Autonomous Council ;
- IV. Deori Autonomous Council ;
- V. Thengal Kachari Autonomous Council ;
- VI. Sonowal Kachari Autonomous Council.

In the *Barak valley*, the Barak Valley Hills Tribe Development Council has been *formed*. As against the three-tier panchayati Raj system prevalent in areas outside sixth schedule in normal areas, the Autonomous Districts Councils (ADCs) in the

two hill districts introduced a single tier local self governing body at district level. Both the Autonomous District Councils have constituted ad-hoc village councils, which are not sufficiently empowered.

The Autonomous District Councils have been powered with various legislative, executive and judicial functions within the constitutional framework. Most important legislative functions of ADCs includes matters related to land, forest, regulation of jhum cultivation and social customs. The ADCs have a three-tier judicial system including of village courts, sub-ordinate district council courts and district council courts. The council discharge all the executive functions regarding execution of Acts, Rules and Regulations enacted by them. In addition, the councils have also been empowered with executive powers relating to as many as departments. The Assam Government directly controls all the subjects which are not vested with the ADCs.

The 29 subjects which are listed in the Eleventh Schedule for the PRIs have been entrusted to Autonomous District Councils with the power of executing these subjects. Funds are released on half yearly basis and the councils are responsible for submitting detailed account every month to the Accountant General, Assam.

The sixth schedule area in the state have been extended from two hill districts to four newly created districts of the BTAD (Bodoland Territorial Area Districts) after creation of BTC in October,2003. Bodoland Territorial Council has been handed over 40 departments through the correction of the schedule VI. The previous panchayati raj institutions under BTAD have been abolished and the village level local administration has been handed over the village council development committees.

5.7 Community participation in rural road development through Panchayati Raj Institution in Assam:-

Since 2000, rural roads in India are mainly constructed under the PMGSY scheme. In Assam, the Assam State Road Board is implementing the PMGSY scheme through the Programme Implementation Unit (PIUs) recognized at the district level (Report on community participation framework by Assam State Road Board). The PMGSY employs a bottom-up approach for planning and preparation of the project.

The core network system, through which the rural roads to be improved are selected, then outfitted at the block level in consultation with the panchayats and consolidated at the district level. The list of roads to be taken up in year-wise is arranged by the program implementation units, approved by the zilla parishad, and then forwarded to the state government for further approval.

In the preparation stage, the position of roads is finalized through community consultation. The PMGSY guidelines requires the PIU to carry out Transect walk along project roads before finalizing the position of the roads, is necessary to make sure of active community participation and minimize social and environmental impacts of the proposed development. Under PMGSY, continuing revenue tracks are taken up for construction of rural roads. The width of the existing continuing tracks often calls for acquisition of additional land to justify the proposed improvemen. However, the extents of impacts on land, structures and livelihood sources are expected to be negligible, as the road improvement are generally carried out along with the existing tracks.

Extra land required for road development under PMGSY has been made available through voluntary donation by the land owners. Such donation is essential to ensure minimization of negative social and economic impacts of the project. There is full consultation with the landowners on site selection. Voluntary donations do not adversely affect the living standards of affected people. Moreover, it directly linked to the benefits for the affected people. Voluntary donations are confirmed through verbal and written records which are verified by an independent third party.

The 73rd Amendment Act, Part IX of the constitution provides for involvement of the panchayati raj institutions, especially the Gram Panchayat during the preparation and execution of the project. The gaon panchayat will harmonize with the Project Implementation Unit (PIU) to confirm the *alignment*, land width necessities, community discussion *and incorporation* of their suggestions, recognition of *vulnerable affected* persons, grievance redressed and collection of memorandum of understanding (MOU) for transfer of land. The main principles in the PMGSY guidelines pertaining to land availability are as follows-

- I. No fund will be provided under PMGSY for land acquisition: Land acquisition will be done by the state government at its own cost. (PMGSY Guidelines section 6.12)
- II. Full responsibility of the state government or district panchayat to ensure land availability for road works. (PMGSY Guidelines section 6.12)
- III. State government may lay down guidelines for voluntary land donation, exchange or other mechanisms (PMGSY Guidelines section 6.12)
- IV. The process of making land available for the road works should sub-serve the common good and also be just and equitable.
- V. Stresses on participation of local people and community including those likely to be affected by the proposal alignment to put forth their views through Transect Walk (PMGSY Guidelines section 6.13)

The Assam Government also introduces the Assam State Roads Resettlement & Rehabilitation Policy (ASRRRP) in 2004, for the state as a whole for all categories of roads to ensure that when a road improvement work is done, no single person is unfavorably affected in this process of improvement. The broad principles of the Resettlement and Rehabilitation policy are as follows-

- I. To prepare a detail plan to ensure community participation through PRIs and local administration in planning, implementation and management of rural roads.
- II. To provide for a clear programme to sensitize and train executing department towards community participation in planning & implementation of the rural roads up gradation programme;
- III. To entrust Gram panchayat to deal with the non-title holder to facilitate the GPs to sensitize and motivate the non-titleholders to voluntarily relinquish the land,
- IV. To enable the GPs to play a greater role in dealing with non-titleholders, who are willing to relinquish the land required for a clear ROW (Right of way) of rural roads.
- V. To develop a mechanism for community contribution to the non-title holders voluntarily relinquishing the land and falling in the category of destitute and BPL through the GPs as decided by the community.

The principles of the policy mainly deal with the need to knob the issues related to R&R on rural roads as well with fussy assistance to the vulnerable sections. The state policy stresses on community participation in planning, implementation and management of rural roads. The state policy also lays down steps to be followed in cases of voluntary donation of land in rural roads. The stages of PRI's participation in PMGSY project preparation is depicted in the flow chart:1 (Annexure:6D)

5.7.1 Dissemination of information on PMGSY under Core Network:

Information on the features of the finalized PMGSY roads under core network is circulated to the public. The information is displayed at the notice boards of zilla parishad and the concerned gaon panchayats and shall include (a) map of the core network of the concerned block showing roads to be constructed under PMGSY, (b) list of the habitations to be connected, (c) length and type of the roads and (d) contact persons of the PIU concerned.

The selection of road for construction under the project shall be from PMGSY core network. The criteria which are adopted in the selection of roads are as follows-

I.sufficient land width availability as prescribed in the national design standards for rural roads,

II.the proposed alignment involving little or no loss of land, and the existing land or structures remain viable for continued use,

III.in case of unavoidable impacts, the losses will be minimized through the adoption of one or more of the followings –

- a) Modifications of design by reducing the length width, alignment shifts and modifications in cross-sections etc. to the extent needed from sfety considerations.
- b) Voluntary donation of land /asset by means of MOU or other documentation acceptable to ADB, the PIU/ or state government,
- c) Provision of support and assistance to the vulnerable affected persons through gaon panchayat and rural development schemes

5.7.2 Dissemination of project information to project affected community:

After the selection of roads and before the finalization of the alignment, a booklet in local language providing an overview of the PMGSY will be available for

distribution in every gaon panchayat along the selected roads. The aim of this is to sensitize the community on the project related issues and also how the issues will be addressed during project preparation and implementation stages.

5.7.3 Finalization of Alignment through Transect walks:

Community always plays a decisive role in the finalization of the alignment. To ensure fuller community participation, transect walks (Transect walk means a walk along the suggested alignment by PIU with the communities, PRI and key informants to observe, to listen, and to ask questions which would enable identification of problems and collectively evolve solutions.) are undertaken on each of the proposed alignments. Transect walks are organized by the respective PIU in close coordination with the gaon panchayats and the revenue officials at the village level (patwari). The main objective of the transect walk are as follows-

- ✓ Finalization of alignment through consultations with the communities and their elected representatives.
- ✓ A joint on site inventory, cross checking and verification of the alignment.
- ✓ Identification & redress of grievances on ground
- ✓ Identification of vulnerable people affected by the project,
- ✓ Acceptance of the project and alignment by the community.

Various stakeholders from the government, PRIs and the local communities which participate in the Transect walk participants are enumerated below:-

From the government:

- Field level PIU staff comprising Assistant Engineer/ Junior Engineer.
- Revenue department officials
- Forest officials
- Social safeguard specialist and environmental specialist of the project implementation consultant engaged to support the concerned PIU.

From Panchayati Raj Institution:

- Village Pradhan or Sarpanch.
- Member of the gaon panchayat.

From the community (Selection done by PRI):

- Community representatives including APs and non- APs.
- School teacher
- Women representatives
- Vulnerable groups comprising households below poverty line, SC, ST and female headed households.
- Elderly people of the village

The PIU have to inform the PRI at least a week before to the transect walk. The information to the public will be in the form of formal notice at the village panchayat building including salient feature of the project, description of the proposed improvements, land width needed and provisions of the resettlement framework. It is the responsibility of the PRI to select a group of villagers who have enough knowledge on physical resources of the village and are willing to participate in the transect walk. Based on the responsibilities assigned, the participants will observe and record all important things in detail on the revenue map and get information as much as possible from the villagers and the local people. Information recorded based on the revenue map also include sensitive locations such as major junctions, water crossing, cultural properties and forest location with large numbers of trees and additional efforts require to be take before finalizing the design. Based on the findings of the transect walk the PIC will prepare the technical drawings for the project road. After that the PIU will make sure that the design by the PIC includes to the extent possible the concerns and suggestion brought forth during the transect walk.

5.7.4 Consultation with Affected persons (APs)

After finalization of the technical drawings of the road alignment, the PIU/ gaon panchayat will organize a formal consultation with those persons likely to get affected as a result of road construction. This consultation is to inform APs of how the concerns raised by them during the transect walk have/ have not been addressed in the project design. The information regarding project design which are disseminated during the consultation are –

- Alignment with land width requirements indicated on a map.
- Community suggestions and comments included in the design.

- Community suggestions and comments not incorporated and the reasons for the same
- Procedure for accretion of land
- Schedule of census survey, method and criteria for identifying vulnerable APs
- Outline entitlement provisions for vulnerable affected people for targeted assistance through linkages with rural development schemes, cash assistance.
- Describe disbursement procedures to vulnerable AP
- Outline inputs required from the community, construction labour, temporary use of land for diversion.

5.7.5 Survey to identify socio-economic profile of APs:

After the formal consultation with the APs, the PIU with the help of the PIC shall undertake a survey of the identified APs. The concerned gaon panchayat will facilitate the survey. The survey find out the estimate asset ownership, sources of livelihood, lost of assets and livelihood and identify vulnerable AP to provide targeted support based on their vulnerability.

5.7.6 Identification of vulnerable APs:

The project provides for assistance and support to the vulnerable APs to make sure that they are not harmfully affected by the project. The categories of APs which should be entitled for assistance as vulnerable APs are as follows-

- Households that are below poverty line,
- Households that are become BPL as a result of loss of assets
- Households losing structure
- Female headed household
- Schedule caste
- Schedule tribe
- Disabled person

Based on the survey data, the PIU, with the help of the PIC and in collaboration with the panchayati raj institutions, assess the vulnerability of APs. This assessment will be discussed with APs and then finalized. After that a list of vulnerable APs and the

assistance/ support options to them will be formulated and displayed at the gaon panchayat office along with the eligibility criteria based on which the list was derived.

5.7.7 Dissemination on process of land transfer and support / assistance.

In addition to disseminate information needed at each of the community participation steps, the PIU in coordination with the PRI will ensure that the following information is known to the community concerned before the start of collection of memorandum of understanding or other documentation acceptable to ADB,

- Project details
- Responsible agencies
- Process of land transfer
- List of APs
- Grievance redressal mechanism
- Likely construction schedule

5.7.8 Submission of written confirmation by Landowners to PRI/PIU:

The project recognizes that voluntary land donation is a long recognized standard practice adopted for rural road developments in India. Keeping this in mind the entire process of land donation emphasizes on the spirit of 'free will' minus any element of coercion. Therefore, individual confirmation that people are 'volunteering' for donation of their land toward the project is mandatory.

To make sure of transparency, a written confirmation of the voluntary donation must be submitted by the owners of land /asset affected by the project. The written confirmation must be in the form of a memorandum of understanding (MOU) or other documentation acceptable to the Asian Development Bank. The conformation will be verified by an independent body, will be the third party. To make sure legal possession, a copy of ownership, as applicable, should be obtained by the concerned PRI and the village community will be concerned to verify the ownership of the land owner on the land parcel or asset in question.

Though there is provision in PMGSY guidelines that the road construction process should take community consultation through concerned PRIs, except the Anjukpani gaon panchayat no participation has seen in the Koroioni and Badalgaon gaon panchayat. In the two gaon panchayat, rural roads are constructed directly through District PWD without any consultation with the GPs. The concerned GPs are also not aware about this provision. The Anjukpani gaon panchayat participate in the process of road construction as per the PMGSY guidelines.

5.7.8 Profile of the Sample panchayat Institutions:

5.8.1 Basic information of population, members and staff:

The basic information regarding the sample panchayats has been presented in table 5.1. reveals that the Anjukpani gaon panchayat cover more than ^{nine} ~~twenty~~ thousand populations; the other two panchayats under Nagaon sub-division and Hozai sub-division cover less than ten thousand population. The Anjukpani gaon panchayat is having 40% female members fulfilling the 33.33% reservation norms for female members in gaon panchayat. The other two gaon panchayats with 30% female members has also almost fulfilled the 33.33% norm for female members in gaon panchayat. Except Anjukpani GP under Kaliabor sub-division, the other two sample gaon panchayats have not fulfilled the one-third member reservation requirement for the ST/SC category. All the sample gaon panchayats have ten members. While the Koroioni GP have three permanent government employees in the post of secretary, tax collector and office bearer, the other two sample GPs are having only two government employees.

Table: 5 .1. Basic information regarding sample gaon panchayats.

Gaon panchayat	No of constituent villages	No of households	Total population	Sample gaon panchayats					
				No of members			No of permanent staff		
				female	ST/SC	Total	secretary	Tax collector	Others
Koroioni	3	1656	8890	3	-	10	1	1	1
Anjukpani	14	681	9423	5	1	10	1	1	0
Amtola	6	1554	7423	3	-	10	1	1	0

Source: Field study

5.8.2 Revenue of the Sample Panchayat:

Panchayat normally mobilises their revenue from both the central and state governments under different rural development schemes. Panchayats have also been empowered to generate their own revenue through taxes, fees and fines collected locally. But, the capacity of the sample panchayats to mobilize their own revenue has been found to be very limited.

