The Impact of Motorable Bridge on the Socio-Economic Development of Rural Community:

A Case Study of Zone of Influence (ZoI) of TiperiKhola Bridge Dailekh District, Nepal

A Thesis Submitted to
The Central Department of Rural Development Faculty, Tribhuvan University in the Partial Fulfillment of the Requirements for the Master of Arts (M.A) in Rural Development

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Recommendation Letter

This Thesis entitled **The impact of motorable bridge on the socio-economic development of rural community: A case study of zone of influence (ZOI) of Tiperi khola bridge, Dailekh district, Nepal** has been prepared by **Neema Lama**, under my guidance and supervision. This is his own innovative research work in the field of IT and I strongly recommend this thesis for its final evaluation.

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Supervisor

Ramesh Neuupane

Department of Rural Development

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Date: 10-04-2016

28-12- 2072

Approval Sheet

This is to certify that this thesis work, entitled **The impact of motorable bridge on the socio-economic development of rural community: A case study of zone of influence (ZOI) of Tiperi khola bridge, Dailekh district, Nepal** submitted by **Neema Lama**, has been accepted in partial fulfillment of the requirements for the degree of Master of Arts in Rural Development by this Department in the prescribed format of the Faculty of Humanities and Social Sciences.

Evaluation Committee

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Prof. Dr. Prem Sharma

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Ramesh Neupane

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Date: 10-04-2014

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Declaration

I hereby declare that the thesis entitled **The impact of motorable bridge on the socio-economic development of rural community: A case study of zone of influence (ZOI) of Tiperi khola bridge, Dailekh district, Nepal** submitted to the Central Department of Rural Development, Tribhuvan University, is entirely my original work prepared under the guidance and supervision of my supervisor. I have made due acknowledgements to all ideas and information borrowed from different sources in the course of preparing this thesis. The results of this thesis have not been submitted or presented anywhere else for the award of any degree or for any other purposes. I assure that no part of the content of this thesis has been published in any form before.

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Abstract

The purpose of this study “The impact of motorable bridge on the socio-economic development of rural community” (A case study of zone of influence of Tiperi khola bridge, Dailekh district) was undertaken mainly to examine and compare the impact of motorable bridge on the Socio- Economic development of rural community during and after the construction of Tiperi khola motorable bridge. The study was limited in Zone of Influence of Tiperi khola bridge in Dailekh district. Motorable bridge is one of the factors that contribute towards the socio- economic development of Zone of Influence by constructing the all-weather road through motorable bridge over Tiperi khola.

This study analyzes and compares information (data) with previous baseline data (LRBP 2014) and identifies the impact of Tiperikhola Bridge in Dailekh. The objectives of the study are: To analyze and compare socio-economic status of the community, To analyze and compare the travel time to services such as District headquarter, District Hospital, Campus, Main Market and to analyze and compare traffic volume.

This study was done in two process, firstly selected the 30 households among 60 households, which were selected during baseline survey (LRBP, 2014) to collect primary data after construction of Tiperi khola bridge. In second, the study obtained the same 30 household baseline survey information (LRBP 2014) among 60 households and analyzed that information to compare with this study to examine the impacts before and after construction of Tiperi khola bridge.

Better access to markets created economic opportunities for people in Zone of influence and people to sell their labor and products through Tiperi khola bridge. At the micro level access to transport facilitated job search and contributed to easier diversification of income. Occupational status also major factors to define the social development of ZOI of this bridge.

Tiperi khola bridge played the vital role for the rapid development of rural society, rural communities and the rural people through connecting with service centers, market, educational institutions, medical facilities and district headquarter etc.

The movement of jeep was increased from 2 to 6 trips, movement of motorcycle was increased 4 to 10 trips, movement of tractors 4 to 18 trips and 5 mini bus started its movement after construction of Tiperi Khola Bridge in Dailekh. After being all- weather road, about 39 vehicles plied up to the Zone of Influence (ZOI) of this bridge. Before construction of Tiperi khola bridge, rarely 10 vehicles plied through this khola, due to the

lack of bridge. After construction of Tiperi khola bridge, it was easier to cross this river for all kinds of vehicle from and to the ZOI of this bridge because of all-weather road and reliable crossing over Tiperi khola in Dailekh.

It was quite sooner to study the impact of Tiperi khola bridges in socio-economic development of ZOI of this bridge in Daielkh district.

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Acronyms /Abbreviation

AD : Anno Domini

ADB : Asian Development Bank

BCT : Brahmin, Chhetri and Thakuri

DDC : District Development Committee

DoLIDAR : Department of Local Infrastructure Development and Agricultural Road

DoR : Department of Road

DTO : District Technical Office

FGD : Focus Group Discussion

GoN : Government of Nepal

HH : Household

Km : Kilometer

LRBP : Local Roads Bridge Programme

PCE : Per Capita Expenditure

PCI : Per Capita Income

VDC : Village Development Committee

RS : Rupees

SDC : Swiss Agency for Development and Corporation

SLC : School Leaving Certificate

WB : World Bank

ZoI : Zone of Influence

CHAPTER- ONE

1. INTRODUCTION

1.1 Background

Nepal is a landlocked country. According to our official data, 77 percent of its land covers of hills and mountains and about 80 per cent of its people live in rural areas. Over 30 per cent of Nepalese live on less than US$14 per person, per month, according to the national living standards survey conducted in 2010-2011. While the overall poverty rate for Nepal is 25 percent, this figure increases to 45 percent in the Mid-Western region and 46 percent in the Far-Western region. 43 percent of the population is unable to read and write.

Isolation and lack of access are one of the primary reasons for high incidence of rural poverty in Nepal. It is evident from the poverty disparity that there are strong connections between poverty and access to economic and social services. The rural areas require minimum infrastructure facilities. The major challenge for Government of Nepal is to provide adequate infrastructure to these remote and scattered settlements. Rural roads provide basic inputs for all-round socio-economic development of the rural areas; so transportation plays a vital role in the overall development and socio-economic transformation of a country. In Nepal, road transport has major role because it is the only means for public transportation .Therefore, Road infrastructure serves as a backbone for an overall socio- economic development of Nepal.

Road transportation has great importance to bring multiple socio-economic benefits to the rural areas which form a strong base of the national economy and it is a powerful instrument for the socio-economic transformations of the villages. Roads play very important role in the transportation of cargo and passengers from one place to another. So it is fundamental factors to develop the country as well as industry, agriculture.

Roads play an important role for overcoming the isolation of the villages. It provides a much needed opportunity for the rural population to come in contact with other groups of the society, which in turn inculcates in them as sense of being a part of national main stream in its prosperity and progress.

The role of transport is to facilitate the access people have to goods, services and information. Improved transport reduces isolation. People need to have access to wide variety of goods,

services and information in order to live a productive economic and social life. Transport is basically concerned with improving the mobility of individuals and the goods and services they need. Improved transport results in faster, safer, cheaper, more reliable and more comfortable travel of people and less spoilage of products. Roads and bridges are the basis foundation for transformation and communication.

The Department of Local Infrastructure Development and Agricultural Roads (*DoLIDAR*) has carried out a study on the length and condition of rural areas, and according to *DoLIDAR's*August Bulletin (2011), more than 40,000km of local roads have already been constructed, out of which 16,000km are operational (all weather).Most of these roads built so far are not pliable throughout the year partly due to lack of adequate maintenance and partly due to lack of reliable motor able river crossings. *DoLIDAR* further estimates that about 3,500 bridges need to be constructed in order to make these roads accessible throughout the year. Most of the local roads in Nepal are considered to be all weather roads. Although this is in large part due to the lack of an all-weather surface, a large number of roads with an improved surface are become impassable during rains and sometimes for several weeks or even moths during the rainy season due to lack of bridges. This is period when people need roads most because this is the season for major cultivation and farmers need transport farm inputs, fertilizers and seeds.

1.2 Statement of the Problem

Daliekh district is one of the remote district of Nepal's mid-Western region. The district borders are Jajarkot to the East, Achham to the West, Kalikot to the North and Surkhet to the South.

Tiperi khola, one of the stream of Dailekh District is located at Badhakhola VDC ward no.5 in the left bank and Bansi VDC ward no.9 in right bank. Tiperi Khola is 16 KM far from the District Headquarter Dailekh Bazzar. This river is situated at KholiBazzar-Badakhola-Bansi-Kashikandh road of Dailekh District. During rainy season, Teper khola was the barrier of the movement of vehicles, people and animals in absence of motorable bridge. Unfortunately, Kholi bazzar-Badakhola-Bansi-Kashikandh road was not functional for almost 4-5 months of the year due to lack of motorable Bridge. As result, rural poor were not able to derive optimum benefit from these roads and the investments made were not fully utilized.

TiperiKhola Bridge was constructed to make KholiBazzar- Badakhola- Bansi-Kashikandh all-weather on the fiscal year 2070/071. After constructing TiperiKhola Bridge, it connected

KholiBazzar-Badakhola-Bansi-Kashikandhrural roads, the roads become motorable throughout the year and the benefits are increased.

