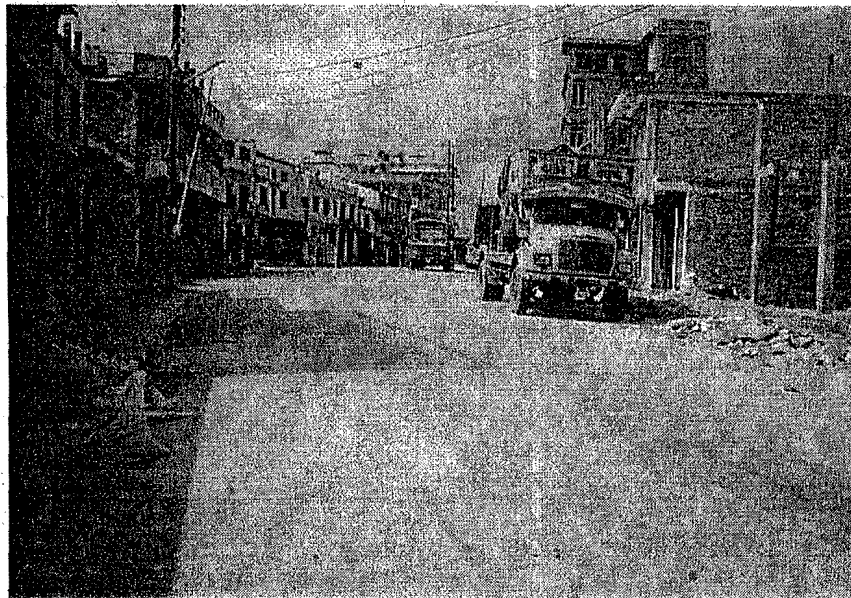


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His Majesty's Government  
**National Planning Commission Secretariat**  
**Central Monitoring and Evaluation Division**  
Singh Durbar, Kathmandu

**EFFECTIVENESS OF INVESTMENT**  
**IN**  
**DUMRE - BESISAHAR ROAD**



**FINAL REPORT**

*Submitted by:*  
**Full Bright Consultancy (Pvt.) Ltd.**  
Gyaneshwor, Kathmandu  
Tel/Fax: 411780  
Email: fbc09@unlimit.com

June, 2000

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## **ACKNOWLEDGEMENT**

We are highly privileged to have opportunity to undertake the study of '**Effectiveness of Investment in Dumre- Basisahar Road Project**'. We sincerely express our gratitude to National Planning Commission Secretariat for entrusting us this study. We believe that the findings and recommendations made in the report will be very helpful in the preparation of similar projects in future.

We gratefully acknowledge the fruitful comments and suggestion provided by Hon'ble Member of NPC Dr. Jagadish Chandra Pokharel during the presentation of the study report. We also acknowledge Mr. V. N. Mallik (Joint Secretary, CMED), Er. C. D. Bhatta (Advisor, NPC), Mr. Ganesh Raj (Under Secretary) and Mr. Kundan Shrestha (Section Officer) for their sincere support, cooperation and valuable comments during the various stage of the study. Thanks are also due to Mr. Shanti Prasai (Section Officer, CMED) for his sincere support during the field visit and writing of the report.

We also express our thanks to officials and local community of the Lamjung, Gorkha and Tanahu Districts for their cooperation and providing required information for the study.

**Full Bright Consultancy (Pvt) Ltd.  
Gyaneshwor, Kathmandu,  
June, 2000.**

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## EXECUTIVE SUMMARY

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### GENERAL BACKGROUND

The Dumre-Besisahar Road starts from Dumre, 134 km. west of the Kathmandu on the Prithivi Highway and ends at Besisahar, the district headquarter of Lamjung. The construction of this road started in the year 1971 (2028 B.S.) with complete participation of local people. The road is aligned along the western coast of Marsyangdi River. HMG, Department of Roads undertook construction of this road in the year 1977-78. Its tempo of construction was accelerated when the IDA loan was channalized in this project in 1993-94. Total budget allocated to upgrade the Dumre Besisahar road was Rs. 450 Millions, 300 Millions for structure and 150 Million for pavement works

### OBJECTIVES

The main objective of the study is to assess the effectiveness of investment in this road and its impact on overall development of periphery including availability of opportunities, economic development in the localities, support to poverty alleviation and raising living standard in study area. The other objectives are assessment of specific environment impact, changes in socio-economic condition of the study area, and condition of infrastructure.