Table: 5.2 Revenue of the sample gaon panchayats in 2013-14 (in Rs.)

Panchayat names	Central govt.	State govt.	Own revenue collected	Total revenue
Koroioni	676476.00 (71.26)	257000.00 (27.07)	15794.00 (1.66)	949270.00 (100)
Anjukpani	2035000.00 (86.09)	325000.00 (13.75)	3600.00 (0.15)	2363600.00 (100)
Badal gaon Amto la	600000.00 (80.14)	145998.00 (19.50)	2600.00 (0.34)	748598.00 (100)

Source: Field study

Note: Figures in parenthesis represent percentage of total revenue.

Data presented in Table: 5.2 reveals that the central government grants constitute dominant part of the revenue of sample panchayats that ranges from nearly 71% to 86%. State government grants also contribute a small portion to these institutions. However, their own revenue mobilizing power is inadequate, that they could raise less than 2% of total revenue from taxation and imposition of fees and fines in 2013-14. Even though the gaon panchayats are constitutionally empowered to raise revenue through local taxes, the sample gaon panchayats did not make much effort to increase their own revenue. The reason behind this could, inter alia, be the huge transfer of funds to such bodies at the grass-roots from upper levels of governments.

5.8.3 Road Development Activities of the sample panchayats:

In the field study, it has been found that the functions of the sample panchayats are restricted mainly in performing specific activities under MGNREGA, Total Sanitation Campaign (TSC) and IAY schemes. The construction of village road in the year 2013-14 by the sample panchayats is shown in Table: 5.3.

Table: 5.3 Activity of the Sample panchayats in 2013-14

Activity	Name of panchayats		
	Koroioni	Anjukpani	Badal gaon
Village road constructed (km) (gravel)	15	7	9
Village road maintained (km)	8	10	2
Culverts constructed on village roads (no.)	2	1	0
Rural road constructed under PMGSY (km)	15	12	5

Source: Field study

The major works of the sample gaon panchayats have mostly concentrated in construction and maintenance of village roads under MGNREGA. Among the sample gaon panchayats, Koroioni GP under Hozai sub-division constructed the highest rural road length of 15 kms in the gaon panchayat area as against the lowest of 7 kms constructed by the Anjukpani gaon panchayat under Kaliabor sub-division in 2013-14. While Anjukpani gaon panchayat maintained the highest of 10 kms. of village roads, Amtola GP maintained the lowest of only 2 km. The Koroioni GP and Anjukpani GP have constructed 2 and 1 culverts respectively on village roads, but the Amtola GP have did not undertake this activity during the period. In case of construction of rural road under PMGSY, 15 kms, 12 kms and 5 kms of roads have constructed respectively. The percentage of fund utilized in the construction of village road under sample panchayats is shown in Table 5.4.

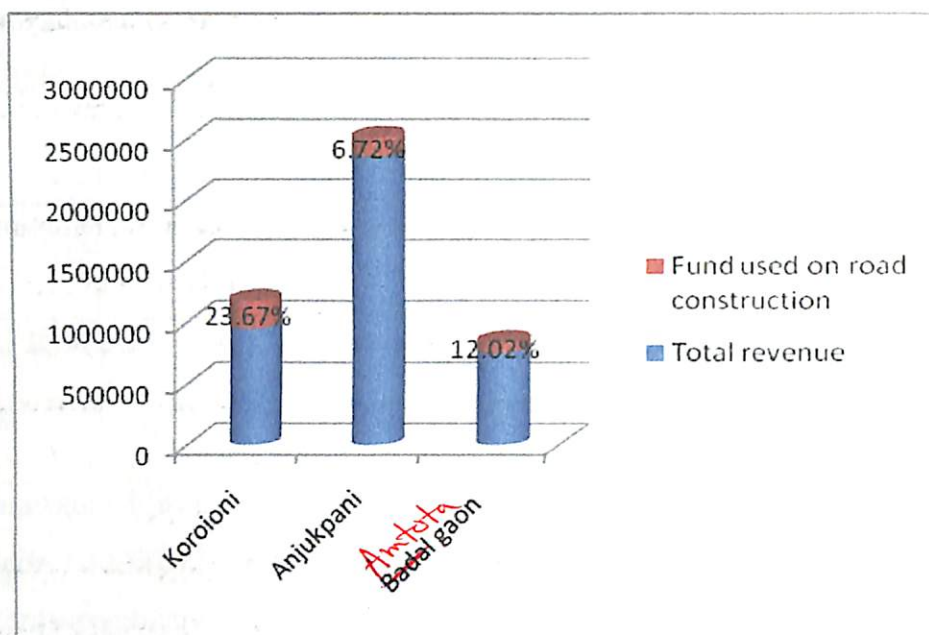
Table: 5.4 Fund used in road construction.(Rs. in lakh)

GP names	Total revenue	Fund used on road construction	% Fund used on road construction
Koroioni	949270.00	224784.00	23.67%
Anjukpani	2363600.00	159000.00	6.72%
Badal gaon	748598.00	90000.00	12.02%

Source: Field study

The percentage of fund used in village road construction by the sampled gaon panchayats can be easily understood through the figure 5.1

Figure: 5.1 Fund used by sample panchayat for gravel road construction



From the diagram, significantly large differences can be observed between the three gaon panchayats regarding the percentage of fund used in road construction among many activities of GPs. The GP koroioni has spent highest fund (23.67%) in road construction from the total revenue of the GP than the Anjukpani and ~~Badal gaon~~ ^{Amtola} GPs. Whereas, Anjukpani has recorded the lowest percentage (6.72%) of money spent on road construction. The GP ~~Badal~~ ^{Amtola} gaon has spent 12.02% from the total revenue.

To sum up, though the panchayati raj institution are expected to act as a dynamic agent for rural development, activities of such bodies are also hindered by too much dependence on higher order governments for fund, political interference influence, lack of trained functionaries and overlapping of activities with the state government departments. Autonomous district council and its sub-ordinate lower order government under sixth schedule are also not an exception in this region which hampers their ability to work independently as self governing bodies.

Though there is provision for the community to participate in the process of road construction under PMGSY scheme, it has been found that two Gaon Panchayats could not participate in the process as the PWD's Nagaon branch directly constructed the roads without any consultation with the concerned GP.

Annexure: 5A

Role of panchayat institutions in infrastructure and rural development.

PRIs	Role in infrastructure development	Role in rural development programme
Zilla Parishad	<ol style="list-style-type: none"> 1. Construction and maintenance of village roads. 2. Opening and maintenance of agricultural farms, marketing agencies, go-downs and cold storages. 3. Construction, renovation and maintenance of minor irrigation works. 4. Establishment and maintenance of hospitals and health centres 5. Establishment and maintenance of primary, secondary schools. 	<ol style="list-style-type: none"> 1. Land reclamation and land development works. 2. Fish seed production and distribution and development of Inland fisheries. 3. Activities towards development of household industries. 4. Planning, supervision, monitoring and implementation of poverty alleviation programmes.
Anchalik Panchayat	<ol style="list-style-type: none"> 1. Construction and maintenance of Public roads and maintenance of public ferries water ways 2. Implementation of individual irrigation works. 	<ol style="list-style-type: none"> 1. Identification and Implementation of agricultural development schemes 2. Training of farmers and extension activities 3. Planning and supervision of implementation of poverty alleviation programmes. 4. Organisation of training programmes in khadi,

		<p>village and cottage industries</p> <p>5. Programmes relating to the development of women and children.</p>
Gaon Panchayat	<p>1. Construction and maintenance of village roads</p> <p>2. Identification of locality for distribution of electricity</p> <p>3. Establishment and maintenance of wireless receiving sets.</p>	<p>1. Development of waste land and grazing land</p> <p>2. Development of fisheries in the villages</p> <p>3. Distribution of house sites</p> <p>4. Selection of beneficiaries under poverty alleviation programmes</p> <p>5. Participation in women and child welfare programmes</p> <p>6. Monitoring public distribution system.</p>

Source: (i) Bhattacharjee, P.R.& Nayak, purosottam (2001); (ii) G.O.A, Panchayat and Rural Development Department.

Annexure: 5B**District-wise numbers of Panchayats in the state at different levels.**

District	Zilla parishad	Anchalik panchayat	Gaon panchayat
	As per Gazette Notification on March,2007		
Dhubri	1	15	172
Bongaigaon	1	5	66
Goalpara	1	8	81
Barbeta	1	11	133
Nalbari	1	7	70
Kamrup	1	16	160
Darrang	1	6	79
Sonitpur	1	14	158
Lakhimpur	1	9	81
Dhemaji	1	5	65
Morigaon	1	7	89
Nogaon	1	20	236
Golaghat	1	8	102
Jorhat	1	8	111
Sibsagar	1	9	118
Dibrugarh	1	7	93
Tinsukia	1	7	86
Karimganj	1	7	96
Hailakandi	1	5	62
Cachar	1	15	163
Assam	20	189	2221

Source: Statistical Handbook Assam, 2009

Panchayat and Rural Development Department, Govt. of Assam

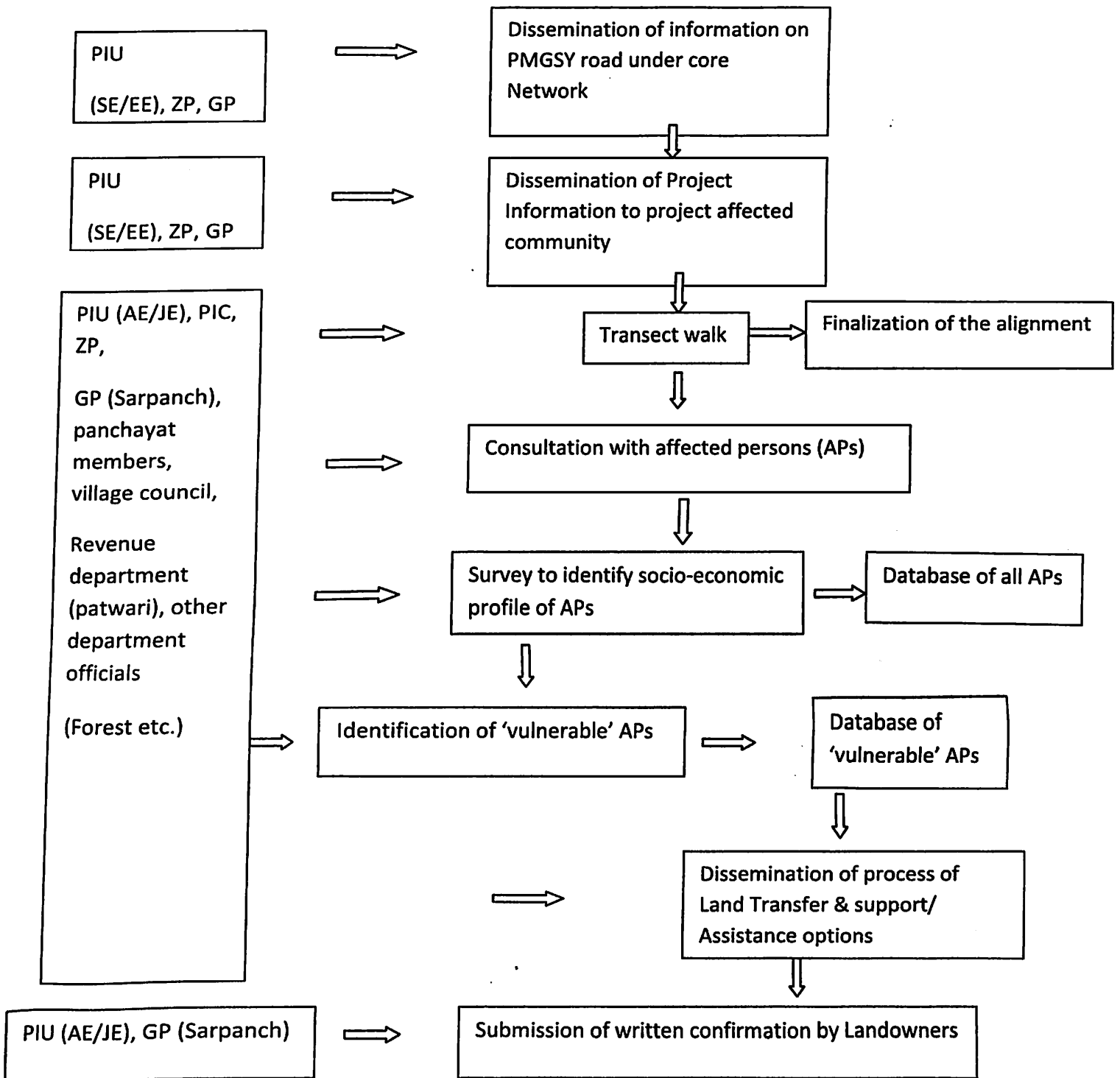
Annexure 5C

Functions of gaon panchayat

- 1) Agriculture including agricultural extension
- 2) Land improvement, implementation of land reforms, land consolidation and soil conservation
- 3) Minor irrigation, water management and water shed development
- 4) Animal husbandry, dairying and poultry
- 5) Fisheries
- 6) Social forestry and farm forestry
- 7) Minor forest produce
- 8) Small scale industries, including food processing industries
- 9) Khadi, village and cottage industries
- 10) Rural housing
- 11) Drinking water
- 12) Fuel and fodder
- 13) Roads, culverts, bridges, ferries, waterways and other means of communication
- 14) Rural electrification, including distribution of electricity
- 15) Non-conventional energy sources
- 16) Poverty alleviation programme
- 17) Education including primary and secondary schools
- 18) Technical training and vocational education
- 19) Adult and non-formal education
- 20) Libraries
- 21) Cultural activities
- 22) Markets and fairs
- 23) Health and sanitation, including hospitals, primary health centres and dispensaries
- 24) Family eelfare
- 25) Women and child development
- 26) Social welfare, including welfare of the handicapped and mentally retarded
- 27) Welfare of the weaker sections, and in particular of the SC and STs
- 28) Public distribution system
- 29) Maintenance of community assets

Annexure: 5D

Flow-chart:6.1 Stages of participation in project preparation.