Before the construction of motorablebridge over Tiperi khola, Baseline survey was conducted at Zone of Influence (ZoI) of Tiperi khola bridge, Dailekh on Chaitra 2070 by Local Roads Bridge Programme (LRBP), which ZoI was identified and decided by the meeting with DDC/DTO/VDC & different stakeholders associated with the bridge during baseline survey. Meeting decided the ZoI of the bridge, were Badakhola VDC (ward 5 & 6) and Bansi VDC (Ward no. 3, 4, 5, 6, 8 & 9) of Dailekh District. Baseline Survey shows that per capita income was Rs. 24563.59 and per capita expenditure was Rs. 18779.47, transportation (only jeep available) took 132.5 minutes (fare Rs. 277) to reach district headquarters, district hospital and main market. 10 vehicles are plying up to the TiperiKhola etc.

All-weather roads are the major channels of transportation for carrying goods and passengers. As the benefits derived from the construction of rural roads are reflected throughout the economy of the rural community, therefore, an adequate All-weather roads network is absolute necessary for the improvement of the economic and social conditions of the rural community. Thus Motorable bridges play a significant role to make roads all-weather. All weather roads play essential role in the economy of rural community. It is accepted that benefits derived from roads are transmitted throughout the economy and its fruits are noticed in every sector of development.

Therefore, it is necessary to study or research the impact of motorable bridges on rural community. This study is expected to seek answer to the following questions;

i. How motorable bridge plays a vital role to generate Income?
ii. How Motorable Bridge reduce travel time of ZoI people?
iii. How Motorable Bridge increase traffic volume in ZoI?

1.3 Objectives of the Study

The general objective of this study is to examine the impact of motorable Bridge on the socio-economic development of Rural Community of the Zone of Influence (ZoI) of Tiperi khola, Dailekh, Nepal.

The Specific objectives are as follows:

i. To analyze and compare socio-economic status of the community
ii. To analyze and compare the travel time to services such as District headquarter, District Hospital, Campus, Main Market
iii. To analyze and compare traffic volume

1.4 Importance of the Study

This study intends to explore and highlight the impacts of TiperKhola Bridge, which was constructed by Local Roads Bridge Programme (LRBP) over TiperiKhola in Dailekh District.

Local Roads Bridge Programme (LRBP) is working in Nepal with aim to improve the livelihood of the people in the programme districts, where assistance focuses on reducing poverty and enabling communities with better access and improved mobility to services and opportunities. The main goal of LRBP is "People in the programme districts have improved livelihood" and Outcome 1 is "People have improved access to services and opportunities". It describes that population of rural community get better access to resources and opportunities from all-weather motorable roads and bridges.

This study will be done in the Zone of Influence (ZoI) of TiperiKhola Bridge, which was identified by the meeting with DDC/DTO/VDC & different stakeholders associated with the bridge during baseline survey. Meeting decided the ZoI of the bridge, were Badakhola VDC (wardno.5&6) and Bansi VDC (Ward no. 3, 4, 5, 6, 8 & 9) of Dailekh District. That baseline survey was conducted before construction of TiperiKhola Bridge on Chaitra, 2070.

This study will collect the required information from sampled households, which households were selected to collect data for baseline Survey on Chaitra, 2070 BS. This study analyzes and compares information (data) with previous baseline data and identifies the impact of Tiperikhola Bridge in Dailekh.

1.5 Limitation of the Study

This study was only focused on the ZoI population of Tiperi khola bridge, Dailekh on the socio- economic impact of Motorable Bridge. Socio-economic condition of the ZoI community may differ from community to community and place to place. So, the finding from this study may not equally applicable to other community.

This study has used the same structured questionnaire, which was prepared and used during baseline survey by Local Roads Bridge Programme (LRBP) on 2014 AD. The survey collected household level information from same Households among 60 Households which were selected for the baseline survey of LRBP on 2014 of the ZoI of Tiperi khola bridge, Dailekh. One Focus Group Discussion (FGD) also conducted to collect required information from stakeholders.

All the baseline information of 2014 AD was acquired from the baseline report 2014 of Local Roads Bridge Programme (LRBP) to compare the socio-economic status of ZOI people of Tiperi khola bridge, Dailekh. Major data were collected from house hold survey method using the structured questionnaire. This survey collected household level information as well as socio-economic condition of 30 Households from same 60 Households, which were selected for the baseline survey of LRBP on 2014 of the ZoI of TiperiKhola Bridge, Dailekh. Altogether 60 households (35 households from Bansi VDC and 25 households from Badhakhola VDC) were randomly selected to collect information during the Baseline Survey (LRBP 2014) of Tiperi khola bridge. 25 HHs Dalit, 7 HHs Janajati and 28 HHs others (Brahmin, Chhetri, Thakuri) were selected for household survey. This study required only 30 HHs so each and every group of HHs were divided into half group of HHs to get information using sampling method.

1.6 Organization of the Study

This thesis report has been organized into five different chapters. The Chapter one deals the introduction with the background, statement of the problem, objectives, importance, limitation of the study and organizational structure of the report. The Chapter two deals the literature review with the theoretical and empirical review related to the topics in various documents, policy documents, study reports, project completion reports and various other records. The Chapter three deals the research methodology with the research design, rationale of the study area, nature and sources data, universe, sample and sampling procedure, data collection techniques and tools and data analysis. The chapter four deals the data presentation and analysis with the results and discussion on the objectives. The Chapter five includes the summary of conclusions and recommendations.

CHAPTER- TWO

2. LITERATURE REVIEW

For this research work, the literature review was done under empirical review. Books,Journals, previous research works, report act, articles, plans, and policies, other published and unpublished documents related to the subject will be reviewed.

2.1 Theoretical review

A Motorable bridge is a structure providing passage over an obstacle without closing the way beneath for a road. The obstacle to be crossed may be a river, canal, stream etc. In other words, a Motorable bridge is a structure for carrying the road traffic or other moving loads over a depression or obstruction such as road. A bridge is an arrangement made to cross an obstacle in the form of a low ground or a stream or a river without closing the way beneath.

Bridges and roads form the basis for transformation and communication. They constitute the most critical infrastructure in the rural, and by extension national development drive. Contributions of rural roads and bridges to rural development include: accelerated delivery of farm inputs and evacuation of product and reduction in the cost of transportation.

All-weather roads are the major channels of transportation for carrying goods and passengers. As the benefits derived from the construction of rural roads are reflected throughout the economy of the rural community, therefore, an adequate All-weather roads network is absolute necessary for the improvement of the economic and social conditions of the rural community. Thus Motorable bridges play a significant role to make roads all-weather by connecting two road heads. All weather roads play essential role in the socio economic development of rural community.

Since 1990s, rural roads have been constructed quite rapidly and have emerged as a major contributor to the rural transport infrastructure sub-sector. Some road inventory records indicate that more than 22,000 km of local roads have been completed. Unfortunately, most of these roads are not functional for almost 4-5 months of the year due to lack of permanent river crossings. As a result, rural poor are not able to derive optimum benefit from these roads and the investments made are not fully utilized

Therefore, there is an urgent need to make rural roads usable all year round, i.e. provide “all-weather roads”. In order to achieve this target, it is necessary to construct motorable bridge, across many rivers or streams so that they form an integral part of the rural roads. RCC

Bridges, Steel Girder Bridges, Steel Truss Bridges and culverts are the traditional river crossing methods. However, as many of these methods are expensive, a more cost effective solution needs to be found, in addition to make local roads motorable all year round

There is a severe lack of rural road bridges in Nepal, resulting in many roads becoming impassable during rains and in some cases for several weeks or even months during the rainy period. Only recently is rural road bridge development receiving more attention, but there are no proper selection and prioritization criteria in place, suitable standards for rural road bridges are lacking and proper design procedures are not being followed. Together with a limited capacity for supervision and monitoring at district and central level, this is resulting in the inefficient use of available funding, slowing down the process of bringing Nepal‟s rural roads to an all-weather standard.

Most of the local roads in Nepal are considered to be fair-weather roads. Although this is in large part due to the lack of an all-weather surface, a large number of roads with an improved surface are become impassable during rains and sometimes for several weeks or even months during the rainy season due to a lack of bridges

An inventory of existing rural road bridges does not exist, and there is no data available regarding the number of bridges in the Local Road Network (LRN), let alone their condition and type. The Swiss Agency for Development and Cooperation (SDC) funded Local Roads Bridge Programme (LRBP) is planning to carry out a local road bridge inventory during its current phase, which will provide the necessary information. However, keeping this information updated will remain an important challenge.

There is also no data available regarding the remaining bridge requirement for the LRN. The Department for Local Infrastructure Development and Agricultural Roads (DoLIDAR) has recently carried out a study on the length and condition of rural roads, and according to DoLIDAR's August Bulletin (2011), more than 40,000km of local roads have already been constructed, out of which only 16,000 km are operational. DoLIDAR further estimates that about 3,500 bridges need to be constructed in order to make these roads accessible throughout the year.