### METHODOLOGY

The study was carried out with the help of primary and secondary data and information. Primary level of information was collected through the survey of 199 of household in seven major corridor along the road side namely Khudi, Basisahar, Bhoteodar, Paudidhik, Turture, Palungtar and Dumre of three districts Lamjung, Gorkha and Tanahu by structured questionnaire. Besides this, interaction with key informants and four focus group discussions were conducted in Basisahar, Bhoteodar, Turture and Dumre to get desirable input for the study. Similarly secondary data and information were collected from concerned agencies and publications.

### TECHNICAL ASPECTS

The elevation of Dumre Bazaar is 400 m and Besisahar is 800, which is the highest elevation of the road alignment. The improvement of road was completed in the year 1998-99 only. It has been observed that the pavement of road is in good condition except problem of side drainage in some places. The side drain should be cleared off.

The encroachment of right of way of the road by local resident in almost all settlements along the roadside has been observed. It could create a serious problem in the future for the road safety, prevention of accident and expansion of road in future. The present traffic flow is quite low in terms of design capacity of the single line black topped road. The 1992 traffic count by DoR reported total annual flow of vehicles works out to 7310 (20 veh/day). The traffic Survey carried out recently by the study team has shown 81 vehicles of different types per day moving on the road. No provision has been initiated for the recovery of the cost for the operation and maintenance of the road.

## **SOCIAL ASPECTS**

According to the Population Census 1991, there are 81,414 people live in the immediate influence area of the DBR. Among the population male are 38,038 and female are 43,356. There are 16538 household under immediate influenced area of DBR. The household survey indicated that 63 percent of population in study area are in 15-59 age group. The family size of the study area comes to 6.3, which is higher than the average of Lamjung and Tanahu Districts. The sex ratio is 98 where as the ratio for over all study area is 114. In all study points, literacy rate is significantly higher than national average and district average. It clearly indicates growing people's awareness about importance of education.

It has been found that health awareness after construction of DBR has increased significantly in study area. The number of household using traditional healer has been decreased significantly in all the points. Households using modern hospital facilities reached to almost 98 percent after the construction of road. Noticeable changes have also occurred in the toilets users, only 51 percent household used toilets after construction of the road now more than 94 percent household use it.

Although the status of women has increased significantly after the completion of roads, it has been observed that the gender relation has not yet changed substantially in the project area. Women are more involved in the household activities and the males are involved in the outside the home activities

Most of the youths of the influence area of DBR have an urge to work in foreign countries. They do not like to work in farm and in rearing livestock. In villages real farmers who play with the soil are few. Nepalese youths are acting as jobseekers but not as job-creators. This has not led to the development of entrepreneur's class as in other countries.

## **ECONOMIC ASPECTS**

The major activities of the study area are found to be agriculture, small business and services. Agriculture has been still a major occupation in the area providing employment for

51 percent of the total surveyed households, it was 63 percent before construction of the DBR.

Agriculture in this area comprised of cereals, vegetables, fruits (esp. orange) and herbal plants combined with livestock farming. Orange is the major horticultural product in this area which has commercial significance. Some farmers have initiated cultivation of vegetable for commercial purpose to some extent where irrigation facilities are available.

The percentage of household changing cropping pattern after road construction is not very high. Comparatively significant changes took place in vegetables cultivation. But, still local vegetable production is not sufficient to satisfy local demand. Noticeable changes have been taken place in practice of kitchen gardening in the study area.

After the construction of DBR changes are noticed in the use of improved varieties of seeds, chemical fertilizer and insecticides. The use of improved seeds increased to 58 percent of the total households, which were only 27 per cent before construction of DBR. The use of chemical fertilizers increase to more than 61 percent and use of insecticides increased to 51 percent of the total household which were only 32 percent and 25 percent respectively before construction of the road.

It is interesting to note that the numbers of cattle, buffaloes, goat, and sheep have been decreased after the construction of the road. Farmers are aware with potential economic opportunities from the livestock. But increasing cost for feeding livestock and low productivity has hindered livestock rearing practice in this area. There are some micro-enterprises producing mainly woolen products, wooden furniture, cement blocks, bakery products, etc. The immediate vicinity of DBR in Lamjung is famous for production of woolen rugs and blankets. The record of the Cottage and Small Industry District Office of Lamjung has shown that 90 industries were registered within 1998/99 while in 1997/98 some 82 industries were registered

Tourism is one of the important activities promoted by the construction of road. About 15000 tourists visit Manang and parts of Annapurna Conservation Area Project (ACAP). The construction of metallic road has made the market areas along the road as tourist centres.