CHAPTER SIX

SOCIO-ECONOMIC IMPACT OF RURAL ROAD DEVELOPMENT

This chapter makes an attempt at an objective assessment of the socio-economic impact of rural road development on the rural economy. In order to facilitate an in-depth analysis of the socio economic impact of road development, the necessary primary data has been collected by carrying out a field survey. The procedure, methodology etc of the field survey has been outlined in the first few subsection of the chapter. The subsequent subsections were devoted to the analysis and interpretation of data.

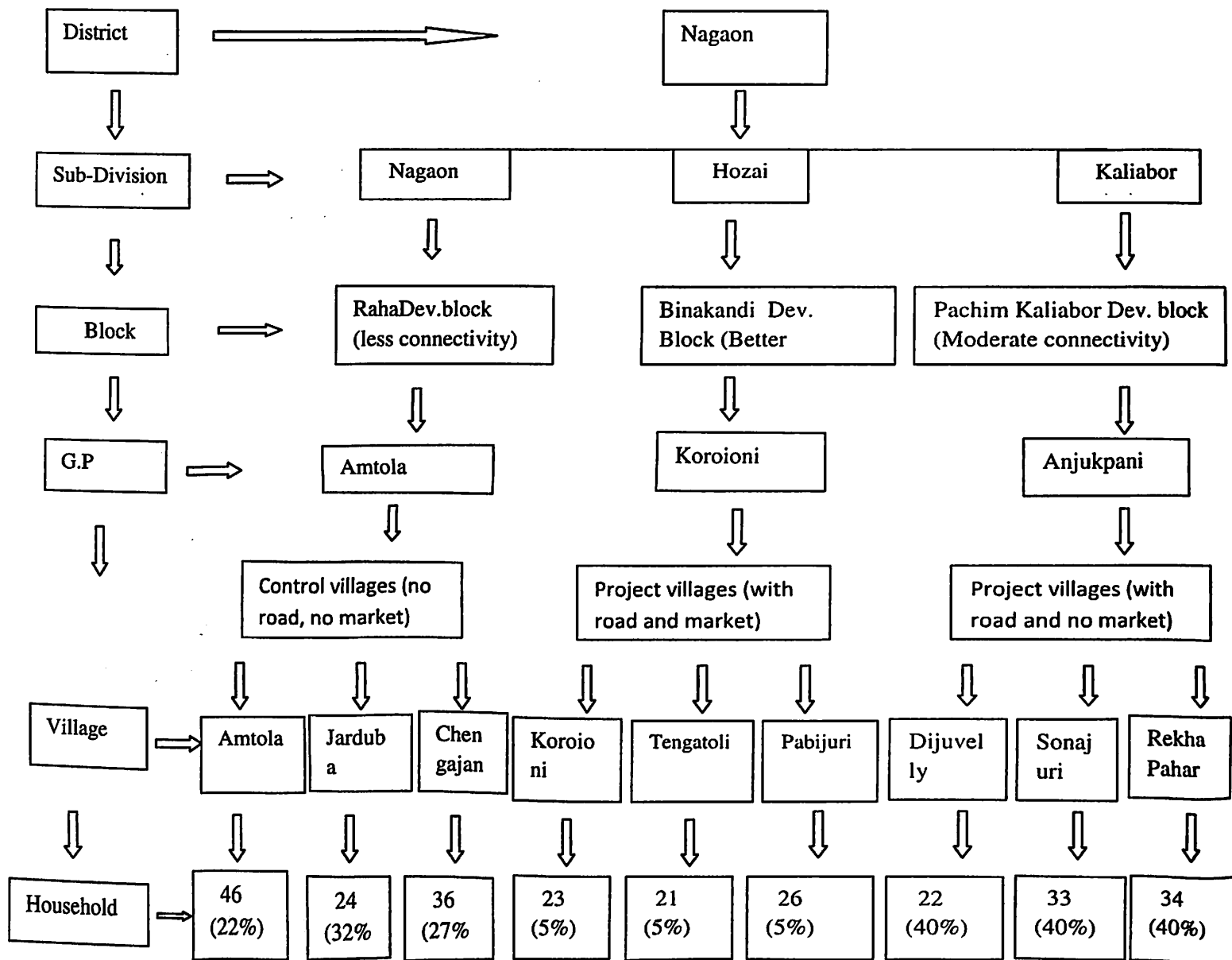
6.1 Sampling Design and Collection of Data

In view of the time and resource constraint, the geographical coverage of the field survey has been confined to the Nagaon district, one of the centrally located districts of Assam. All the three subdivisions of the Nagaon district viz. Nagaon, Hozai and Kaliabor, has been selected for the study. A three-stage sample design with judicious blending of random and purposive techniques has been used for collecting the field data. In the first stage, 3 community development blocks, one from each subdivision has been selected on the basis of degree of connectivity- viz better, moderate and less connectivity. In the second stage, three gaon panchyats, one from each development block and 9 villages three from each gaon panchayat, has been purposively selected on the basis of existence of paved road, market and no paved road and no market. Finally 5 to 40% households from each village have been randomly selected depending on the numbers of households in the villages. Thus 3 GPs, 9 villages and 265 households have been surveyed.

For collecting primary data from the selected Gaon panchayats, villages and households, three different sets of structured questionnaires comprising of both open ended and close ended questions have been used. The data on gaon panchayats/village development council have been collected from GP functionaries. The village level data have been collected from village headman and other informed sources. Household data have been collected directly from the head/member of the

selected households. Apart from questionnaires, important information has also been collected through interview and consultation. The details of the sampling design have been depicted in chart 6.1

Flowchart 6.1: Sampling Design



6.2 Profile of the selected Roads:-

Two roads which are constructed under Pradhan Mantri Gram Sadak Yojana in Nagaon district has been selected to ascertain the socio-economic impact on the lives of the villages connected through them.

Road No.1 – Uttar Dimarupar to Kaki (under koroioni gaon panchayat).

This road was sanctioned in April 2012 and completed by the end of December 2012. The total length of the road is 15 kms. and the road was constructed at the total cost of Rs. 230.00 lakh. The road falls under Hojai sub-division, Binakandi dev. block and Koroioni gaon panchayat. The road connects NH-37 and the Hojai town. Koroioni, Tengatoli and Pabijuri villages are connected to this road. The road also connects these three villages to the district headquarters. Many other surrounding villages are connected through kutchra roads to this PMGSY road.

Road No.2 – Amoni to Anjukpani (under Anjukpani gaon panchayat).

This road was sanctioned in April 2012 and completed by the end of October 2012. The total length of the road is 9.10 kms. and was constructed at the total cost of Rs.315.00 lakh. The road falls under Kaliabor sub-division, Pachim Kaliabor dev. block and Anjukpani gaon panchayat. The road connects NH-37, to the district headquarter and Kaliabor town. Rekhapahar, Sonajuri and Anjukpani villages are connected to this road. Many other villages are also connected through kutchra road to this sample road.

6.3 Socio-economic Profile of the Sample Villages:

6.3.1 Social composition of the sample villages

For the study, three villages from each selected gaon panchayat have been taken for investigating the socioeconomic impact of rural roads which are constructed under different scheme. The social composition of the sample villages is depicted in table 5.1. Among the sample villages, the highest numbers of households (773) and population (4052) are found in Koroioni village while Dijuvelly is found to comprise the lowest numbers of households (67) and population (391). This village falls under Hozai sub-division and Koroioni G.P. In this G.P. all the sample villages are inhabited by Muslim Community and are having 100% general population. In

Kaliabor sub-division, the village Dijuvelly is having 66% schedule tribe population with 34% general population while major part of population in Sonajuri village consists of general population (57%) with 43% OBC. But Rekhapahar is a unique village with representation of each category though major part of population belongs to the general category (42%). The population in Amtola comprised of 19% general, 60% SC and 21% OBC population. While Jarduba gaon is having a large percentage of general population (80%) with small OBC representation. As many as 81% of the population of the Chengajan gaon belongs to general category and remaining 19% belongs to OBC category.

Table: 6.1. Social composition of the sample villages

Village Name	No. of households	Total population	Caste (%)				Religion (%)		
			General	SC	ST	OBC	Hindu	Muslim	Christian
Koroioni	773	4052	100%	-	-	-	-	100%	-
Tengatoli	438	2023	100%	-	-	-	-	100%	-
Pabijuri	445	2815	100%	-	-	-	-	100%	-
Rekhapahar	83	412	42%	22%	25%	11%	100%	-	-
Sonajuri	87	497	57%	-	-	43%	100%	-	-
Dijuvelly	67	391	34%	-	66%	-	60%	-	40%
Amtola	155	788	19%	60%	-	21%	100%	-	-
Jarduba	75	233	80%	-	-	20%	100%	-	-
Chengajan	213	1075	81%	--	-	19%	100%	-	-

Source: Field Study

In terms of religion, in Koroioni, Tengatoli and Pabijuri villages are consisted predominantly of Muslim families while in Amtola, Jarduba and Chengajan are consisted predominantly Hindu families. The village Dijuvelly is having 40% of Christian families and 60% Hindu families.

6.3.2 Economic Background of the Sample Villages:-

The data presented in the Table 5.2 reveals that majority of the households (44%) lives in katcha houses, followed by pucca (24%) and semi pucca houses (20%). Households residing in IAY houses accounts for 12% of the sample villages. The table also reveals that households living in katcha houses have been highest in Amtola village (61%) under Raha block and lowest in Sonajuri village (24%) under Pachim Kaliabor dev. block.

Table: 6.2. Economic background of the sample villages

Village name and household nos.	House type (%)				Percentage of household engaged in			
	Kutch a	Semi-pucca	Pucca	IAY house	Agriculture	Salaried job	Daily labour	Other Services
Koroioni,	42	14	29	15	64	8	11	17
Tengatoli	48	25	19	8	75	5	15	5
Pabijuri	46	22	19	13	53	7	10	30
Rekhapahar	35	18	37	10	49	15	13	23
Sonajuri	24	29	22	25	40	20	12	28
Dijuvelly	31	17	36	16	52	10	18	20
Amtola	61	13	16	10	70	7	14	9
Jarduba	35	23	33	9	65	15	8	12
Chengajan	39	34	19	8	46	21	15	18
Over all	44	20	24	12	61	9	12	18

Source: Field Survey

Households having semi-pucca houses are found to be highest in Chengajan gaon (34%) and lowest in Amtola gaon (13%). The village Rekhapahar is in a better position in respect of pucca houses where 35% of the households are living in pucca houses compared to 16% households in Amtola gaon. Sonajuri village (25%) is occupies at the top of the list in getting houses under Indira Awash Yojana as against the lowest (8%) households getting IAY houses in Tengatoli (8%) and Chengajan gaon (8%).

Maximum households in Koroioni (64%) and Tengatoli (75%) are engaged in agricultural activities for earning their livelihood. Moreover 11% and 15% households of these villages earn their livelihood by working as daily wage earner while engage in salaried job has been negligible. The condition is more or less similar in Amtola, Jarduba and Chengajan where majority households earn livelihood from agriculture (70%, 65% and 46%) and daily labour (14%, 08% and 15%) with 7%, 15% and 21% households depending on salaried job respectively.

The picture of three sample villages in Pachim kaliabor dev. block is different where only 40% household in Sonajuri are engaged in agricultural activities. Percentages of households engaged in salaried job are not much less in these villages. It is interesting to note that the major part of the households (28%) in Sonajuri is engaged in other activities like dairy farming and self-employed.

6.4 Methodology:--

Rehabilitation works of the selected roads was completed in 2012. No baseline survey (in case of household) was carried out during the pre-construction period. In case of traffic volume on the road, number of road side shops, public transport (tracker, tempo, bus etc.), other infrastructure facilities like electricity, water supply etc., baseline survey was carried out before the development of the road. This survey was done in the month of April, 2012. Since it was not possible for us to conduct baseline survey in households as the construction of road was already started, we decided to take another round of survey. Accordingly, the follow up survey was carried in December, 2014, using the recall technique (in some questions) to compare before and after condition in a qualitative and quantitative sense. We have already mentioned that primary data were collected on the basis of degree of connectivity- better connectivity, moderate connectivity and less connectivity. From this three connectivity villages two categories of villages were selected- (i) villages with roads and market and (ii) villages without roads and market. The second category is designated as the 'control villages'. Villages with the road and market were further categorized into (i) villages with roads and market from better connectivity and (ii) villages with only roads and no market from moderate connectivity. This was done to make the control villages more comparable with the villages with better connectivity and villages with moderate connectivity in terms of

socio-economic impact. Control villages are selected from the less connectivity area. The villages with roads and market were again designated as the 'project villages'. **Project villages** are the villages with rural roads where roads have been improved or constructed. **Control villages** are the villages where no rural roads are constructed in any other govt. scheme and are also not likely to be taken up for improvement /construction during the study period. These roads are located in similar socio-economic characteristic as the project roads.

The study adopted three distinct criteria viz (i) adoption of modern agricultural technology, as the economy of Assam is agriculture based, (ii) existence of a market, which is the center of rural economic activities and (iii) existence of a road, which is the project intervention mechanism.

Modern agricultural technology has been adopted by the farmer of Assam, though the level of using the technology varies. The technologies used by the Assam farmers in the study include (i) power tiller and tractor, (ii) HYV seeds, (iii) chemical fertilizer, (iv) pesticides, (v) thresher machines and (vi) irrigation technology. The technology used by the farmers have been classified into six categories (table 6.3.)

Table 6.3. Classification of level of Agricultural Technologies.

Level of Agricultural Technology	Criteria
A	When a farmer uses all six level of technologies i.e. power tiller/tractor, HYV seeds, chemical fertilizer, pesticides, thresher machine and irrigation will referred as an A level technology user.
B	When a farmer use any five out of six technologies.
C	When a farmer use any four out of six technologies.
D	When a farmer use any three out of six technologies.
E	When a farmer use any two out of six technologies.
F	When a farmer use any one out of six technologies.