The Local Infrastructure Development (LID) Policy (2004) requires the involvement of users‟ committees in the planning and implementation of all local infrastructure, including bridges. The formal procedure should be that bridge demands are discussed and selected in the District Transport Infrastructure Coordination Committee (DTICC), endorsed by the District Development Committee (DDC) Council and then forwarded to DoLIDAR and the

Ministry of Local Development (MoLD). The selected bridges should also be included in the District Transport Master Plan (DTMP), which is supposed to form the basis for all rural transport infrastructure investments at district level. Currently, however, there is no such mechanism in place. Participatory planning does not take place, and DTMPs tend to only focus on roads and not explicitly look at bridges. (LID Policy 2004 cited in WB and GON. (2013)

Based on above literature review, motorable bridges play the vital role to connect rural roads with market and services centers providing all weather road to achieve socio –economic development in rural area of Nepal.

2.2 Empirical review

(Enefiok and Ekong, 2013***)*** found that rural roads and bridges form the basis for transformation and communication in his evaluation report "The impact of rural roads and bridges on the socio-economic development of AkwaIbom state, Nigeria: an Evaluation". They constitute the most critical infrastructure in the rural, and by extension national development drive. Contributions of rural roads and bridges to rural development include: accelerated delivery of farm inputs and evacuation of product and reduction in the cost of transportation.

On the other hand lack of rural access roads has killed the dreams and resilience of those who may have chosen to live in the villages with their village cutaway from the city and potentials in the villages wasting away, these set of people have chosen to join the rest for urban life. Since majority of economic activities in our society depend in one way or the other on road infrastructure, AkwaIbom State Government from1999 made an effort to provide roads and bridges. This work therefore assessed the impact of government effort in the provision of rural road and bridges on the socio-economic transformation of the State.

The study adopted a historical as well as descriptive approach in data collection. The study therefore revealed that the government efforts has increased socioeconomic activities in the state as people and goods now move freely from rural areas to the urban centers. The study further revealed that provision of rural roads and bridges has equally helped to reduce the cost of transportation in the state. Above all, it has reduced rural urban drift in the state. Based on this, the study recommended that the government should sustain the present tempo by increasing fund allocation in the annual budget for rural roads and bridges

Birdsall (2001) analyzed the decision of saving money as the culture's main mechanism to influence the economic preferences, through the relation between religion and the preference for savings (indicator measured as the percentage of population that educate their children to make savings).

Christiaan (2002), the transport sector has a long tradition of justifying its projects on the basis of efficiency considerations, evaluating alternative investments on the basis of cost-benefit data. For road transport investments, the main economic benefits consist of savings in vehicle operating costs (such as fuel costs, vehicle maintenance), time savings, and a reduced risk of accidents. These benefits accrue to road users, in particular operators of vehicles, and apply to motorized as well as non-motorized transport. Operators of commercial vehicles may or may not pass on these cost reductions to passengers and shippers. Vehicle operators, as well as consumers, may or may not be local residents, so that the benefits could be spread out over a large geographic area. Recently, in part fueled by the Bank's sharpened focus on poverty reduction and the World Development Report 2000/2001: Attacking Poverty, interest has emerged in the distributional impact of transport projects and especially the impact on poor groups. (World Development Report 2000/2001 cited in Christiaan 2002)

Eisenbeis (2008), Society is the benefactor when our industry provides safe, long-term, dur-able structures. Even more so when economical, attractive, and low-main- tenance describes our bridge. Sound familiar? Additional benefits occur when construction minimizes site disruption, environmental impact, and traffic congestion, again, all common benefits inherent to current bridge construction. Let's look at various social benefits of concrete bridges as they relate to sustainability.

Concrete bridges, with their typically redundant structural systems, are safe bridges. The excellent fire and seismic resistance characteristics of these structures further ensures the public well- being. In seismic zones, confinement and corresponding ductile behavior in plastic hinge regions provides for minimal earthquake damage, low repair costs, and immediate post-earthquake use. With accelerated bridge construction, rapid replacement of other bridges that may have been damaged is also beneficial. Concrete bridges also demonstrate outstanding performance when exposed to fire as illustrated by other articles in this issue. The necessity of safe bridges is fundamental to our industry.

Precast components allow rapid construction of bridges to occur. With the advancement of rapid construction techniques, construction time previously measured in weeks and months is

now measured in hours and days. Minimal lead times, locally manufactured products, and standard shapes make this method economically feasible. Deck formwork for cast-in-place concrete can be eliminated when adjacent precast members are used. Combined with the reduced disruption to traffic, shorter detour times, and minimal site impact afforded, the social benefits are significant.

(RGBCP, 2011)The positive impact of the road and bridge on the biological environment accessibility it provide to the area, and this allow administrative services, associations and NGOs to expand their activities throughout the project area. The construction of the bridge allow structured free flowing traffic, less costly travel and improved road safety. The benefits are as follows:

i) Reduced travel time: The link-up by the bridge allowed average travel speeds of about 80km/h for light vehicles and 50km/h for heavy vehicles. Thus, the considerable waiting times, coupled with the ferry operating times, virtually eliminated.

ii) Easier access to health facilities, education and administrative offices: Access to administrative, economic, educational and health centres in major towns along the project corridor will be facilitated and improved in terms of travel time, safety and comfort. Intra- and inter-regional trade, particularly between Farafenni and Soma, boosted.

iii) Job creation in the construction, operational and subsequent phases. The number of jobs and qualifications determined by the contractors and their sub-contractors, as appropriate. Considering that the construction of this type of bridge requires about 400 to 700 jobs for the 40 months' duration of the construction, the surrounding population could potentially used as labour, particularly as security guards, traffic controllers, and for manual earthmoving and weeding. There recruitment of several middle-level and high-level officers, including project leaders (engineers), team leaders (senior technicians) and topographers (senior technicians).

iv) Facilitation of access and travel: The project benefited the local residents and those of the regions along the river banks, as well as Senegalese nationals and transport sector operators. The international scope of the bridge construction and road rehabilitation is likely to promote improved movement of goods and persons throughout the sub-region.

v) Development of socio-economic activities: With project workers moving into Farafenni and Soma, as well as the towns and villages, there was greater demand for low-cost, middle-income and luxury housing, leading to increased rental income. Demand for equipment could

encourage house owners to improve the state of their property, which have a positive impact on the environment. During construction, the population in the project area increase because of the presence of the contractors' staff, as well as those coming there to trade. The authority of traditional leaders and that of elected officers enhanced during the construction phase through their involvement in the commitments made by various stakeholders (promoters, contractors and the population), and fostered social cohesion. Furthermore, the temporary influx of workers to the project site increased the consumption of several basic commodities such as fuel and foodstuffs, thereby increasing the incomes of traders and business persons. More specifically, at the bridge, the revenue of the Gambian Ports Authority (GPA) increased with the use of the jetty by the construction firm.

vi) Improved environmental integration: The construction of storm water drainage gutters helped curb soil erosion and protect water resources and dwellings along the road from flood water. The erosion control measures (planting over slopes, stabilizing erosion areas, building booms and dwarf walls, carrying out re-vegetation, mangrove restoration, etc.) helped curb soil loss and contribute to the sustainability of the road. Planting on the shoulders of the road added aesthetic value and curb noise and light nuisance. Permanent maintenance by the NRA helped to significantly reduce the risk of degradation.

There are more than 6,000 rivers in the Nepal, with an annual discharge of 200 billion cubic meters of water. Thus, if roads are to be made all-weather, more than 3,500 bridges need to be built on the existing local roads. If motorable bridges connect rural roads, the roads become motorable throughout the year and the benefits are expected to increase exponentially, adding more values to those roads already built. All-weather roads are the major channels of transportation for carrying goods and passengers. As the benefits derived from the construction of rural roads are reflected throughout the economy of the rural community, therefore, an adequate All-weather roads network is absolute necessary for the improvement of the economic and social conditions of the rural community.

Since 1990s, Rural roads have been constructed quite rapidly have emerged as a major contribute to the rural transport infrastructure sub-sector. DoLIDAR's August Bulletin (2011), indicate that more than 40,000km of local roads have already been constructed. Unfortunately, Most of these roads are not functional for almost 4-5 months of the year due to lack of permanent crossings. As result, rural poor are not able to derive optimum benefit from these roads and the investments made are not fully utilized. Thus Motorable bridges

play a significant role to make roads all-weather. All weather roads play essential role in the economy of rural community. It is accepted that benefits derived from roads are transmitted throughout the economy and its fruits are noticed in every sector of development. (DoLIDAR August Bulletin cited in LRBP 2010),

(LRBP 2010) explained that there is an urgent need to make rural roads usable all year round (all weather roads). In order to achieve this target, it is necessary to construct permanent crossings across many rivers or streams so that they form an important part of the rural roads. Rural roads and bridge provide basic inputs for all-round socio-economic development of the rural areas. The provision and construction of bridge and road links brings multiple socio-economic benefits to the rural areas and results in forming a strong backbone for the socio-economy of rural areas in Nepal.

CHAPTER- THREE

3. RESEARCH METHODOLOGY

3.1 Research Design

The purpose of the study was to examine the impacts of Motorable Bridge on socio-economic sector of the Zone of Influence (ZoI) of TiperiKhola Bridge, Dailekh after construction motorable bridge over TiperiKhola in Dailekh. This study explained the facts and results of research in descriptive way. The study adopted descriptive research design to analyze and interpret the quantitative and qualitative data collected from the study area. This study area and topicis different from another study and it explored and identified new facts and results so explorative research design was adopted to analyze and interpret the quantitative and qualitative data collected from the study area.