Noticeable changes have been occurred in the expenditure pattern of the households of the study area especially in education, transportation, food and utilities.

Study points are settlements along the roadside. So Business has dominated in the employment pattern of study area. Almost 54 per cent of total employed are in involved in business sector. The construction of road has created more business opportunities along the settlement of road. So large numbers of people have been attracted to this sector

Noticeable changes have been occurred in the living standard of the households of the study area. The construction of DBR has raised the permanency in the settlement of households of study area. Tendency of constructing cemented and concrete house has been increasing

Discussion with the concerned governmental officers and local elite in the study area has indicated that the service delivery system by the various institutions has been enhanced after the construction of road

### **ENVIRONMENTAL ASPECTS**

The major stretch of the road has passed through steep slopes and has invited to some extend the land slide problems after the road construction. Major land slide problems were seen at Khurhure & near Dalal Bazaar and few problematic landslide prone areas have been identified, should be properly protected.

Loss of trees, vegetation, and topsoil, which promotes erosion and instability, has not been identified with an exception of few area which can be brought to control with due care.

Discharge of large quantities of high velocity storm water and diversion of spring water come during the monsoon to natural drainage channels and gullies results in overloading of natural drainage capacity. Due to proper management of water drainage system, It is not visible; severe erosion, few gullies formation, few slope instability and sedimentation problems.

Two quarry sites had been used at the time of upgrading. One quarry site was outside the road area Dust raised from the road and flown by vehicles especially during the dry season deteriorated the air quality of the road corridor. After the road has been black topped, problems has been solved. Noise and smoke from vehicles have been increased marginally due to the increase of the number of vehicles. People have positive attitudes toward road. But people are little bit suspicious about things like accident and deforestation (due to easy access) may increase.

### **EFFECTIVENESS OF INVESTMENT**

The major development and impacts of the road have been analyzed taking into consideration the impact of the road on different sectors of the economy. The benefits realized from the road are: changes in the pattern of cultivation, investment in transportation sector, creation of new employment opportunities and growth of market centers

The permanent structure of the road has been created very recently so it has not yet been able to bring substantial changers in the socio-economic life of the people of the project area.

The following development potentialities have been identified to utilize the road up to its optimum capacity:

- Opportunities for the Commercialization of Agriculture
- Opportunities for Industrial Development
- Openings for Tourism Development
- Development of Mountaineering School
- Development of Livestock

#### **LOCAL RESOURCES UTILIZATION.**

The construction of the road has created opportunities for the utilization of the following local resources:

- Use of Local Savings
- Use of Natural Resources
- Utilization of the Local Entrepreneurship
- Raising of Revenue for O&M

#### **Lessons Learned**

The construction of DBR has provided various types of lessons to the planners, policy makers and the implementers of the road development program that should be used as a basis for the future development activities. The major lessons identified are as followings:

- Stability in Investment with Black Topped Road
- Small Amount of Fund Allocation for Long Time is Ineffective
- A Comprehensive Development Program of Investment in Road for Its Effective Utilization
- Involvement of the Local Community in Operation and Maintenance of the Road

## ABBREVIATION

ACAP	: Annapurna Conservation Area Project
ADB	: Asian Development Bank
ANC	: Antenatal Care
B.S.	: Bikram Sambat
CBOs	: Community Based Organizations
CBS	: Central Bureau of Statistics
CMED	: Central Monitoring and Evaluation Division
CSO	: Civil Society Organization
DBR	: Dumre- Besisahar Road
DDC:	: District Development Committee
DoR	: Department of Roads
F	: Female
FDI	: Foreign Direct Investment
FGD	: Focus Group Discussion
GOs	: Government Organizations
HMG/N	: His Majesty's Government of Nepal
ICIMOD	: International Centre for Integrated Mountain Development
IDA	: International Development Agency
IMR	: Infant Mortality Rate
LGI	: Local Government Institution
M	: Male
MCH	: Maternal Child Health
MIE	: Marshyangdi Industrial Estate
MMR	: Maternity Mortality Rate
MRVIADP	: Marshyangdi River Valley Integrated Agriculture Development Programme
NEA	: Nepal Electricity Authority
NGOs	: Non-Governmental Organizations
NPC	: National Planning Commission
NPCS	: National Planning Commission Secretariat
O&M	: Operation and Maintenance
PCO	: Public Call Office
PNC	: Postnatal Care
RCC	: Reinforced Cement Concrete
SLC	: School Leaving Certificate
TOR	: Terms of Reference
TV	: Television
VCR	: Videocassette Recorder
VDC	: Village Development Committee
VOC	: Vehicle Operating Cost
WB	: World Bank