Thus this classification has been followed in the analysis of agricultural indicators. The selection criteria of the sample villages has been presented in Table 6.4

Table 6.4 Selection criteria of the sample villages.

Project villages		Control villages
Better connectivity villages	Moderate connectivity villages	Less connectivity villages
<ul style="list-style-type: none"> • Road • Market • Agricultural technology level either A or B 	<ul style="list-style-type: none"> • Road • No market • Any level of agricultural technology 	<ul style="list-style-type: none"> • No road • No market • Any level of agricultural technology

The only difference between the two is the existence of market infrastructure in better connectivity villages. Between the moderate and control villages, the existence of a road in moderate villages is the only difference. Thus, a comparison between a moderate and control village shows the impact of road intervention and a comparison between better connectivity village and moderate village and / or between the better and control village shows how other interventions (including road) affects economic growth.

Double-Difference Method:-

Double-Difference is a popular method to estimate impact of road project. Ravallion (2001) in his work on 'The Mystery of the Vanishing Benefits' have provided a theoretical framework for application of 'regression model' in 'double differencing' to estimate net project impact. To him the double difference method entails comparing a participant group with a nonparticipant group both before and after the intervention. The main steps are as follows:

Step 1: A baseline survey before the intervention is in place, and the survey must cover both participants and nonparticipants.

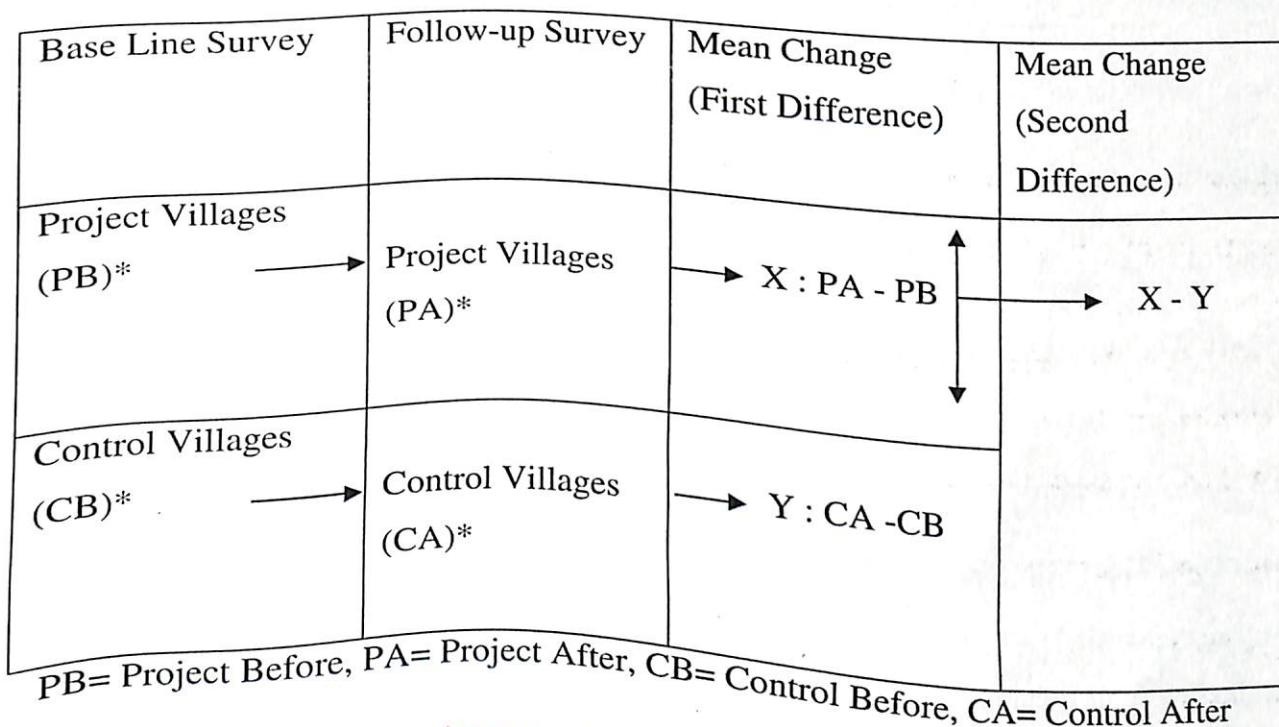
Step 2: There should be one or more follow-up surveys, after the program is put in place. These should be highly comparable to the baseline survey (in terms of questionnaire, the interviewing, etc.). The follow-up surveys should be of the same sampled observations as the baseline survey.

Step 3: Next step is to calculate the mean difference between the 'after' and 'before' values of the outcome indicator for each of the participants and nonparticipant groups.

Step 4: Then calculate the difference between these two mean differences. That is the estimate of the impact of the programme.

The schematic diagram showing the application of double difference method is presented in Diagram 6.1

Diagram 6.1: Application of Double – Difference Method



Therefore, first difference between the project villages and control villages is taken before the construction of the road and second difference is taken after the project implementation.

Thus, project impact = (Mean PA - PB) - (Mean CA - CB)

The "Double-difference" method can be applied where baseline information of both the project and control villages are available. In the absence of baseline statistics, the analysis is limited only to the follow-up year, and the difference between the project and control villages in the follow-up year is the only option to estimate the project impact (Islam, et al. 2008).

The 'general regression model' is used to build the relationship between the outcomes variable and the explanatory variables, which takes the general form:

$$Y = a + bx + u \dots \quad (i)$$

Where Y is outcome variable, and x is the series of explanatory variables capturing household and community characteristics, a and b are constant terms and u is an error term. In the follow-up period, taking agricultural income (y) as the outcome variable and x as the series of explanatory variables, we can write three regression model for the 'better' 'moderate' and 'control villages' in the follow-up year as follows-

$$\text{Better connectivity: } Y_b = a_b + b_b D_R + b_b D_M + b_b X_b + U_b \dots \quad (ii)$$

$$\text{Moderate connectivity: } Y_m = a_m + b_m D_R + b_m X_m + U_m \dots \quad (iii)$$

$$\text{Control villages: } Y_c = a_c + b_c X_c + U_C \dots \quad (iv)$$

Where D_R and D_M are the distance to road and distance to market from the households.

6.5 Socio-Economic Impact

The socio-economic impact of rural roads can be divided in to two categories- direct impact and derived impact. Direct impacts are the impacts which are most immediately noticeable to project outputs. Rural road project have direct impact on (i) the provision and uses of transport services and facilities and (ii) commercial activity which is highly dependent on the transportation system i.e. marketing, warehousing, vehicle repair etc.

Derived impact can be viewed as dependent on direct impacts. Derived impacts are likely to take place only after the improvements in the transportation system have been achieved. The derived impacts of rural road projects typically include changes in farm production, agricultural technology, land value and the quality of life in communities located in the project area.

Project designers commonly expect direct and positive effects on the transportation system by reducing travel time and costs. In most cases, these benefits come from a change in the mode of transportation i.e. a shift from animal drawn transport to

motorized vehicles because of road improvements. Reduced transportation costs mean direct savings to vehicle operators by lowering fuel and repair costs and lessening delays. Road development can increase the earnings or wages of vehicle operators because they will be able to make more trips, carry larger loads, and use the road more frequently throughout the year. This will again increase the competition among transportation providers, reduced transportation costs to small farmers and other users.

Road project are expected to have a direct impact on commerce and marketing. Better access to markets is expected to increase the flow of commodities both into and out of the project area. Producers within the region will be able to reach new markets. Producers from the outside of the project area will find new customers for their goods. Hence, it is sometimes reasonable to expect higher farmgate prices or at least a greater volume of production being marketed at existing prices. Therefore, direct impacts are more likely to have occurred within a relatively short period of time after achievement of project outputs.

6.5.1. Transportation related impact:

Transportation service is the adjacent sector on which the immediate impact of road improvement is likely to be felt. Improvement of roads is expected to lead to an increase in the volume of traffic, decrease in travel time and changes in the patterns of ownership in the transport sector.

Growth of Public/Private transport

In the project as well as control villages, the public transport is in the form of buses, trackers and three wheelers while private ownership of vehicles is in the form of motor cycles, bi-cycle, car, tractor and bullock cart. The impact of road in case of public and private vehicles is summarized in Table 5.5. The mean change relating to project and control roads in project and control villages have been worked out and finally the difference of project village over control villages is assessed in the last column of the Table. A positive figure in the table indicates 'net increase' and a negative figure indicates 'net decrease'. The net increase and net decrease can be considered because of the improvement of roads. It is evident from the data presented in Table 6.5 that there is an increasing trend of public transport in project

villages and the mean difference is 8 over the control villages. As the road is developed mainly three wheeler public transport is showing an increasing trend. In case of private ownership of vehicles, motorcycle, bicycle and car have increased in the project village by 8.34, 4.84 and 5.00 over the control villages. However, there is a negative figure – 0.99 in case of bullock cart, which means net decrease in the number of bullock cart in the project villages over the control villages.

Table 6.5 Growth of Public/Private vehicles in sampled villages.

Transport (public)	Mean Difference (First difference)		Difference (PR over CR) (Second difference)
	PR	CR	
Bus/three wheeler/ tracker	10.17	2.17	8
Transport (private)			
Bullock cart	0.16	1.33	-0.99
Bicycle	9.84	5.00	4.84
Motorcycle	9.67	1.33	8.34
Tractor	1.50	0.67	0.83
Car	5.00	0	5.00

Source: Field Survey

The large farmers reported that they will prefer to switch over from the traditional tilling to the tractor led tilling. In many cases, the presence of tractor is encouraging faster carrying of the farm produce to the markets, a facility available for large farmers. Hence, it is clear from the survey that the people in the control villages are much more likely to travel on foot whereas project households are much more likely to use either a bicycle, motorcycle or three wheelers. In general, project households have the opportunity to travel more for all purposes, have greater access to and made greater use of transport services, uses private modes of transport.

6.5.2 Trade Impact Indicators

A. Increased number of shops

The road improvement has result a substantial increase in the number of shops within the project villages. Different types of commercial activities came into operation in order meet the demand of the people. Since the people had good purchasing power, they started demanded different kinds of food, beverage and other daily necessary items. To meet this demand, many local and outside people have operated a number of small shops and restaurant around the road side. These demand increases the local trade and business in the area. The overall no. of shops has increased more than doubled after road construction. The largest rate of growth takes place along the project villages. In these villages, the total number of shops increased by 150% from 34 to 85. In control villages, the total number of shops increased from 5 to 9. The mean differences of the shops among the project and control villages are shown in table 6.6.

Table 6.6 Growth of shops

Growth of Shops	PR	CR	Difference PR Over CR
	8.50	1.34	7.16
Present sales volume in a day (in Rs.)			
Project Villages/	Control Villages		Difference PR over CR
153000.00 (Rs. 1800.00 per shop)	11500.00 (Rs.1277.77 per shop)		141500.00

Source: Field survey

The average difference of shops in the project roads and control roads both in the baseline and follows up year 8.50 and 1.34 and difference of project roads over the control roads is 7.16.

B. Current sales volume in a day

The sale volume per day in all the surveyed shop in the project villages is Rs. 153000.00 and daily sales volume in the control villages is Rs. 11500.00. The average sales volume in the surveyed shop in project villages and control villages

are Rs. 1800.00 and Rs.1277.77 respectively. There are no available statics on the sales volume in previous years before the road improvements.

6.5.3 Land Value:

Development of road increases the value of land close to the road. In expect of road development, land prices in the project villages registered a significant rise even before the development of the project roads. As a result, increase in the land prices in the project villages is likely to be more than the control villages. The changing pattern of land prices (in percentage) is evident from the data presented in Table 6.7.

Table 6.7 changes in land prices (per Bigha)

(in rupees)

Land Values	PR		% Change	CR		% Change	Change in PR over CR
	Before	After		Before	After		
Agricultural Land	70,000.00	1,20,000.00	71%	60,000.00	66,000.00	10%	61%
Commercial Land	1,50,000.00	4,50,000.00	200%	1,00,000.00	2,00,000.00	100%	100%
Residential Land	1,20,000.00	3,00,000.00	150%	1,20,000.00	1,50,000.00	25%	125%

Source: Field Survey

The road development has resulted in a substantial increase in land prices in the project villages. Here the % change in prices of the agricultural land in project villages is 71%, in commercial land is 200% and residential land is 150%. In the control villages, change in percentage in agricultural land, commercial land and residential land are 10%, 100% and 25% respectively. Percentage change in project villages over the control villages are 61%, 100% and 125% respectively. Hence, the table indicates that project villages show much higher increase in land price compared to the control villages during the study period.

6.5.4 Impact on livelihood patterns:-

A. Changes in occupational mobility:-

One important aspect of change in rural livelihood system because of road development is occupational mobility among the rural households. From poverty alleviation perspective, mobility issue is basically relevant for the household with

low asset. Therefore, to examine this mobility issue we traced occupational changes among the household heads in project villages who indicated agricultural labour as the primary occupation prior to the road development. Of such 133 agricultural labourers, 50 changed their occupational pattern after the road development. The field data shows that 62% of them are still farmer as they are large land holders. The second major occupational shift has been to the trade and transport sector. Major activities which are taken up in the trade sector are small grocery store, vegetable sellers, tea-stall, hawker, fruit and miscellaneous trading. Nearly 7% Of these agricultural labourers took up in the construction sector as wage employment. The major occupational shifts have been seen to the transportations. Nearly 12 percent of these agricultural labourers became tempo operators taking the advantage of the improvement brought about in the transport sector through road development. It can be reported here that a large number of transport operators were found to belong to the landless and near landless category. The Table 6.8 shows the occupational shift from agricultural labour to the other activities in the project and control villages.