3.2 Rationale of the selection Study area

The basic principle for the study area was to choose the Zone of Influence (ZoI) of Motoralbe Bridge, where the MotorableBridge was constructed. It was decided to make a case study of the communities fall under the ZoI of motorable bridge. The Local Roads Bridge Programme (LRBP) has constructed MotorableBridgeover Tiperikhola in DailekhDistrict with aim to improve the livelihood of the people fall under the ZoI of bridge, where assistance focuses on reducing poverty and enabling communities with better access and improved mobility to services and opportunities so this Bridge supposed to be an appropriate of study on impact of Motorable bridge in rural community.

3.3 Nature and Sources of Data

Both qualitative and quantitative data were collected during this study. Filed survey was conducted for primary data and VDC, DDC, LRBP cluster no. 6 and DTO were visited for secondary data.

3.4 Universe, Sample and Sampling Procedure

According to the Baseline Report (LRBP, 2014), there were 703 households in Zone of Influence (ZoI) of TiperiKhola Bridge, Dailekh.The ZoI of the bridge is Badhakhola VDC wards no. 3, 4, 5, 6, 8 & 9 and Bansi VDC ward no.5 & 6 of Dailekh District.

During the baseline survey (LRBP 2014) of TiperiKhola Bridge, Altogether 60 households (35 HHs from Bansi VDC and 25 HHs from Badhakhola VDC) were randomly selected to

collect information. 25 HHs Dalit, 7 HHs Janajati and 28 HHs others (Brahmin, Chhetri, Thakuri) were the statistically representatives of 703 HHs of ZoI.

This study required only 30 HHs from the same HHs which were selected for the baseline survey (LRBP 2014) so each and every group of HHs of baseline survey groups, were divided into half group of HHs to get information. 13 households from Badakhola VDC and 17 households from Bansi VDC were selected to collect information including 13 HHs Dalit, 3 HHs Janajati and 14 HHs others (Brahmin, Chhetri and Thakuri) were selected by simple random sampling method.

This study was done as case study approach on the basis of baseline survey of Tiperikhola Bridge in Dailekh district. The list of selected HHs during baseline survey was enlisted firstly, then required HHs were selected through quota and random sampling. Then selected HHs were interviewed for household survey to get required information.

3.5 Data collection Techniques and Tools

During the research work, more emphasis were given to collect accurate information and try to get reality of the respondent as possible. The study followed the following techniques and tools of data collection:

3.5.1. Household survey

Major data were collected from house hold survey method using the structured questionnaire, which was prepared and used during baseline survey by Local Roads Bridge Programme (LRBP) on 2014. The survey collected household level information as well as socio-economic condition of 30 Households from same 60 Households, which were selected for the baseline survey of LRBP on 2014 of the ZoI of TiperiKhola Bridge, Dailekh. Quantitative as well as qualitative data also collected through the interview during Household survey.

Household survey questionnaire is presented in Annex 1.

3.5.2. Observation

One day observation of traffic count was conducted within the bridge site from 6 am to 6 pm. During this observation each and every means of transportation were counted to collect information about traffic volume after construction of Tiperi khola bridge. Observation was helpful to count present traffic volumes. This study has used the same observation guidelines, which was prepared and used during Baseline Survey by LRBP on 2014 AD. This study

collected the information depend on the guideline of traffic count which was prepared and used during baseline Survey by LRBP on 2014, which is presented in Annex 2.

3.6 Data analysis

Data will be analyzed with the help of computer programme such as Ms-Excel. Simple statistical tools like tables, graphs will use for data presentation. To describe the information, descriptive method will be used for qualitative data.

CHAPTER FOUR

4. DATA PRESENTATION AND ANALYSIS OF SURVEY DATA

Acquired primary and secondary data have assisted in the preparation of this section of the report. All the information before bridge construction, were taken from Baseline Survey Report by Local Roads Bridge Programme (LRBP) on 2014 AD. This chapter contains the information of sampled households before construction of Bridge of 2014 AD and after construction of Bridge of 2016 AD. Required information of before and after construction of Tiperi Khola Bridge are presented and brief analysis and compare is done according to the questionnaire submitted to 30 sampled households. This chapter has been organized as follows;

4.1 Study area at a glance

4.2 Socio-economic Characteristics

4.3 Access to the service centers

4.4 Traffic Volume

4.1 Study area at a glance

Dailekh District is located in Bheri Zone of the Mid-western Development Region of Nepal. It borders with Jajarkot district to the East, Achham district of Seti Zone to the West, Kalikot of Karnali Zone to the North and Surkhet of Bheri Zone to the South. The total area of the district is 1,502 km2. The district lies mostly in the Mid-Hills and partly in the Terai.

The Tiperi Khola Bridge is situated on Kholi Bazzar-Badakhola-Bansi-Kashikandh road of Dailekh District. Tiperi Khola Bridge is 16 KM far from the District Headquarter Dailekh Bazar. This bridge site is located at Badha khola VDC ward no.5 in the left bank and Bansi VDC ward no.9 of Dailekh district in right bank.

This Tiperi khola is RCC Bridge with span arrangement of 25 meters. This Tiperi khola bridge links the ZOI or Kholi Bazzar-Badakhola-Bansi-Kashikandh road with Mid-hill highway.

4.2 Socio-economic Change of the respodents

4.2.1 Population and Family Size

Motorable bridge can play the vital role to reduce and increase population and family size, therefore the information related to population and family size were collected which has been presented and compared in table 4.1.

Table 4.1: Population status and family size of respondents

S.N.	Particular	Before (2014)	After (2016)
1	HH	30	30
2	Male	83	88
3	Female	91	85
Total		174	173
Average family size		5.80	5.77

(Source: Field survey, 2016)

The table shows that there were 173 population of 30 household after bridge construction where 174 population were existed before construction the Bridge. Household family size was decrease from 5.80 to 5.77. The percentage of men is more than percentages of women in this study. On Baseline survey (LRBP, 2014), Women population was more than male population.

Decrease of family size was not a big change but it was defined that population growth was under control. It was happened by the access to the education, to the health post and to the awareness of family planning through the Tiperi khola bridge, dailekh.

Before construction Tiperi khola bridge, there was traditions to produced more daughters in hope of son. After construction of Tiperi khola bridge, ZOI got knowledge and about equality of son and daughter through awareness campaign, school, health post etc. Awareness rising program, campaign and other health institutions have easy access to provide lots of awareness and services in this ZOI of Tiperi khola Bridge through all-weather road which was become after construction of Tiperi Khola Bridge.

4.2.2 Change in Literacy Status

Motorable bridge can play the important role to make people literate therefore the information related with literacy status of ZOI people, was also collected which has been presented and compared in table no.4.2.

Table 4.2: Change in Literacy status

S.N.	Education Status	Before (2014)		After (2016)	
		Population	%	Population	%
1	Literate	127	72.99	133	76.88
2	Illiterate	34	21.12	25	15.82

(Source: Field Survey, 2016)

This table shows that the percentage of literary rate was increased from 72.99 % to 76.88 % after construction of Tiperi Khola Bridge. Percentage of illiterate rate was decreased from 21.12% to 15.82 % after construction of Tiperi khola bridge. The number of people who were unable to go to school according to their age, were not included in this literacy study. The number of illiterates is defined as the number of persons who cannot both read and write with understanding a short simple statement on their everyday life. The number of literates is defined as the number of persons who can both read and write with understanding a short simple statement on their everyday life.

Transport facilities to educational materials and educational institutions increased students' enrolment and teachers did not hesitate to get transferred to ZOI of this bridge which were previously considered quite remote and not accessible through motorbike. Tiperi khola bridge linked ZOI settlements with market so local people got the opportunities to sell their own agricultural product and their labor so they earned money and can made some effort to send their own children to school. In this way, this study shows that Tiperi khola bridge played important role to increase literacy status.

4.2.3 Change in educational Level

Motorable bridge can play the important role in education therefore the information related with literacy status of ZOI people, was also collected which has been presented and compared in table no.4.3.

Table 4.3: Change in educational Level

S.N.	Education Status	Before (2014)		After (2016)	
		Population	%	Population	%
1	Primary	45	27.95	47	29.75
2	Secondary	44	27.33	34	21.52
3	SLC	29	18.01	37	23.42
4	Intermediate	8	4.97	11	6.96
5	Bachelor	1	0.62	2	1.27
6	Masters'	0	0	2	1.27
Total		127	100	133	100

(Source: Field Survey, 2016)

This table shows that the percentage and number of people in educational level was increased after construction of Tiperi Khola Bridge.The population of SLC holder were increased from 29 to 37, Intermediate level holder population were increased from 8 to 11, Bachelor holder population were increased from 1 to 2 and 2 people got the change to study Masters' level after construction of bridge while compare with before construction bridge's status or data.

The connection of the ZOI to the road network increased the educational standard of the inhabitants of ZOI. Not only the ZOI students found it easier to go to their place of education, but good and efficient teaching staffs were also attracted to ZOI schools and thus the literacy level is increased and educational standards were improved. This study shows that population of ZOI got the opportunities to get the higher education after construction the Tiperi Khola Bridge.