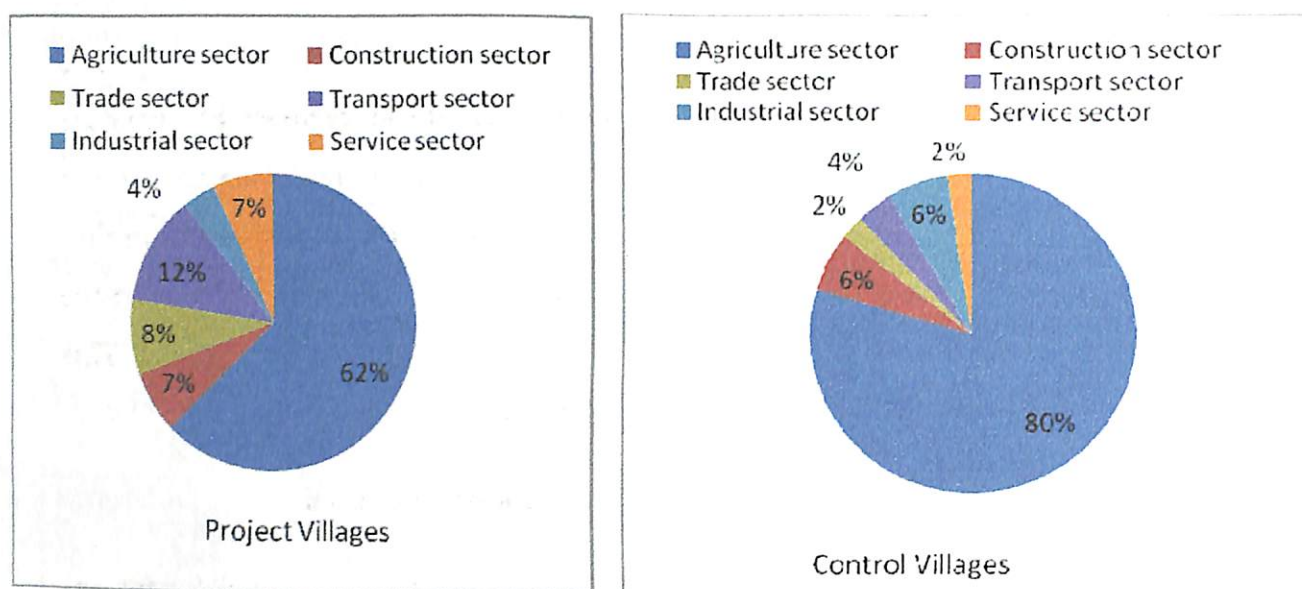
Table: 6.8 Occupational shifts from Agriculture to other activities.

	Project Road			Control Road			Difference of PR Over CR
	Before	After	Difference	Before	After	Difference	
Agricultural labour	133	83	50	83	66	17	53
Shifted to other activities							
	Project Villages			Control Villages			
	Nos.			Nos.			
Construction sector	9 (7%)			5 (6%)			
Trade sector	11 (8%)			2 (2%)			
Transport sector	16 (12%)			3(4%)			
Industrial sector	5 (4%)			5 (6%)			
Service sector	9 (7%)			2 (2%)			
Agricultural sector	83 (62%)			66 (80%)			

Source: Field Study

From the data presented in Table 6.8, it is evident that after the development of the road, 7% agricultural labourer has shifted to construction sector, 11% to trade sector, 12% to transport sector, 4% to industrial sector and 7% to the service sector respectively. In the control villages 6% agricultural labourer has shifted to construction sector, 2% to trade sector, 4% to transport sector, 6% to industrial sector, 2% to service sector and 80% did not change their occupation during the study period. This shifting pattern will be clearer from the following pie diagrams.

Figure: 6.1% of shift of agricultural labourer to the other activities.



Source: Table 6.8

Development of rural road renders labour-market more elastic by facilitating geographical movement of labour. With the improvements in rural road, a labour can move with no difficulty between the place of work and residence which may reduce the need for out-migration. The development of road infrastructure also facilitated generation of employment opportunities. During the study period, population in the project villages experienced a positive growth and population in the control villages also experienced a positive growth. The mobility of labourer from villages is estimated at 9.52% in the control villages against 11.22% in the project villages in the follow-up survey where as the rate of mobility in search of work was estimated at the rate 8.18 percent in the control villages against 7.73% in the project villages in baseline year. These results are summarized in the (Annexure 6A).

B. Change in the ownership of livestock and poultry:

Development of roads did not have any visible impact on livestock and poultry rearing. The data presented in Annexure 6A clearly reveals that the stock of cattle and poultry birds seems to have declined in the project villages, whereas the tendency of the livestock and poultry rearing has increased in the control villages. However, it may be noted that holding of cattle and poultry birds decreased amongst poor-households, especially in the project villages. This may be because of an attempt of poor households to diversify their livelihood. In case of control villages, the stock of livestock and poultry has been increased by 11.32% compared to the baseline data, whereas, in the project villages, it is decreased by 13.2% compare to the baseline data. The poor households in the project villages have slight advantage over those of the control villages in the diversification attempt. Though there is decreasing tendency in the livestock and poultry rearing, people in the project villages reported that dairy production and milk values have increased due to the operation of milk tankers that have allowed sale of liquid milk from the area. This would not have been possible without a paved road.

C. Change in the ownership of commercial transport equipment:

Auto van, Tempo, Jeep and truck are the most important commercial transport owned by the households in the villages and their importance has increased with the development of the road. The pace of increase has been higher in the project villages than in the control villages.

D. Increased new employment in both government and private sector

The study also attempted to quantify the rates of new employment in both government and private sector by household members in the sampled villages. It was found that the employment rate has gone up in the project and control villages with the development of the road (Table: 6.9)

Table 6.9 New employments in both government and private sector after 2011-12

Project Road						Control Road	
Better connectivity		Moderate connectivity		Both			
HHM*	Employed	HHM	Employed	HHM	Employed	HHM	Employed
500	20 (4%)	471	26 (5.52%)	971	46 (4.73%)	599	15 (2.50%)

Source: Field Study

***HHM stands for household member**

Average employment rate of household members in project villages is about 4.73%, whereas the moderate villages' shows slightly higher employment rate (5.52%) compared to the better connectivity villages (4%). In control villages only 2.50% household members got employed in both government and private sector after 2011-12.

From the results of the above explanation, here we have found the answer of the research question that rural road generates livelihood opportunities in the rural area.

6.5.5 Impact on Agriculture:

The Assam economy is agriculture based and states economy depends primarily on the development of the agricultural sector. The adoption of modern agricultural technology not only increases production per acre, but also increases the cropping intensity.

The farmers in Assam are using the following modern agricultural technologies, though not all the farmers have equal access to them.

- (1) Tractor/ Power tiller
- (2) HYV seeds
- (3) Chemical fertilizer
- (4) Pesticide
- (5) Irrigation

To analyze the level of technology used by the farmers, the study divided the farmers into three technology groups as follows:

Level A: Farmers using all the above five agricultural technologies.

Level B: Farmers using any four out of five technologies.

Level C: Farmers using any three out of five technologies.

The data presented in Table 6.10 reveals the level of adoption of modern agricultural technology by the farmers of the sample villages.

Table: 6.10 Level of adoption of modern agricultural technology by the farmers.

Name of villages	Project villages			Name of villages	Control villages		
	Level of adoption of agricultural technology				Level of adoption of agricultural technology		
	A	B	C		A	B	C
Koroini	46.66%	33.34%	20%	Amtola Gaon	-	55.55%	44.44%
Pabijuri	16.67%	50%	33.33%	Sutar Gaon Jaschuba	-	60%	40%
Tengatali	-	72.73%	27.27%	Dewri Gaon Chengrajan	-	63.63%	36.36%
Dizuvelly	30%	20%	50%				
Sonajuri	-	75%	25%				
Rekhapahar	-	42.85%	57.15%				
All Average	5.55%	48.99%	35.46%	All Average		59.73%	40.27%

Source: Field Survey

In the project villages 15.55% of households are using A level of modern agricultural technology, though in Tengatali, Sonajuri and Rekhapahar villages, none of the sample households in project villages fall in the category A. But the majority of the sample households in project villages are using four modern agricultural technologies. Interestingly none of sample households in control villages are using A level of agricultural technology. This may partly be explained that the agricultural development interventions have not expanded in the remote

areas of the district. 59.73% of sample households are using B level of agricultural technology and 40.27% of households are using C level of technology as against 48.99% and 35.46% of households in the project villages are using B and C level of technology respectively, which is 10.74% (B level of technology) higher than the corresponding figure of households in project villages and 4.81% higher in use of C level of technology than the project villages.

A. Impact analysis by using Regression Model:-

Looking carefully the survey data, we decided to use the following variables for the regression model.

Y = Agricultural household income as outcome variable (In Rs.)

D_R = Distance of the household from the paved road. (In km)

D_M = Distance of the household from the market. (In km)

X_1 = Expenditure on seeds.

X_2 = Expenditure on chemical fertilizer.

X_3 = Expenditure on pesticides.

We form three regression models for three kinds of villages in the follow-up year as follows

$$\text{Better connectivity: } Y_b = a_b + b_b D_R + b_b D_M + b_b X_{b1} + b_b X_{b2} + b_b X_{b3} + U_b \dots \dots \dots \quad (\text{ii})$$

Model I

$$\text{Moderate connectivity: } Y_m = a_m + b_m d_R + b_m X_{m1} + b_m X_{m2} + b_m X_{m3} + U_m \dots \dots \dots \quad (\text{iii})$$

Model II

$$\text{Control villages: } Y_c = a_c + b_c X_{c1} + b_c X_{c2} + b_c X_{c3} + U_c \dots \dots \dots \quad (\text{iv})$$

Model III

By regressing the above equation and using the field survey data, we have the following results

Table: 6.11 regression results

Test of heteroskedasticity	Project villages		Control villages
	Better connectivity	Moderate connectivity	
	Breusch-pagan test Chi ² [1] = 1.41 Prob. = 0.2349 Result = Absence of heteroskedasticity	Breusch-pagan test Chi ² [1] = 1.14 Prob. = 0.2859 Result = Absence of heteroskedasticity	Breusch-pagan test Chi ² [1] = 0.91 Prob. = 0.3398 Result = Absence of heteroskedasticity
Variables	Estimates of coefficient/ values	Estimates of coefficient/ values	Estimates of coefficient/ values
Distance to road (D _R)	-73616000(-4.34)***	-79753.52 (-6.91)***	-
Distance to market (D _M)	- 64480.9 (-3.98)***	-	-
Expenditure on seeds	- 7.618867 (-0.49)	-2.918007 (-0.64)	1.119474 (-0.31)
Expenditure on fertilizer	1.631775 (0.16)	-10.37999 (-1.40)	5.510402 (1.34)
Expenditure on pesticides	4.000098 (0.43)	- 7925371 (-0.07)	8.664143 (1.57)
Constant	268784.8 (6.50)***	208012 (9.49)***	24397 (3.54)**
R ²	0.7127	0.6280	0.0911
F [5,32]	12.40 ***		
F [4,20]		10.80 ***	
F [3,61]			2.25*

Note: Figures in () and [] represents standard error and Degrees of freedom respectively.

(***, ** and * represents significant at 1, 5 and 10 percent level.)

Heteroskedasticity is absence in all the three models as depicted by the insignificant chi-square value.

The model I and II are significant as depicted by F values 12.40 and 10.80 which are significant at 1% level of significance.

71.27% of variation in model I and 62.80% of variation in model II can be analyzed by these factors as shown by 0.7127 and 0.6280 value of the co-efficient of determination (R^2) respectively.

Out of all these independent variable only road and market factors are significant, others are insignificant. The variable distance to road is significant at 1% level of significance. 'Distance of household from the road' is found negatively related with the household income which means that longer is the distance from the road of a household, lower is the household income.

The variable 'Distance to market' is also significant at 1% level of significance where the co-efficient value is -64480.92, which is again found to be negatively related to the household income i.e. longer the distance of household from the market, lower is the household income.

When considering the 'expenditure on seeds' both in the Better connectivity and Modern connectivity villages, the co-efficient of seeds has been found to be negative and insignificant indicating that use of less rupees in HYV seeds may cause lower income.

The 'expenditure on fertilizer' and 'expenditure on pesticides' in the household of better connectivity and control villages has been found to have positive impact, though not significant.

The $R^2 = 0.0911$ for the model III indicates that only 09.11% of the increase in household income is explained by these factors in control villages.

Therefore, the regression models lend strong support to the hypothesized effect of road improvement. The overall affect of using seeds, fertilizer and pesticides have positive impact though not significant as well as the existence of market and road have significant impact on household income.

The R^2 value increases when the variable road is included. Increase of income can be better defined while including the variable market. Hence, the model can be better explained while including the factors road and market.

The regression result also reveals the answer of the research question that rural road has an impact on agricultural income.

A. Changes in the Cropping intensity:

As many as 45 farmer constituting 71.42% of farmers in the project villages reported that they have changed their cropping pattern. It implies that road development encourages the farmer to use their land more intensively. In addition to rice, there has also been significant increase in the output of potato, oilseeds and vegetables in the project villages. The cropping pattern in the control villages also changed during the study period as 36.36% (24 nos.) of farmers in the control villages reported that they use their land more intensively by cultivating HYV boro, potato and sugarcane.

B. Changes in fertilizer uses:

During the study period, no significant difference was observed in the use of fertilizer in both categories of the villages. In the project villages 90.47% (57 nos.) reported that there is no any impact of road development in the use of fertilizer. Only 9.52% (6 nos.) farmers opined that they are using fertilizers in Boro (rice) farming after the road development. But in control villages 100% farmers are using fertilizer such as urea.

6.5.6 Impact on Education sector:

The provision of rural roads has an important role on the attendance of the students coming from the villages where the rainy season disrupts the movement for long time. The school in rural areas always suffers from the problem of inadequate attendance during the rainy season. As the roads are constructed, not only the students in the villages find it easier to go to schools, but good and efficient teachers are also attracted to those village schools. As a result the literacy rate has increased and educational standards improved.

The rural areas of Assam have relatively less number of high and higher secondary schools. As most of the High and Higher Secondary school are concentrated in urban areas, the students from the rural areas have to travel all the way to the towns to attend these schools. Therefore, rural connectivity plays a significant role in the decision of the families for enrolling their wards into higher schools. A lot of time is wasted when the villages were not connected with all weather roads.

Table: 6.12 Enrollments of boys and girls students in project and control villages

Enrollment in primary school		PR (first mean difference)	CR (first mean difference)	Difference PR over CR	
		14.2	13.33	0.89	
Enrollment in secondary school		62.75	15	47.78	
% of respondents reported improvement in attendance of their children during rainy season					
Project Villages			Control Villages		
Respondents	Improved	Not Improved	Respondents	Improved	Not improved
159	147 (92.45%)	12 (7.54%)	106	49 (46.22%)	57 (53.77%)

Source: Field Survey

The above table reveals that in project villages, school enrollment has increased and mean difference is 14.2 over baseline period and 0.89 over control villages in case of primary school, and the first mean difference is 62.75 and the second difference is 47.78 over the control villages. The data on school enrolment rate of boys and girls in both project and control villages presented in (Annexure 6B) reveals that the rate enrollment of girls' student during the study period has increased from 38.62% to 47.09% in the project villages, whereas that of the boys' student in the primary school has decreased from 60.70% to 52.90%. The reason behind this may be the increase of child labour in the tea gardens. The moderate connectivity villages which are under project road are mainly surrounded by tea gardens. The head masters in the primary school reported that though the rate of enrollment increased over the years, the percentage of students attending school is low as some of them works with their parents in the tea gardens. However the percentage of enrollment in the project villages increased by 9.45 and 7.75 in control villages during the study period.

In the control villages, the boys' enrollment rate has increased from 57.55% to 59.53% while girls' enrollment rate decreased from 42.44% to 40.46%. In case of secondary school, boys' enrollment has decreased from 56.69% to 54.92% whereas girls' enrollment has increased from 43.30% to 45.07% in project villages. In control villages boys' enrollment has increased from 56.32% to 57.40% and girls' enrollment has decreased from 43.67% to 42.59%. The secondary school enrollment has increased by 8.88% in project villages and 4.17% in control villages during the study period. The head masters in all schools has also opined that the road development have encouraged the teacher's attendance as well as school inspection which has improved the academic performance of the students.

As high as 92.45% of the respondents felt that the frequency of their children missing schools during the rainy season has gone down. However, 7.54% respondents felt that the situation remain more or less the same after the development of the road. In the control villages 46.22% households reported that their child goes to school regularly during the rainy season. However, 53.77% respondents opined that their children missed the school during the rainy season.

6.5.7 Health care Facility:

Rural areas in Assam have been suffering seriously in terms of accessibility to the basic necessities of life like health care. Emergencies due to serious illness, accidents and complications in pregnancies require immediate medical attention. The awareness regarding health status has also been very low in backward rural areas of Assam. Construction of rural roads connecting the isolated villages with the highway and towns not only improve access to the existing facilities but also facilitates establishment of more health centers where the medical staff can function more effectively. Improved access to health centers and better transport facilities has come as a blessing to the study area. The percentages of men and women visits to the health centers after the road development have shown in table 6.13.

Table: 6.13. Frequency of Access to health centers by Men and Women in the Project and Control villages.

Project villages				
Respondent	Men	Times/Year	Women	Times/Year
159	81 (50.94%)	Two times	126 (79.24%)	More than two times
	22 (13.83%)	Once	8 (5%)	Once
	56 (35.22%)	Don't visit	25 (15.72%)	Don't visit
Control villages				
Respondent	Men	Times/Year	Women	Times/Year
106	28 (26.41%)	Two times	32 (30.18%)	Two times
	36 (33.96%)	Once	49 (46.22%)	Once
	42 (39.62%)	Don't visit	25 (23.58%)	Don't visit

Source: Field Study

It is evident from the data presented in Table 6.13 that the women visit to the hospital or clinic centers are more frequent than that of men. As high as 79.24% women visit the nearest hospital more than two times a year in the project villages after the construction of the road, 5% of them visit once in a year and 15.72% doesn't visit health care centers in a year. Only 50.94% of men visit a clinic two times, 13.83% visit once in a year and remained 35.22% don't visit hospital in the project villages yearly.

In control villages, women visits health care centre more frequently than men. A little less than one-third (30.18%) women of these villages visited health care centre twice a year, 46.22% once in a year; remained 23.58% did not visit healthcare centers. A little more than one-fourth 26.41% of men in the control villages visited the health care centers twice in a year, 33.96% of them visit clinic once and 39.62% respondents said that they hadn't visited hospital during the study period. The frequency of visits to health centers by women living in the project villages has been highest which may be attributed to the increased accessibility resulting from road development.

6.7 Sum up:

To sum up, the existence of all weather rural roads constitute an essential enabling condition for improvement in the living condition of the people it serves. Such a road facilitates the use of a variety of vehicles which are more regular, speedy and often economical. Improvement in transport facilities, in its turn, makes certain critical services and facilities such as education, health care etc. relatively easily accessible to people compared to an area lacking such as road. Needless to state that accessibility to such facilities and services are indispensable for improvement in the living condition of the people.

Field data reveals that the frequencies of different vehicles playing in the project road are much higher compared to control road. Due inter alia, to existence of improved project road, the private ownership of vehicles in the project villages increased at a relatively faster rate than in the control villages.

Road development gave a boost in the growth of trade and commerce in the project villages by facilitating better movement of goods from one place to another. The substantial increase in the number of shops overtime in the project villages compared to those in the control villages in an indication of the role played by project road in improving trade and commerce in the villages served by it.

Road development encouraged the farmer in project villages to make use of their land more intensively and grow a variety of crops leading to significant increase in agricultural output. The cropping intensity and pattern also underwent some changes in the control villages but not to the extent it did in project villages.

An indication of the impact of road development in education sector is the increase in the enrollment of students, both boys and girls, in the primary schools particularly in the project villages. Besides, the accessibility to health care facilities in the project villages improved substantially following road development. It has been found that frequency of visit to health care center among women is higher compared to that of men.

It has been found that in the project villages, the employment rate in government sector is higher among the households in the moderately connected villages. A significant finding of the study is the shift in occupational pattern of the workers in

project villages as a result of road construction. A sizeable number of agricultural labourers in the project villages left the agriculture sector and started earning the livelihood as workers in the service sector, especially transport, trade and construction activities.

The regression models results lends strong support to the hypothesized effect of the road improvement. Distance of household from the road and market is found to be negatively related to the household income which means that longer the distance of a household from the road and market lower is the household income. The overall effects of using seeds, fertilizers and pesticides have positive impact though not significant as well as the existence of market and road have a significant impact on household income.

ANNEXURE: 6A

(Daily mobility of labourer in search of work)

No. of respondent	Project Villages				No. of respondent	Control Villages			
	Before		After			Before		After	
	Yes	No	Yes	No		Yes	No	Yes	No
159	75	896	109	862	106	49	550	57	542
HHM(97 1)	7.73%	92.27%	11.22%	88.78%	HHM(599)	8.18%	91.82%	9.52%	90.48%

Ownership of livestock and poultry

No. of respondent	Project Villages				No. of respondent	Control Villages			
	Before		After			Before		After	
	Yes	No	Yes	No		Yes	No	Yes	No
159	131	28	110	49	106	82	24	94	12
	82.38%	17.61%	69.18%	30.81%		77.35%	22.64%	88.67%	11.32%

Ownership of commercial vehicles

No. of respondent	Project Villages				No. of respondent	Control Villages			
	Before		After			Before		After	
	Yes	No	Yes	No		Yes	No	Yes	No
159	9	150	33	126	106	5	101	6	100
	5.66%	94.33%	20.75%	79.24%		3.14%	95.28%	5.66%	94.33%

ANNEXURE 6B

Primary School											
Project villages(9 schools)						Control villages(3 schools)					
2012			2014			2012			2014		
M	F	Total	M	F	Total	M	F	Total	M	F	Total
822	523	1354	784	698	1482	297	219	516	331	225	556
60.70%	38.62%		52.90%	47.09%		57.55%	42.44%		59.53%	40.46%	
Secondary School											
Project villages(4 schools)						Control villages(2 schools)					
2012			2014			2012			2014		
M	F	Total	M	F	Total	M	F	Total	M	F	Total
1601	1223	2824	1689	1386	3075	405	314	719	430	319	749
56.69%	43.30%		54.92%	45.07%		56.32%	43.67%		57.40%	42.59%	

CHAPTER SEVEN

CHAPTER SEVEN: SUMMARY OF FINDINGS, CONCLUSIONS AND POLICY IMPLICATIONS

This concluding chapter endeavours at recapitulating the summary of findings of the study, inferring final conclusion and indicating the policy implications. The chapter consists of four parts. A brief but comprehensive background of the study has been presented in the first part. The next part has been devoted to re-capitulation of the chapter wise summary of findings. The overall conclusion and the policy implications of the study have been presented in the third part. In the final part, limitations of the study and the scope for future/further research have been outlined.

7.1 Summary of principal findings:

Introduction

This chapter introduces the basic problem under study with emphasis on the impact of rural road. The objectives of the study, the research queries are framed on the basis of the objectives, utility of the study, methodology of the study and the organization of the thesis are systematically presented.

Road infrastructure is generally recognized as the key to economic development. In rural areas, the success of any development programme depends a lot on the availability of good road network. Rural road enables the rural people to have access to schools, health centers and markets etc. most of the studies have shown that rural roads serve as an entry point for poverty alleviation and reduce production cost.

Investment in rural road contributes to economic growth and raises the quality of life. At the household level, rural roads increases the agricultural production and open up non-farm employment, resulting higher level of earnings and more diversified sources of income. These roads reduced the transportation cost and thereby make labour market more efficient.

Statement of the problem:

The present study is an attempt to gauge the role played by the rural roads in rural economy of Assam. But there are a large number of problems associated with the development of rural roads in Assam.

Depletion of roads constructed under different rural development programmes due to poor maintenance is one of the most important problems faced by the state. Most of the roads were constructed 10-20 years ago and these roads were become unusable for the people because of non-repairing. There is again inadequate number of rural roads including cluster roads in the rural areas of Assam.

The gaon panchayat in Assam are financially not sound to construct new roads and to maintain the already constructed roads. The cost of road construction per sq.km in Assam is high in comparison to other states of the country because of the presence of high rainfall, flood and seismicity. Again the encroachment of rural road lands by the villagers is a major problem .it may be noted in the context of Assam, due to shortage of culverts and bridges in the rural areas, it is frequently observed that the roads are submerged in the in the rain and floodwater and if not submerged then there are much water logging to trouble the travelers. There is gross misappropriation of funds in various rural road development programmes from the top to the bottom for which the development in question remains standstill in most of the rural areas of Assam.

Objectives:

The present study attempts to make an in-depth analysis of the role of rural roads in rural economy of Assam in the light of the following objectives:

- i. To analyze the status of rural roads in Assam.
- ii. To assess the government funding and utilization pattern for the construction of rural road.
- iii. To examine the socio-economic impact of roads in rural areas.
- iv. To find out the level of people's participation in the construction of rural roads through local bodies.

Research Questions:

1. Whether construction of rural road generates any livelihood opportunities?
2. Whether rural road has any impact on agricultural income or not?

Methodology

The present study of the impact of road infrastructure on rural economy of Assam has been conducted in four dimensions, namely rural road status in Assam, govt. funding and utilization pattern, socio-economic impact and people's participation in the construction of rural road through local bodies. Rural road status consists in analyzing the status of rural road in different district of the state and also among the different states of the country. This analysis is carried out on the basis of secondary data collected from various offices and published sources. There is a comparative analysis between different states of the country. The said analysis uses statistical tools like averages, percentages, index, and radar diagrams for analyzing the status of rural road. Secondly, the financing and utilization pattern of government for rural road construction is analyzed. The different schemes of govt. to construct rural road like PMGSY, NLCPR, RIDF, MPNA and MPDNA by using statistical tools like percentage and bar diagrams.

Thirdly, the socio-economic impact of rural roads is gauged. In order to facilitate an in-depth analysis of the socio-economic impact of road development, the necessary primary data has been collected by carrying out a field survey. The information or reporting against each indicator is made from primary data collected through direct personnel interview conducted with the household members and village on the basis of pre-tested, well structured schedule. The impact on different indicators is measured by using double-difference and regression analysis.

Fourthly, the participation of local people's through panchayati raj institutions in the development process of rural road is analysed. Here also the information about panchayat is made from primary data collected through direct personnel interview with the officials of the panchayat institutions on the basis of well structured schedule.

Organization of the thesis:

The present study comprises of seven chapters.

Chapter one provide an insight to the topic of the study with the sub-topics including introduction, statement of the problem, utility of the study, objectives of the study, research questions, methods and methodology of the study and profile of the study area.

Chapter two consists of the theoretical framework of the study and the review of literature.

Chapter three is a study of the status of the rural roads in the state and different states of the country.

Chapter four includes the different schemes of government under which the rural roads are constructed.

Chapter five includes peoples participation through PRI's in different stages of road construction under PMGSY scheme and status of PRI in Assam.

Chapter six consists of impact of rural road development on different socio-economic indicators.

Chapter seven includes the summary of findings of the study, suggestions and also the limitations of the present study and the scope of future research in the related topics of the present study.

7.1.2 Re-capitulation of principal findings of the study.

A. Status of Rural road in Assam and India.

The status of rural road has been measured in terms of indicators like rural roads per lakh of rural population, per '00 sq.km of rural geographical area, percentage of rural roads to total roads and road index. The findings are:-

- Rural roads consists 77 percent of total road length in the state.
- Rural roads per lakh of rural population are the highest of 961 km in N.C. Hills and the lowest of 57 km in Karimganj.