Tiperi Khola Bridge connected the two road heads and made them all weather so population of ZOI got the direct opportunities to get the higher education at the district headquarter. Better transport infrastructure and services facilitated access to schools through Tiperi khola bridge. Literacy rate measures the development of society or people so above information shows that the ZOI population were being developed after construction of Tiperi Khola Bridge.

4.2.4 Change in Occupational patterns

Motorable bridge can play the important role to generate income by creating the occupational opportunities therefore the information related with occupations of ZOI people of Tiperi khola bridge, was also collected which has been presented and compared in table no.4.3.

Table 4.4: Change in Occupational patterns

S.N.	Occupation	2014 (Before)		2016 (After)	
		Population	%	Population	%
1	Agriculture	52	29.89	47	27.17
2	Foreign Employment	25	14.37	35	20.23
3	Service	3	1.72	6	3.47
4	Business/Commerce	1	0.57	3	1.73
5	Wage Labor	4	2.30	3	1.73
6	Student	74	42.53	65	37.57
7	Depended	15	8.62	14	8.09
Total		174	100.00	173	100

(Source: Field Survey, 2016)

Table shows that people engagement on Agriculture was decreased from 29.89 % to 27.17 % after construction Tiperi Khola Bridge Foreign Employment was increased 14.37 % to 20.23 %, Service was increased from 1.72 % to 3.47 % and Business was increased 0.57% to 1.73% after construction of Tiperi khola Bridge.

Better access to markets created economic opportunities for ZOI people and people to sell their labor and products through Tiperi khola bridge. At the micro level access to transport facilitated job search and contributed to easier diversification of income. Occupational status also major factors to define the social development of ZOI of this bridge. Above information shows that bridge have major impact on the economic growth of this ZOI of Tiperi Khola Bridge, which means people got another source to income.

4.2.5 Change in Per Capita Income and Expenditure

Motorable bridge can play the important role to generate Per Capita Income and Expenditure therefore the information related with income and expenditure of ZOI people of Tiperi khola bridge, were collected which has been presented and compared in Figure 1.

Figure 1: Change in Per Capita Income and Expenditure

(Source: Field Survey, 2016)

This figure shows that Per Capita Income of Sampled households was increase from Rs 24563.59 to Rs. 36081.50 after construction of Tiperi Khola Bridge, which was more than Rs 11517.91. Per capita expenditure was also increase 18779.47. After construction of Tiperi Khola Bridge, Per capita income and expenditure was also increased from Rs. 18779.47 to Rs 25065.32, which was more than Rs. 6285.85.

With the construction of Tiperi Khola Bridge, import of agricultural inputs to remote villages and export of outputs to markets are greatly facilitated. ZOI People are able to develop backward and forward linkages with the markets. As a result ZOI people sold their Livestock and birds.

Tiperi Khola Bridge connected the two road heads and made them all weather so population of ZOI got the direct opportunities to easily get the access to higher education, Main market, hospital, local market, medical facilities, fertilizers, to the district headquarter. After

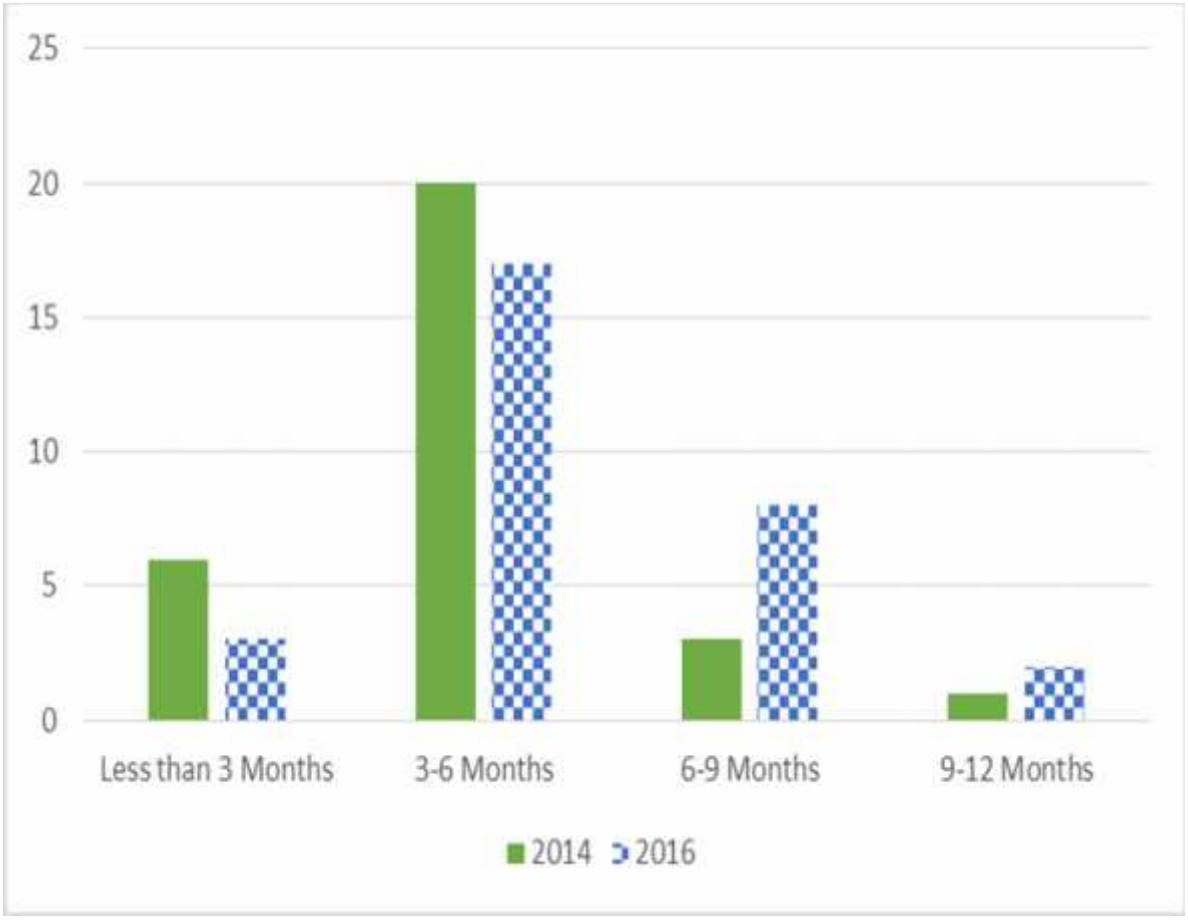
connecting with the all-weather road, local market was established at ZOI of Tiperi Khola Bridge. ZOI people got the daily uses goods at low price so they got the chance to save money after buying the same goods in low price. ZOI people got the chances to saving money by buying good in low price, which influenced the economic status. In this way, Tiperi Khola Bridge plays a vital role to connect to roads and increase per capita income and expenditure of ZOI people.

Per Capita Income and Expenditure are one of the major factors of measuring economic development of people. The most important reason for the increase income and expenditure is the increase in marketable surplus of cash crops accessibility to the service centers. On the basis of per capita income and expenditure factor, above table shows that construction of Tiperi khola bridge in remote area played a vital role to generate the income of remote people.

4.2.6 Change in Food Sufficiency

Motorable bridge can play the important role to increase the food sufficiency level therefore the information related with food sufficiency of ZOI people of Tiperi khola bridge, were collected which has been presented and compared in Figure 2.

Figure 2: Change in Food Sufficiency



(Source: Field Survey, 2016)

This figure shows that food sufficiency level less than 3 months of 6 households was decreased in to 1 household, Food sufficiency level 3-6 months of 20 households was decreased in to 13 households after construction of Tiperi Khola Bridge. Food sufficiency level 6-9 months of 3 households was increased in to 12 households, Food sufficiency level 9-12 months of 1 households was decrease in to 4 households.

Tiperi Khola Bridge connected the ZOI of bridge with the all-weather road that means ZOI people easily got the access to the local market, fertilizer shops, medical facilities, district hospital, district headquarter etc. ZOI people of this bridge got the opportunities to get the scientific and modern seeds and fertilizer to increase their agricultural products. In other hand ZOI people also got the opportunities to sell their agricultural products in local level and out of ZOI. People of ZOI had easy access to the main market to sell the agricultural product through vehicle which was the available from Tiperi Khola Bridge.

Measuring food sufficiency is one of the factors to analyze and compere economic development of people. So above information shows that Tiperi Khola bridge made road all weather and connected remoter area with local market, fertilizer shops, medical facilities, district hospital, district headquarter etc. Study shows that Motorable Bridge play the important role to development the economic status.

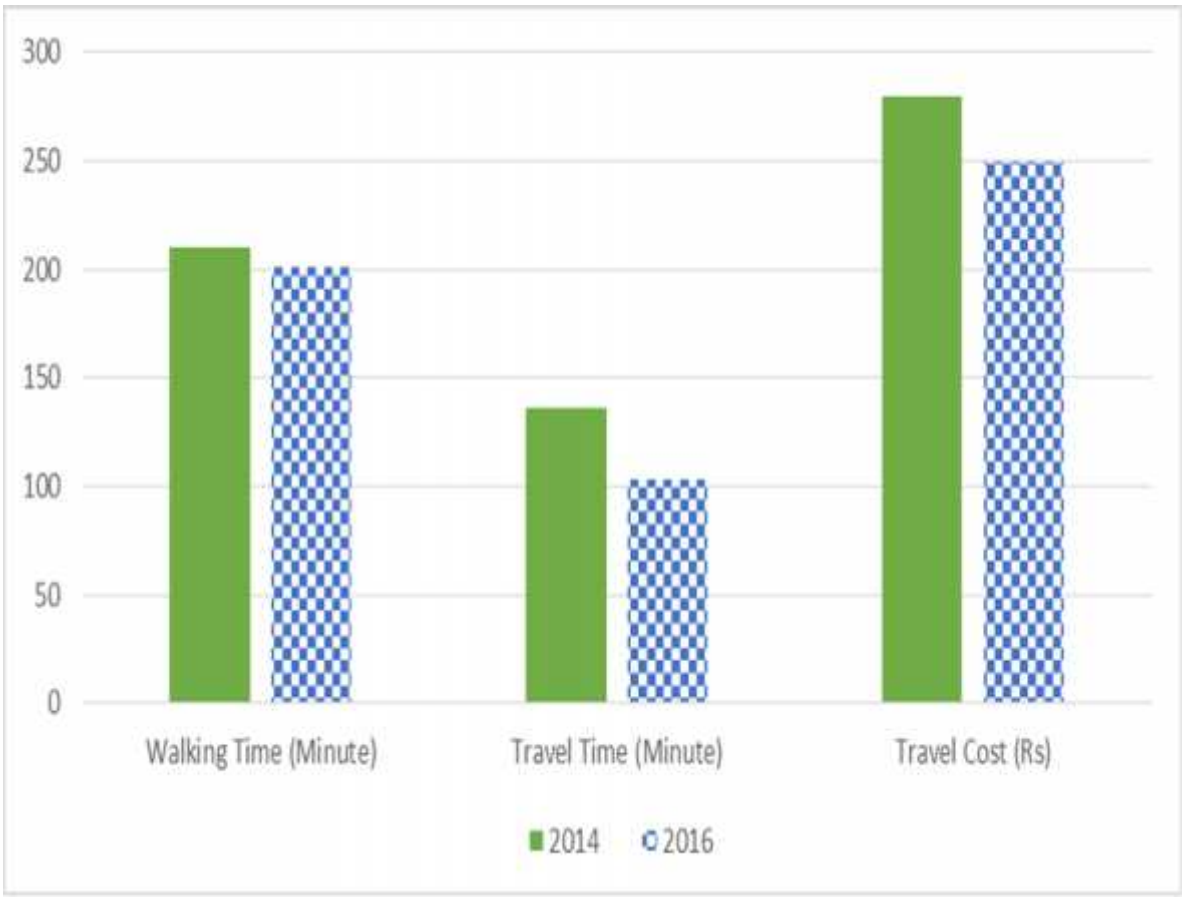
4.3 Access to the service centers

Motorable bridge can play the vital role to increase mobility of people to the service centers due to the safety, convenience and time saving traveling factors. Service centers are organizational unit, which provides a specific service or product, or a group of services or products to users.

4.3.1 Access to the District Headquarter

Tiperi khola bridge play the important role to decrease the travel time and cost therefore the information related with travel time and cost to the District headquart of ZOI people of Tiperi khola bridge, were collected which has been presented and compared in Figure 3.

Figure 3: Travel time and cost to the District Headquarter



(Source: Field Survey, 2016)

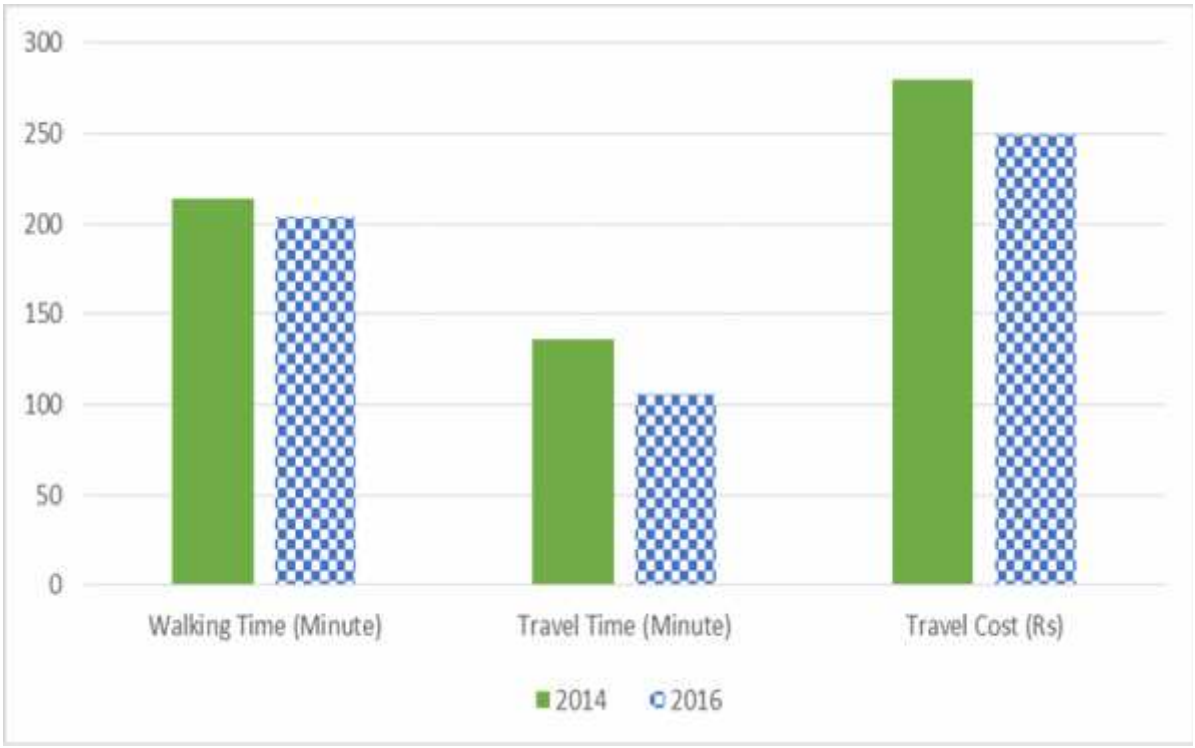
This figure shows that after construction of Tiperi Khola Bridge, walking time and travel time were decreased from 210 minutes to 201 minutes and 136 minutes to 103 minutes respectively to reach headquarter Dailekh bazzar. Travel cost also decreased from Rs.280 to Rs. 250 to reach district headquarter.

After construction of Tiperi Khola Bridge, travel time to the district headquarter dailekh bazzar was decrease by the all-weather road and motorable crossing over river. Travel time and travel cost to the district headquarter are the factors of measuring access to the services so above information shows that Tiperi Khola bridge made road all weather and connected remote area with local market, fertilizer shops, medical facilities, district hospital, district headquarter etc..

4.3.2 Access to the District Hospital

Motorable bridge play the important role to decrease the travel time and cost therefore the information related with travel time and cost to the District hospital of ZOI people of Tiperi khola bridge, were collected which has been presented and compared in Figure 4.

Figure 4: Travel time and cost to the District Hospital



(Source: Field Survey, 2016)

This table shows that after construction of Tiperi Khola Bridge, walking time and travel time were decreased from 214 minutes to 204 minutes and 136 minutes to 106 minutes respectively to reach district hospital. Travel cost also decreased from Rs.280 to Rs. 250 to reach district hospital.

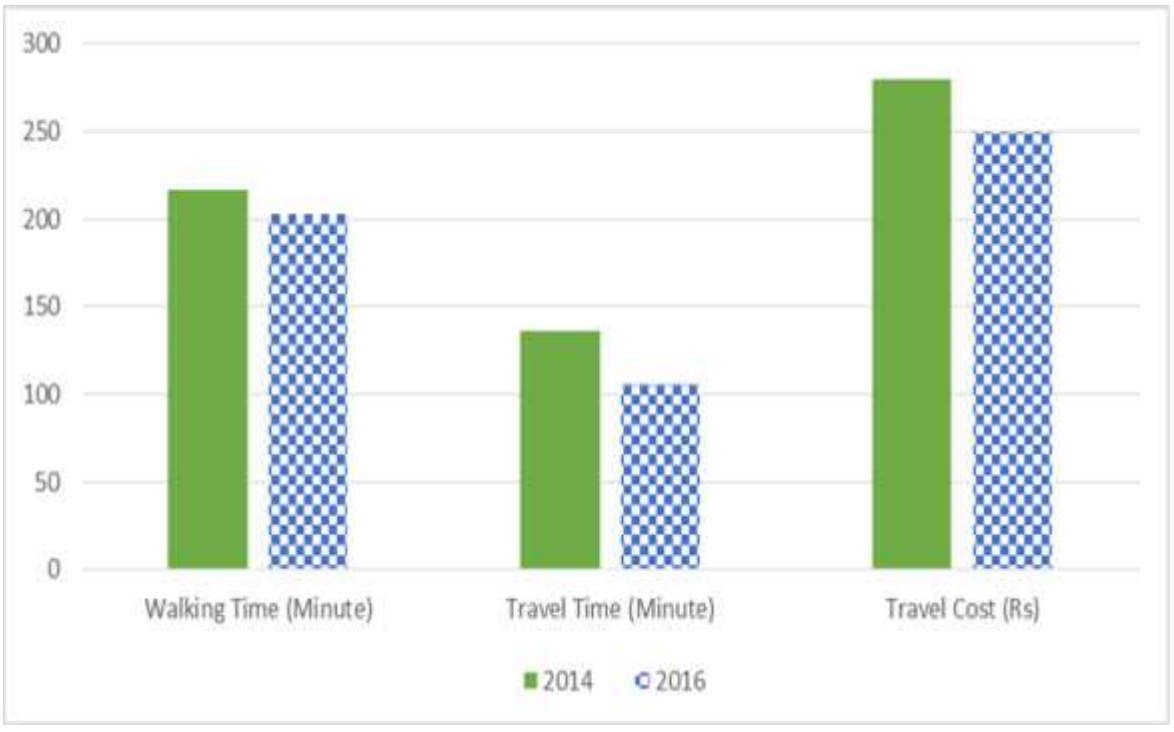
After construction of Tiperi Khola Bridge, travel time to the district hospital (Dailekh Bazzar) was decrease by the all-weather road and motorable crossing over river. Increased in access to health facilities through Tiperi khola bridge, ZOI people are able to reach district hospital to get medical facilities and Department of Health and other health institutions have easy access to provide medicines and medical facilities to ZOI people.