- Such differences can also be seen in availability of rural roads per hundred square kilometer of total rural geographical area which ranges from 92.20 km.in Sibsagar to 22.60 km. in Cachar.
- Sibsagar district achieved higher level of rural roads infrastructure in terms of road index and Cachar district ranks lowest in terms of rural road connectivity.
- Total road length in India has increased more than 11 times during the period 1952 to 2011 from 3.99 lakh to 46.90 lakh kms, the growth rate has been 4.4 percent during last six decades. The growth rate of rural roads in Assam during 2004 to 2012 is 3.5.
- Rural road development in India reveals considerable Inter- state variations in terms of road index. while Kerela has records highest rural (0.741) followed by Assam (0.576) and lowest in Jammu & Kashmir (0.006) stands at the bottom of the list

B. Financing Rural Road Development in Assam.

The fund for rural road development in Assam mainly comes through schemes like PMGSY, NLCPR, RIDF, MPNA and MPDNA under State and Central budgetary allocations. Rural road development funds are also received from the World Bank and Assian Development Bank. MORD is the nodal ministry for implementation of the programme at the central level. PMGSY is funded mainly from the accruals of diesel cess in the Central Road Fund. Recipient states have to set up State Rural Roads Development Agency. The SRRDA is the executing agency at the state level. The SRRDA is the actual recipient of the fund which is transferred by the central government. Funds are made available to SRRDA in two installments. For the second installment, many conditions regarding utilization of available funds, physical progress, utilization certificates, audited statement of accounts for the previous year and certificate of the Bank manager etc. have to be met.

- ✓ It is observed from the study that PMGSY plays a specific role in the construction of rural road as it occupies the top position with 78.25% of share of fund and 84.86% of road length.
- ✓ Utilization of fund among different districts varies between 70 to 80 percent.

- ✓ Overall utilization of PMGSY fund in the state was 78.59% as on March end 2013.
- ✓ In case of most of the states like Arunachal Pradesh, Bihar, Chattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Odisha, Punjab, Rajasthan, Uttarkhand, Uttar Pradesh and West Bengal fund utilization was 100 percent. The reason behind this could be that the number of works remained incomplete after spending money because of non-availability of land.

Another scheme NLCPR is meant only to supplement state fund for infrastructure development, not for normal plan programmes. DONER provides budgetary allocation for the NLCPR scheme for infrastructure development projects mainly for North-Eastern States. 90% fund of the project is granted by central government and remaining 10% is provided by the state. 40% of fund released after the project approval and remaining part is released in two installments of 40% and 20% of total grant. The second installment is released after completion of at least 40% of the project and submission of utilization certificate of at least 80% Of funds released in first installment.

- ✓ The study reveals that in Assam as against the sanctioned amount Rs. 81477.8 lakhs till March end 2013, only Rs. 46312.5 lakhs of fund have been released. This shows that there are some problems like failure to submit the utilization certificate of funds, quarterly release of progress report and also non release of the state share. As a result, funds were held up after the first installment. The seasonal stoppages of the projects consistute another major problem. Regarding utilization of fund, no releases were made from the government in the year 2011 and 2012, as the utilization was only 76.60%.
- ✓ The utilization of funds in other states of North-East was low till 2009-10. As the scheme is project based, the list of the proposed projects has to be submitted by Nov. 30 and the first installment should be released at the beginning of the next financial year. But in practice, much of releases take place in the second half of the financial year, which delay the implementation of the programe. Therefore, the problem arises in physical implementation of the project.

RIDF scheme was introduced in the year 1995-96 by the Reserve Bank of India in NABARD with contributions from commercial banks. RIDF-1 was launched with Rs. 2,000 crores through contributions from both public sector and private sector banks. Except for a period of break, the funding provision has been continuing till today. Creation of irrigation facilities and construction of rural roads are two major activities of the scheme.

- ✓ It is observed from the study that the actual disbursement figure against the sanctioned amount is 73.11% for the states in the North-Eastern region, but the average for the other state is near about 84%. Disbursement pattern of RIDF in terms of percentage of different states reveal that the share of the states in the North-Eastern region is much less than the other states. This implies that the level of regional convergence of RIDF in different tranches almost not realized the objective of balanced regional disbursement of such fund at least at state level.
- ✓ The study also reveal that among the different districts, disbursement of fund in Kamrup district is highest at 95.95% while some other districts like Dhemaji, Golaghat, Karbi-Anglong, Dibrugarh and Tinsukia are lagging behind of other districts with a significantly low disbursement of RIDF at 16.99%, 22.78%, 30.45%, 32.71% and 41.68% respectively.
- ✓ It is found that the main causes behind low utilization of fund under different schemes are the problem of land acquisition and forest clearance, seasonal stoppages of the project and in some places labour related problems arising due to the presence of extremist activity.

C. Peoples' Participation in rural road construction.

Under democracy, successful implementation of any development programme depends to a great extent on peoples' participation and such participation is possible only when a strong and vibrant self governing local body exists at the grass root. Since panchayati raj institutions are theoretically best suited for the purpose, the 73rd amendment of the constitution of India provided guidelines for empowering the grass root level local self governing bodies. Like the other states, Assam also made effort to empower the PRIs at the grass root level both in the general and in the sixth schedule areas where the 73rd amendment is not applicable. But the PRIs in Assam

are yet to emerge as vibrant self governing local bodies in the real sense of the terms. Too much dependence on the higher order governments for fund, undue political interference, dearth of trained functionaries and overlapping of activities with the state level government departments are some of the factors hindering proper functioning of these institutions. The autonomous District Councils and their subordinate lower order institutions under the sixth schedule are not an exception in this regard. Some of the important findings of the field study presented below also corroborate such observations.

- ✓ The Central govt. grants constitute major part of the revenue of the sample panchayats that ranges from nearly 71% to 86%.
- ✓ State government grants are found to contribute a small portion to these institutions.
- ✓ The sampled panchayats' own revenue mobilizing power is inadequate and the share is less than 2% of total revenue
- ✓ Sampled panchayats are found to be restricted in performing specific activities under MGNREGA, Total Sanitation Campaign and IAY schemes.
- ✓ Koroioni GP constructed the highest rural road length (gravel) of 15 kms followed by 7 kms and 2 kms in Anjukpani and Badal gaon GP respectively in the year 2013-14.
- ✓ Koroioni GP and Anjukpani GP have constructed 2 nos. and 1no. of culverts on village road respectively.
- ✓ Though there is provision in PMGSY guidelines that the road construction process should take community consultation through concerned PRIs, except in Anjukpani GP no participation has seen in the Koroioni and Badal gaon GPs. In the two GPs, rural roads under PMGSY are constructed directly through district PWD without any consultation with the GP. The concerned GPs are also not aware about this facility.

D.Socio-Economic Impact

Socio-economic impacts of rural roads could be either direct or indirect. Direct impact takes place immediately after the road construction and indirect impact can be viewed as dependent on direct impacts. Road projects have direct impact on (i) Transport services and facilities, (ii) Commercial activity which is highly dependent

on the transportation system. Indirect impact takes place after the improvements in the transportation system have been achieved. Changes in farm production, agricultural technology, land value and the quality of life among inhabited in the project area are some indirect impact of rural road. The followings are the main findings of the chapter-

- ✓ On the project roads, frequency of operation of vehicles is higher for bicycle followed by car and motorcycle. Bus operation is lowest among all types of vehicles on the project road.
- ✓ In case of private ownership of, bicycle (mean difference 9.84) and motorcycle (9.67) are growing faster in project villages compared to the control villages.
- ✓ The number of shops has increased almost more than double from 34 shops to 85 in the project villages.
- ✓ Average sale volume in the surveyed shops in project villages is Rs. 1800.00 in a day and Rs. 1750.00 in control villages.
- ✓ Moderate connectivity villages showed slightly higher employment rate (5.52%) compared to better connectivity villages (4%) in government sector.
- ✓ Changes take place in livelihood pattern. Out of 133 nos. of farmer, 70 nos. change their occupational pattern after the road development from agriculture to trade sector, construction and transport sectors.
- ✓ Distance of household from the road and market is found to be negatively related to the household income which means that greater the distance of a household from the road and market lower is the income.
- ✓ The overall effects of using seeds, fertilizers and pesticides as well as the existence of market and road have a significant impact on household income.
- ✓ In primary school, enrollment of girl students has increased from 38.62% to 47.09% while that of boy's has decreased from 60.70% to 52.90% in the project villages.
- ✓ Percentage of enrollment in primary school increases from 9.45% and 7.75% in project and control villages respectively.
- ✓ In secondary school, enrolment has increased by 8.88 % and 4.17% in project and control villages respectively.

- ✓ In project villages, 92.45% of the respondents felt that the frequency of their children missing school during the rainy season has gone down.
- ✓ 79.24% women visit the nearest hospital more than two times in a year and 50.94% of men visit the hospital two times after the road development.
- ✓ In control villages, women are more frequent visitor of hospitals than men. 30.18% women visit hospital two times in a year, whereas 26.41% of men reported that they visit the hospital twice in a year.

7.2. Conclusion and Policy Implications.

7.2.1 Conclusion

The status of rural roads in India reveals considerable interstate as well as intrastate variations. The level of rural roads in terms of road index has been highest in Kerala, followed by Assam and lowest in Jammu and Kashmir. The road index in Assam also reveals considerable intrastate disparity. The road index has been highest in Sibsagar district and lowest in the Cachar district.

Not only that the quantum of fund sanctioned and released under various schemes like PMGSY, RIDF etc for road development/ construction in Assam has been inadequate compared to the requirement, the fund so released are often underutilized. The low utilization of the fund released is attributable, inter alia, to the problem of the land acquisition and forest clearance, disruption of road projects due to natural calamities and in some places labour related problem arising due to extremist activities.

Rural road projects exert direct impact on transport services and facilities commercial activities. The indirect impact which takes place with the improvement in transportation services include changes in farm production, agricultural technology, land value and the quality of life among the people living in the project area.

Panchayati Raj Institutions in Assam failed to emerge as self governing local body capable of empowering the people at the grass root and encouraging them to participate in developmental activities due primarily to too much dependence on the higher order governments for fund, under political interference, dearth of trained functionaries and overlapping of activities with the state government departments.

7.2.2 Policy Implications

Despite the achievement in the construction of rural roads, *there were some* hindrances that impede its further progress. To facilitate rural road construction by removing the hindrance, the Government should initiate the following measures in the right earnest.

- The state government should sustain the present tempo by providing rural roads to other rural communities who are yet to benefit from such provision.
- District wise master plans for rural road should be prepared and properly followed in all the districts of the state.
- The govt. of Assam should allocate more funds in the annual budget for rural road maintenance and also such funds should be released in time considering the seasonal nature of road construction and maintenance.
- Market is the centre of all rural economic activities, and it influences economic diversification and productivity. Linking rural roads with markets and markets to project roads will create external demand for the local products. Inputs can be easily available with the producer at the remote areas. To maximize benefits to the rural people, linking rural roads with markets and markets with project roads deserves top priority.
- Public discussion in project formulation, scheme selection by local participation and partial contribution in project implementation by the project beneficiaries will create a sense of ownership of the project facilities. It is hoped that with greater people participation in project implementation, there will be greater transparency in the functioning of these institutions eventually leading to fuller accountability. Therefore, good environment should be created by the state rural road development agencies to participate in project implementations for the Panchayati Raj Institutions.

7.3 Limitations of the study

1. Though the universe of the study is Assam, *the field study has been* carried only in Nagaon district of Assam.
2. The technical side of road construction is not addressed.

3. The study mainly concentrates on the relationship between the presence of roads and agricultural income.
4. The present study includes the families who are engaged in agricultural and allied activities to check the implication of road on overall changes.
5. The study covers only 2 years i.e. 2012 to 2014 for impact evaluation.
6. The study did not made any attempt to evaluate the environmental impact due to road construction.
7. The cost of rural road maintenance is not considered in the study.

7.4 Scope for further research:

Impact of road infrastructure on rural economy of Assam is a broad concept consisting of several interrelated dimensions of equal importance. The present study deals with four of these aspects, namely, status of rural road, govt. funding and utilization pattern, socio-economic impact of road and peoples participation in the process of road development through PRI's. In this light, studies can be undertaken in future in several other dimensions. This may include aspects like study of environmental impact of road projects. Studies may also be undertaken to gauge the technical side of road construction.

Road maintenance is of crucial importance in Assam because of the inherent characteristics of road network. Many rural roads in the state are usually built of earth or gravel that are cheaper to construct and relatively more expensive to maintain. Therefore, studies may be undertaken to investigate about the funding for maintaining rural roads.

BIBLIOGRAPHY

A. Books:

- Beenhakker, Henri L.(1987). *Rural Transport Services: A Guide to Their Planning and Implimentation*. London: Intermediate Technology Publications, Ltd.
- Greenhut,Melvin L. (1956), "*Plant Location in Theory and in Practice*", University of North Carolina Press: Chapel Hill.
- Capello, Robert (2007), *Regional Economics*, Routledge,London and New York.
- Gandhi, M.K.(1962) *Village Swaraj*. Ahmedabad, India: Navajivan Publishing House.
- Gururajachar S. (1974) "*Some Aspects of Socio-Economic Life in Karnataka*" Rajanna printers and publications. Mysore,p. 343
- Hoover M.(1948), "*The Location of Economic Activity*" New York. MC GRAW-Hill.
- Howe, John D.G.F. 1984, "*The Impact of Rural Roads on Poverty Alleviation: A Review of the Literature, in Rural Roads and Poverty Alleviation*", ed. By John Howe and Peter Richards. London: Intermediate Technology Publications Ltd.
- Jetli, K.N. and V. Sethi (2007),"*Infrastrcture Development in India: Post Liberalisation Initiatives and Challenges*", New Century Publications, New Delhi.
- Jimenez,Emmanuel (1995), " Human and Physical Infrastructure: Public Investment and Pricing Policies in Developing Countries; *Handbook of Development Economics*, edited by J.Behrman and T.N. Srinivasan, Elsavier Science BV. Netherlands
- Methew M.C.,(1964) "*Rail and Road Transport in India*" 1964, Scientific Book Agency,No.1 p.36
- Malaviya, H.D. (1956) *Village Panchayat in India*. New Delhi, Economic and Political Research Department, All India Congress Committee.

Oommen, M.A. (2008), "Introduction", Fiscal Decentralisation to Local Governments in India, edited by M.A.Oommen, Cambridge Scholars Publishing.

Raghunandan, T.R. (2007), "Rural Infrastructure Report, 2007, Rural Infrastructure, Oxford University Press.

World Bank (1994) *World Development Report 1994: Infrastructure for development*. Oxford University press, Oxford.

B. Journals:

Ahmed, Raisuddin and Mahabub Hossain. 1988. "Infrastructure and Development of the Rural Economy of Bangladesh", *Final report prepared by the International Food Policy Research Institute in collaboration with Bangladesh Institute for Development Studies*. Washington, DC: International Food Policy Research Institute.