Travel time and travel cost to the district hospital are the factors of measuring access to the hospital so above information shows that Tiperi Khola bridge connected the ZOI with district hospital to get medical facilities. Study shows that visiting to district hospital affected long term impact on increase in the life expectancy of the ZOI people and become more health conscious.

4.3.3 Access to the Campus

Motorable bridge play the important role to decrease the travel time and cost to take higher education out of ZOI therefore the information related with travel time and cost to the campus of ZOI people of Tiperi khola bridge, were collected which has been presented and compared in Figure 5.

Figure 5: Travel time and cost to the Campus



(Source: Field Survey, 2016)

This table shows that after construction of Tiperi Khola Bridge, walking time and travel time were decreased from 214 minutes to 204 minutes and 136 minutes to 106 minutes respectively to reach campus. Travel cost also decreased from Rs.280 to Rs. 250 to reach to the campus.

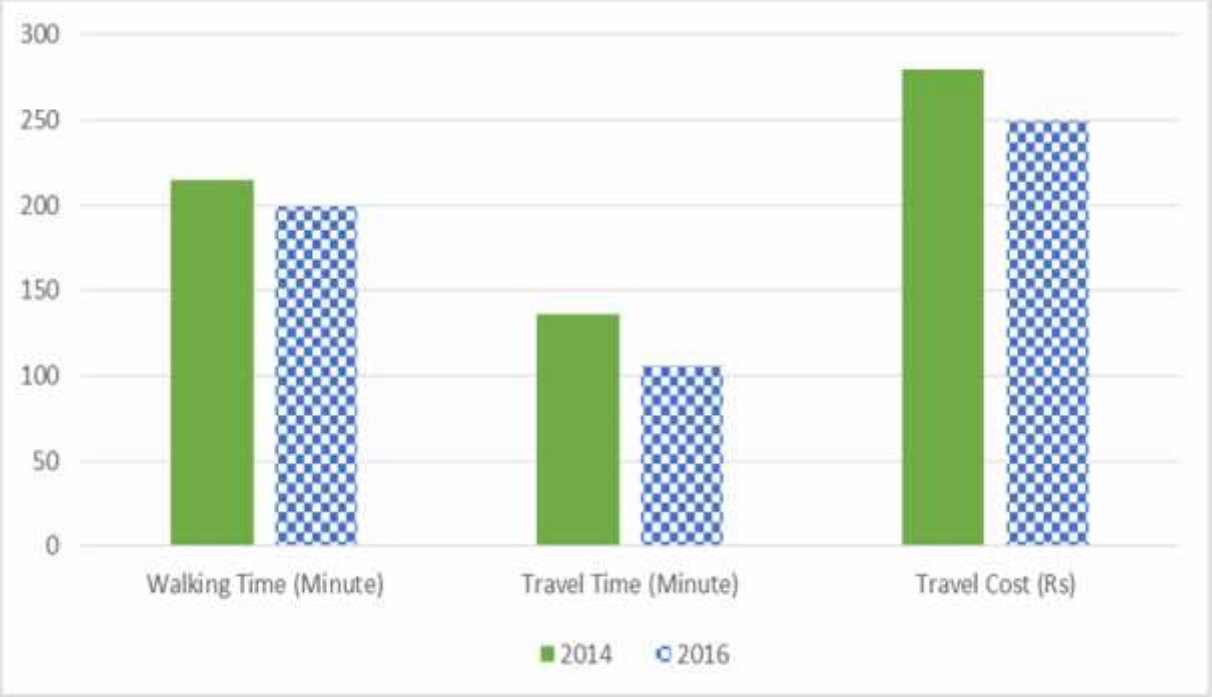
After construction of Tiperi Khola Bridge, Travel time to the campus was decrease by the all-weather road and motorable crossing over river. Tiperi khola bridge is one important reason for an increase in student enrolment in Campus, school etc. Transport facilities to educational materials and educational institutions increased students' enrolment and teachers did not hesitate to get transferred to ZOI of this bridge which were previously considered quite remote and not accessible through motorbike.

Travel time and travel cost to the campus is the factor of measuring accessibility to the education so above information shows that Tiperi khola bridge reduced travel time and travel cost to the campus.

4.3.4 Access to the Main Market

Motorable bridge play the important role to decrease the travel time and cost to reach main market out of ZOI therefore the information related with travel time and cost to the main market (Dailekh Bazzar) of ZOI people of Tiperi khola bridge, were collected which has been presented and compared in Figure 6.

Figure 6: Travel time and cost to the Main Market



(Source: Field Survey, 2016)

This table shows that after construction of Tiperi Khola Bridge, walking time and travel time were decreased from 214.67 minutes to 199.67 minutes and 136 minutes to 106 minutes respectively to reach main market. Travel cost also decreased from Rs.280 to Rs. 250 to reach main market.

After the construction of Tiperi Khola Bridge, road become all weather and increased access to and from markets has developed in trading and marketing practices as well as in the development of entrepreneurship in the zone of influence of this bridge. The number of retail and wholesale shops increased with in the ZOI and it directly contributed benefits to local people.

Travel time and travel cost to the main market is the factor of measuring accessibility to the trade center so above information shows that Tiperi khola bridge reduced travel time and travel cost to main market.

4.4 Change in Traffic Volume

Motorable bridge play the important role to make road all-weather and all- weather encourage to increase vehicle movements with in the ZOI therefore the information related with traffic volume through Tiperi khola bridge, were collected which has been presented and compared in table 4.5.

Table 4.5: Daily traffic movement

S.N.	Means of Transportation	Before (2014)	After (2016)
		Travel times	Travel times
1	Mini Bus	0	5
2	Tractor	4	18
3	Jeep	2	6
4	Motorcycle	4	10
Total		10	39

(Source: Field Survey, 2016)

This table shows that only average 10 vehicles plied up to Zone of Influence (ZOI) of this Tiperi khola bridge before construction of the bridge over Tiperi khola in a day. The movement of jeep was increased from 2 to 6, movement of motorcycle was increased 4 to 10, and movement of tractors 4 to 18 and 5 mini bus started its movement after construction of Tiperi Khola Bridge in Dailekh. After being all- weather road, about 39 vehicles plied up to the Zone of Influence (ZOI) of this bridge.

Before construction the Bridge over Tiperi khola, it was difficult to cross tiperi khola for minibus, truck, jeep to reach basi bazzar lack of reliable crossing over tiperi khola. After construction of Tiperi khola bridge, it was easier to cross this river for all kinds of vehicle from and to the ZOI of this bridge because of all-weather road and reliable crossing over Tiperi khola in Dailekh.

Before construction of this Tiperi khola bridge, it was difficult to cross Tiperi khola during rainy season for people and animals. People waited more than 20 hours to cross this Tiperi khola bridge during flood. There was no any kinds of crossing over Tiperi khola bridge before construction of this RCC bridge. After construction of Tiperi khola bridge it is also a reliable crossing for people and animals over Tiperi khola. During rainy season, Lots of people depend on this bridge to cross the Tiperi khola so people movements also increased after construction of Tiperi khola bridge. This Tiperi khola bridge totally reduced the crossing incident during flood in absence of bridge over Tiperi khola.

Before construction ot Tiperi khola bridge, it was difficult to get ambulance facilities within the ZOI of this bridge because off reliable crossing over Tiperi khola. So people have no options without carrying the patient to the hospital for more than 7 hours. After construction of Tiperi khola bridge, local people easily get the ambulance facilities with in the zone of influence of Tiperi khola. It just took maximum one and half hour to get medical facilities in district hospital for ambulance. In this way, Motorable bridge can play the important role to reduce the incident of death of patient.

After construction of this Tiperi khola bridge, Wholesalers visited with their vehicle and goods in this ZOI to sell their goods and to search a market. Seasonal Merchants also visited ZOI of Tiperi khola bridge to buy the seasonal agricultural production and livestock. So this bridge directly links the ZOI with other communities, Society, Market etc. that's way vehicle volume is increasing day by day.

According to the above information, Tiperi khola bridge played the vital role to make road all- weather and motorable so traffic volume increased up to 39.

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY

Tiperi khola bridge in one of the factors that contribute towards the socio –economic development of Zone of Influence by constructing the all- weather road through connecting the rural roads with service centers. Tiperi khola bridge plays the vital role to make road all- weather and that roads provide basic inputs for all-round socio-economic development of the rural areas. The mobility level of the ZOI people is increased and the people are lured to make social visits and recreational journeys to more distant places.

This study signifies that how the motorable bridge can play the vital role for the socio- economic development of the rural society, rural communities and the rural people through connecting two road heads.

This study was done in Zone of Influence (ZOI) of Tiperi khola bridge, Dailekh in two process, firstly selected the 30 households among 60 households, which were selected during baseline survey (LRBP, 2014). In second, the study obtained the same 30 household baseline survey information (LRBP 2014) among 60 households and analyzed that information to compare with this study to examine the impacts before and after construction of Tiperi khola bridge.

The impact of Tiperi khola bridge in the social and economic sectors of rural area is briefed in details is presented;

Tiperi khola bridge played the vital role for the socio- economic development of rural society, rural communities and the rural people through connecting with service centers, market, educational institutions, medical facilities and district headquarter etc.

Due to the Tiperi khola bridge construction, per capita income has increased from Rs 24563.59 to Rs 36081.50 and per capita expenditure also increased is Rs. 18779.47 to Rs. 25065.32. The most important reason for the increase in per capita income and expenditure is the increase in marketable surplus of cash crops, access to the market, reduce of travel and transport fare etc.

Increased in access to health facilities through Tiperi khola bridge, ZOI people are able to reach district hospital to get medical facilities and Department of Health and other health institutions have easy access to provide medicines and medical facilities to ZOI people.

Tiperi khola bridge is one important reason for an increase in student enrolment in Campus, school etc. Transport facilities to educational materials and educational institutions increased students' enrolment and teachers did not hesitate to get transferred to ZOI of this bridge which were previously considered quite remote and not accessible through motorbike.

After construction of Tiperi Khola Bridge about 39 vehicles plied up to the Zone of Influence (ZOI) of this bridge. It was difficult to cross tiperi khola for minibus, truck, jeep to reach basi bazzar lack of reliable crossing over tiperi khola before construction the Bridge.

5.2 CONCLUSION

Based on all information and facts collected and presented here, it has been concluded that the motorable bridge is most important crossing to make road all-weather then all-weather roads play the vital role to develop the socio -economic status of the ZOI people of Tiperi khola bridge through the increase in marketable surplus of cash crops, access to the market, access to the health post, access to the education, reduce of travel and transport fare etc.

Construction of Tiperi Khola Bridge facilitated easy access to markets for existing products and cash crops. Better access to markets created economic opportunities for people in Zone of influence and people to sell their labor and products.

It was easier to get ambulance facilities within the ZOI of this bridge because of all-weather road and reliable crossing over Tiperi khola in Dailekh.

5.3 RECOMMENDATIONS

On the basis of opinion expressed by respondents and also according to the findings of the study the following suggestions are recommended:

- During this study, delineators of approach road of Tiperi khola bridge, were laid down. As soon as possible, those delineators should be built to protect vehicle to get accident by the Village Development Community, District Development Committee, District Technical Office and Stakeholders at the approach road in the left bank of Tiperi khola. Delineators protect and control the vehicles to ply in the right track of road so probability of accident and crash on the bridge may reduce after construction of Delineators.

- Study about impacts of Motorable bridge on infant mortality need to be done to examine the role of motorable bridge to reduce infant mortality in such rural area. This kinds of study about infant mortality shows the intervention to the Government of Nepal and Local stakeholders to construct the motorable bridge in appropriate river to reduce infant mortality and develop socio- economic development in rural area.

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Annex 1

Government of Nepal
Ministry of Local Development
Department of Local Infrastructure Development and Agricultural Road
Office of District Development Committee
District Technical Office (DTO)

…….

Local Road Bridge Program (LRBP)

Household Survey

Name of Bridge …… Road Alignment……	Household No.: ……

Name of Interviewer: ……..……..…… Date: ……

1. General Information

1.1 Name of Respondent: ……..……..……

1.2 District: ……..…… 1.3 VDC: …… 1.4 Municipality: ……

1.5 Ward No.: …… 1.6 Name of settlement (village): ……..……

1.7 Name of HH head …….

1.8 Sex of the household head 1. Male 2. Female

If Female:

1.8 a. Are land registration in your name?

1. Yes 2. No

1.9 Caste/ethnicity: 1. Dalit 2. Janajati 3. B/C/T (please specify)…….…..…

1.10 Do you need to use this proposed bridge? 1. Yes 2. No

1.11 At present how do you cross the river?

1. Temporary bridge 2. Artificial ford 3. Others (specify) ……

2. Household Information:

Total Member: ……

S.N.	Name	Relation to HHH	Sex	Age	Literacy Status	Education	Occupation
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							

Code:

Relation to HHhead 1 = Household Head, 2 = Wife/Husband, 3 = Son/Daughter, 4 =Daughter min law 5= Brother/ Sister, 6 = Grandchild, 7= Parents, 8= Others (specify)

Sex	*1 = Male and 2= Female*
Literacy Status	*1 = Literate and 2 = Illiterate*
Education	*1-10 passed class write 1-10 respectively, 11-Intermidiate level, 12-Bachlore level, 13-Masterlevel, 14-PHD*
Occupation	*1=Agriculture/ livestock raising, 2=Business/commerce, 3= Service, 4=Wage labor, 5= Foreign employment 6=Student, 7= Housewife*

3. Access to utilities and services:

S.N.	Services	Location	Means of Transport/Time Taken (Min.)			One way Expense (Rs.)	Use of Proposed Bridge
			Frequency	Walk	Vehicle		
1	Primary School						
2	Secondary School (+)						
3	Colleges						
4	Communication center						
5	Health post/Sub Health post						
6	Pharmacies/Clinic						
7	District Hospital						
8	Veterinary and Agriculture service center						
9	Local market						
10	Main Market						
11	District Headquarters						
12	Nearest Fair weather road head						

Codes:
Location *1= In Village, 2=In VDC, 3=In District, 4=Out of District*
Use of Proposed Bridge *1= Yes and 2= No*

4. Does your household own land?

1. Yes **2. No**

If yes, please provide the following information.

Type of land	Unit	Irrigated	Non-irrigated	Total
Khet				
Bari				
Pakho				
Total				

Code:

1= Ropani, 2= Kattha, 3= Bigha, 4=Hectare

5. Details of Income and Expenditure of Family:

5.1 Income Sources

S.N.	Particular	Annual Production	Annual Income (Rs.)
1	Cereal crops		
2	Cash crops		
3	Livestock		
4	Milk products		
5	Vegetables and fruit		
6	Agriculture wage labor		
7	Services		
8	Business		
9	Pension/ remittance		
10	Rent/ interest		
11	Seasonal Business		
12	**Wage Labor**		
13	Other 2		
	Total		

5.2 Expenditures of family

S.N.	Particular	Annual Expenditure (Rs.)
1	Food items	
2	Clothing	
3	Education/Reading material	
4	Medicine/Doctor/Hospital charges	
5	Fuel Energy (Bio-Gas, Kerosene, Fuel Wood)	
6	Fertilizers	

7	Transportation/ Communication	
8	Social, Religious & cultural function	
9	Donation for social action	
10	Bangles/Cigarettes/Alcohol	
11	Loan and interest payment/Taxes/Fines/Loans etc.	
12	Transport cost for household goods & farm inputs	
13	Transport cost for taking farm products to the market	
14	Ornaments	
15	Investment in IG Activity (Micro-enterprise/Cottage industry/Small shops)	
16	Livestock	
17	Other	
Total		

6. For how many months is your agriculture production sufficient?

1. Less than 3 months 2. 3 – 6 months 3. 6 – 9 months

4. 9 – 12 months 5. Surplus

Annex 2

Government of Nepal

Ministry of Local Development

Department of Local Infrastructure Development and Agricultural Road

Office of District Development Committee

District Technical Office (DTO)

…….

Local Road Bridge Program (LRBP)

Traffic Count

Name of Bridge…… Road Alignment

Name of Interviewer: ……Date: ……

Name of Settlement:……VDC: ……

Q.N.1. How many vehicles ply through this bridge in a day?

S.N.	Means of Transport	Number	Remarks
1	Heavy Truck		
2	Medium Truck		
3	Small truck		
4	Large Bus		
5	Mini bus		
6	Micro Bus		
7	Tractor		
8	Jeep/Cars		
9	Motor Cycle		
10	Cycle		
11	Carts		
12	Pedestrian		

Annex-3

Picture1: Before Construction of Tiperi Khola bridge over Tiperi khola, Dailekh

Picture 2: After construction of Tiperi Khola Bridge over Tiperi khola, Dailekh