Ahmed, Farhad, Peter o' Neil, David Salter, "International Conference on Engineering Education & Research", December 2-7, 2007, Melbourne, Australia

Anderson, William, G. and Vndervoort (1982) "Rural Roads Evaluation Summary Report. AID," *Program Evaluation Report. No.5*. Washington, DC: U.S. Agency for International Development. [available online]

Alagh, Y.K. (2000) Panchayati raj and planning in India: Participatory institutions and rural roads. (Online) Available: www.unescap.org/ttdw/publications/tptspubs/.../bulletin69_a.pdf

Bardhan P. and Dilip Mookherjee (2004) "Poverty Alleviation Efforts of Panchayat in West Bengal" *Economic and Political Weekly*, 39(9) 965-974.

Bravo, A. (2002) "The impact of improved rural roads on gender relations in Peru", *Mountain research and Development*, 22(3): 221-224.

- Bryceson, D.F. and Bradbury, A(2008) " Roads to poverty reduction? Exploring rural roads. Impact on mobility in Africa and Asia". *Development of policy review*, 26(4): 459- 482
- Binswanger,H.P.,Khandker,S.R.,& Rosenzweig,M.R.(1993) "How infrastructure and financial institutions affect agricultural output and investment in India". *Journal of Development Economics*, 41,337-366.
- Beenhakker, Henri L. and Armando M. Lago. (1983) "*Economic Appraisal of Rural Roads*", World Bank Staff Working Paper No.610. Washington, DC: The World Bank.
- Beenhakker, Henri L.and Abderraouf Chammari (1979) "Identification and Appraisal of Rural Roads Projects", World Bank Staff working paper No.362. Washington, DC: The World Bank.
- Bhattacharjee, P.R.& Prusottam Nayak (2001), "Panchayatin Raj in Assam", paper presented at the National Seminar on *Local Governance and Rural Development: the Indian Experience*, at Utkal University, Bhubaneswar, 24-25 February
- Carapetis, S., Henri L. Beenhakker and John D.G.F.Howe (1984) "The supply and Quality of Rural Transport services in Developing countries". World Bank staff working paper No.654. Washington, DC: The World Bank.
- Devres, Inc.(1980). *Socio-Economic and Environmental Impacts of Low-Volume Rural Roads-A Review of the Literature*. AID, Program Evaluation Discussion Paper No. 7. Washington, DC: United States Agency for International Development.
- Forman Richard T.T.and Lauren E. Alexander(1998) "Roads and their Major *Ecological Effects*", *Annual Review of Ecological and systemtics*, 29(1998) 207-231
- Guimaraes, A.L.&Uhl,C(1997) "Rural transport in Eastern Amazonia: limitations, options and opportunities", *Journal of Rural studies*,13(4) 429-440
- Gwillian Ken and Shalizi Zmark(1999) "Road funds, user charges and taxes", *The World Bank Research Observer*,14(2):159-185

- Gwillian Ken and Ajoy Kumar (2003) "How Effective are Second Generation Road Funds? A Preliminary Appraisal". *The World Bank Research Observer*, 18(1) 113-128.
- Gupta Manish, Mukherjee A., Sen T.K. and Srinivasan R. (2011) "Improving effectiveness and Utilisation of Funds for selected schemes through suitable changes in Timing and Pattern of Releases by the centre". A report of Research Project sponsored by the planning commission of India.
- Gibson J. and Scott Rozelle (2003) "Poverty and Access to Roads in Papua New Guinea". *Economic Development and Cultural change*, 52(1) 159-185.
- Hide,H.and D. Keith (1979) "Effect of Simple Road Improvement Measures on Vehicle Operating Cost in the Eastern Caribben," in *Low Volume Roads: Second International Conference*, Transportation Research Record, No.702. Washington, DC: Transportation Research Board, National Academy of Sciences, pp.269-276
- Isotalo, J.(1992) Community participation in rural road maintenance : Finnish and lessons for Sub Saharan Africa. [available online]
- Islam Mafizul, Wieland R. and Adiv R. (2008), "Roads Socio-Economic Impact Assessment", United States Agency International Development (USAID) Washington, D.C. (available online)
- Jahan, Selim (1989) 'Benefits and costs of rural road maintenance in Bangladesh: A critical survey'. A report prepared by Associates in Rural Development for USAID/Dhaka. Burlington, VT: Associates in Rural Development.
- Jaarsma, C.F. and Dijk, T.V (2002) "Financing local rural road maintenance. Who should pay what share and why", *Transporttion Research part A: Policy and practice*, 36(6):507-524
- Khanna,S.K., Sikdar, A.K., Mahendru (1982) "Nodel points in Rural Road Network Planning in Indian Highway", *Journal of Indian Road Congress*, 10:5-10

- Khandker and Koolwal G.B.(2006) "The poverty impact of rural roads: The evidence from Bangladesh, World bank policy research working. Paper 3875 [available online] <http://ideas.repec.org/a/ucp/ecdecc/v57y2009>
- Levy, H.(1996) "Morocco-Socioeconomic Influence of Rural Roads: Fourth Highway Project" Impact Evaluation Report. Report No.15808. Washington, D.C.: The World Bank, operations Evaluation Department.
- Limao, Nuno and Anthony J Venables(2001) "Infrastructure, Geographical Disadvantages, Transport costs and Trade," *The World Bank Economic Review*,2001,15(3) 451-479)
- Liu, Z (2000) "*Economic analysis of a rural basic access road project: the case of Andhra Pradesh, India*, Infrastructure Notes: Transport sector, (Transport no.RT-5), The World Bank
- Mpolokeng P.G.(2003): "People's participation in Rural Development: The examples Mafikeng." *African Journal of Political Science/ Revuene de Science politique*, vol.8, No. 2 (December 2003) pp.55-86
- Nadkarni, M.V. and Deogirikar,A.B.(1972) "Demand for roads in Maharashtra: A cross-section study", *Economic and Political weekly*, 7(51):2465-2468
- Newbery, David M.(1989) "Cost Recovery from Optimally Designed Roads," *Economica* vol.56(May):165-185.
- Ostrom, Elinor, Larry Schroeder and Susan Wynne(1990) "*Institutional Incentives and Rural Infrastructure Sustainability*". Burlington, VT: Associates in Rural Development.
- Postigo, A. (2008) "Financing road infrastructure in China and India: currents and future options", *Journal of Asian Public Policy*, 1(1):71-89
- Rawat, D.S.and Sharma,S.(1997) "The development of a Road network and its impact on the growth of infrastructure: A study of Almora district in the central Himalaya", *Mountain Research and Development*, 17(2): 117-126
- Rajaraman, I. (2005) "*Financing rural infrastructure in developing countries: The case of India*", *Applied econometrics and International Development*, 5(2)

- Rashid, Md. And Sen, Anjan. (2010) "Participatory panchayati Raj Institutions and Awareness of Rural Development Programs in Bihar". *Institute of Town Planners, Indian Journal*, 7(2):70-84
- Ravallion, Martin (2001) "The Mystery of the Vanishing Benefits: An Introduction to Impact Evaluation", *The World Bank Economic Review*, Vol. 15, No. 1 115-140
- Richard, L.C. and Scaparra, M.P. (2005) "A GRASP and path Relinking Heuristic for Rural Road network Development", *Journal of Heuristics*, 11(1): 89-108
- Rajeev Meenakshi (2008) "Rural Infrastructure Development Fund: Need for a Track change. A Critical Analysis of the RIDF, *Economic and Political Weekly*, XL III (7) (available online)
- Steven Deller C. and Nelson H. Carl (1991) "Measuring the Economic Efficiency of producing Rural Road Services", *American Journal of Agricultural Economics*, 73(1):194-201
- Schroeder Larry. Managing and Financing Rural Road Maintenance in Developing Countries. [available online]
- Swaminathan, C.G., Lal, N.B. and Kumar, A. (1998) "A system approach to Rural Road Development", *Indian Road Congress*, 42(4) paper no.346
- Singh Vidyapati (1962) "Financing of Road Improvements for Farm Marketing", *The Journal of finance*, 17(3): 537-539
- Todd J. Hawbaker, Volker C. Radeloff, Murray K. Clayton, Roger B. Hammer and Charlotte E. Gonzalez Abraham (2006) "Road Development, Housing Growth, and Landscape Fragmentation in Northern Wisconsin: 1937-1999". *Ecological Applications*, 16(3) 1222- 1237.
- Verma (1980) "Role of periodic markets in Economic Organisation of Rural India". Project report, sub., UGC.
- V.N. Alok, (2011) "Role of Panchayat Bodies in Rural Development since 1959", Theme paper for the fifty-fifth Members, Annual conference Indian Institute of public Administration, New Delhi.

Walle de Van and Dominique (2007) Impact Evaluation of Rural Road projects, Draft prepared for the World bank PREM sector Evaluation Notes [available online]

Available:http://siteresources.Worldbank.org/INTISPMA/Resources/3837041146752240884/Doing_ie_series_12.pdf

Xie, F. and Levinson, David. (2006) Measuring the structure of Road Networks. [Online] Available : <http://nexus.umn.edu/papers/Topology.pdf>

Thesis:

Kumar, P.(1997) “ Facility based optimal rural road network design” PH.D. Dessertation, Department of Civil Engineering, University Roorkee: India

Kantharajappa H.C.(1998), Rural Road System and its Impact on Rural Development (Special reference to agriculture). Dessertation submitted to the Bangalore University in partial fulfillment of the requirements for the degree of Master of Philosophy in Rural Development.

Sarma Amiya (2013), An investigation into the status of rural Infrastructure and its impact on the Rural Economy of Assam, Ph.D.thesis of Gauhati University

Report

Indian rural development report, 2012-13

Economic Survey, 2012-13

Economic Survey, Assam, 2011-12

NABARD Annual Report, 2000

Comtroller and Auditor General (CAG) Report 2010-11

Statistical Hand Book, 2011, Government of Assam

APPENDIX- I

QUESTIONNAIRE FOR HOUSEHOLD

General information

1. Name of the sub-division -----, Block -----, Panchayat -----
2. Name of the village -----
3. Name of the head of the household -----

Male/Female	Age	Education	No. of family members	Occupation	Monthly Income

4. Transport related question

- a. Did you own any vehicle before the construction of the road? -----
- b. If yes, what kind of vehicles you had and how many? -----
- c. Do you own any vehicle after the road development? -----
- d. If yes, what kind of vehicles do you have now and how many? -----
- e. Have you own any vehicle for commercial purpose? -----
- f. What type of vehicle do you use for travel? -----
- g. Would you like to travel on foot now? -----

5. Livelihood information

- a. What was your occupation before the development of the road? -----
- b. Have you change your occupation after the road development? -----
- c. If yes, to which sector of the following have you change your occupation?
 - (a) Construction sector
 - (b) Trade sector
 - (c) Transport sector
 - (d) Industrial sector
 - (e) Service sector
 - (f) Agricultural sector

6. Livestock and poultry

- a. Have you own any stock of cattle and poultry birds before the road development?
- b. If yes, you continue the stock of cattle and poultry birds?
- c. Do you earn money by selling your livestock's in the market?

7. Employment

- a. Is there any member in your family who get job in any private or govt. sector after the road development?

8. Agriculture

- a. Do you raise crops? Yes -----, No -----
- b. If yes, how many Bighas of land do you farm?
- c. Information on household agricultural output.

(a) Types of crops cultivated	(b) % for use in household	(c) % for sale in market

- d. How do you cultivate your land?
 - (a) Animal traction
 - (b) Tractor
- e. How much do you spend per year on?
 - (a) Fertilizers
 - (b) Pesticides
 - (c) Seeds
- f. Can you estimate how much you earned from the sale of product in a year? Rs.
- g. Where do you sell your farm product?
- h. Are there any changes in the use of fertilizer after the road development?
- i. Do you change the cropping pattern after the road development?
- j. If yes, what type of crops you raise to use your land more intensively?

- k. What level of the following technology you used to raise your agricultural product?

- (i) Tractor/power tiller
- (ii) HYV seeds
- (iii) Chemical fertilizer
- (iv) Pesticide
- (v) Irrigation

Level A: All the above mention five technologies

Level B: Any four of five technologies

Level C: Any three out of five technologies

9. Health care

- a. How many times per year do members of this household normally go to health center or hospitals?

Men ---- (times/year), Women --- (times/year)

- b. Do you use the project road to obtain medical care?

10. Education

- a. Do you feel that your children missed the school during the rainy season?
- b. Is your children attendance to school increase due to good road compare to before condition? ----

11. Land value

- a. Is there any increase in the prices of land after the road development?
- b. If yes, what is the change for the following types of land—

Agricultural land	Before price (in Rs.)	After price (in Rs.)
Commercial land		
Residential land		

12. Trade related questions

- a. How long have you been selling goods here?
- b. What is your estimated total daily sale? ----
- c. How far do you live from your shop?
- d. Do you use the pucca road to get from home to here?

APPENDIX-II

A survey on the Gaon Panchayat

1. Name of the Panchayat:
2. Villages covered:
3. Nos. of Households:
4. Approximate Area:
5. Total Population:
6. Details of Members of the Panchayat

Member	Nos
Female members	
SC/ST Members	
Members in the age group 21-40	
Total members	

7. Details of permanent staff in the panchayat

SL No	Designation	Nos.
1	Secretary	
2	Tax Collector	
3	Others (specify)	

8. Amount of Grants Acquired last year

SL No.	Source	Amount	When Sanctioned	When Disbursed
1	Grant from Central Govt.			
2	Grant from State Govt.			
3	Others (specify)			

9. Details of own revenue collected last year:

SL No.	Source	Amount
1	Tax Revenue	
2	Fees and fines	
3	Others	

10. Infrastructure in panchayat

SL No	Infrastructure	Quantity
1	Length of total road	
2	Length of all weather roads	
3	Length of black-topped roads	
4	Primary schools	
50	High schools	

11. Activities performed by the panchayat in the last year

SL No.	Activity	Details of quality
1	Length of roads	
2	No. of bridges	