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## **Annex 1 - Socio-economic and Environment Situation**

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## **Annex 8 - Forms for Engineering Observation Records**

## **Annex 9 - Field Visit Photographs**

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## CHAPTER 1: INTRODUCTION

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### 1.1 GENERAL BACKGROUND

The Dumre-Besisahar Road (DBR) starts from Dumre, 134 km. west of the Kathmandu on the Prithivi Highway, and ends at the Besisahar, the district headquarter of the Lamjung. The Road is aligned along the western coast of the Marshyangdi River To reach Basisahar. The construction of Dumre-Besisahar Road was started in 1971 (2028 B.S.) Under the then programme of "Back to the Village Campaign", the local people participated voluntarily to construct road in their respective wards. A general alignment of the road was fixed by the Department of Roads in the FY 1972-73 (2029-30). Following this alignment, with assistance of World Food Programme and the participation of local people, the construction of earthwork of some six-km road up to Barabise was completed within two years. The Road was undertaken by HMG, Department of Road, with the provision of construction budget under the name of "Bandipur-Dumre Basisahar Road Project in the Fiscal Year 1977-78 (2034-35) and constructed Jeepable road up to Turture Bazaar (11.5 Km from Dumre) in the same year. The local people's participation for the construction of this road ceased from FY 1979-80.

A detailed survey of this road was carried out by a local consulting firm in the FY 1982-83 (2039-40) and estimated cost of Rs. 14,52,29,550.00 for complete black top road with the contraction programme of five years. Then the construction of DBR was being continued following the report of the consultant. Despite the effort made from time to time, the pace of construction of this road remained slow mainly due to insufficient budgetary provisions and also lack of constant flow of fund to complete the project in time. The first vehicle reached to Basisahar was only in FY 1986-87 (2043-44 B.S.) whereby, the earthwork and structural works were completed about 45% and 10% respectively.

The DBR got the boost after the World Bank agreed to provide assistance to HMG/N in July 1992, for Power Sector Efficiency Project to tide over the power crisis faced by the country, beside providing transport facility to the local public and also to help promote the tourism in the area. The executing agency for the project - The Department of Roads engaged SILT Consultants (P) Ltd. for detailed engineering design and construction supervision of the road and bridge works. The improvement of Road was started in August 1995 and was completed and opened formally in June 1999.

In response to an advertisement from National Planning Commission Secretariat, Central Monitoring and Evaluation Division, the Full Bright Consultancy (Pvt.) Ltd. submitted a Technical and Financial Proposal on March 17, 2000 for the study if 'The Effectiveness of Investment in Dumre - Besisahar Road Project'. This proposal was accepted and both the parties entered into the agreement for the said study on April 11, 2000. As per the Agreement, the Consultant has already submitted a Field report, which included Consultant's desk study in brief and field activities at large, carried out as a part of study project.

## 1.2 PROJECT LOCATION AND DESCRIPTION

Based on the site visit and review of project related reports and document, DBR is located in the Western Development Region of Nepal (refer **Fig 1.1a and 1.1b** - Location Map and Route Map). The road runs approximately north south and follows the bank of Marsyangdi River. The road takes off from Dumre, a small market centre on Prithivi Highway and terminates in Besisahar - the district headquarters of Lamjung. The road crosses Tanahun and Lamjung districts.

The total length of road is 42.8 km and is of Feeder Road standard with single lane blacktop carriageway of 4.5 m in width with a provision of by passes at places. It has five bridges and many culverts and causeways.

## 1.3 PROJECT OBJECTIVES

The overall project objectives set for upgrading of road were as follow;

- ◆ To provide transportation facility to population in Tanahun, Lamjung, Gorkha and Manang districts by improving the road that connects Prithivi Highway and district headquarters of Lamjung; and
- ◆ To increase foreign exchange earnings by increasing tourist flow to Manang-Mustang.

## 1.4 STUDY OBJECTIVE

The main objective of the study is to review and present findings of the consultant concentrating on the effectiveness of investment in this road project. The other objectives are to study its impact on overall development of periphery including opportunity and support to poverty alleviation, economic development in the localities and raising of living standards in the project area and finally the policy recommendation for planning and financing the project of similar nature in future.

While carrying out this study, the consultant would duly consider the followings:

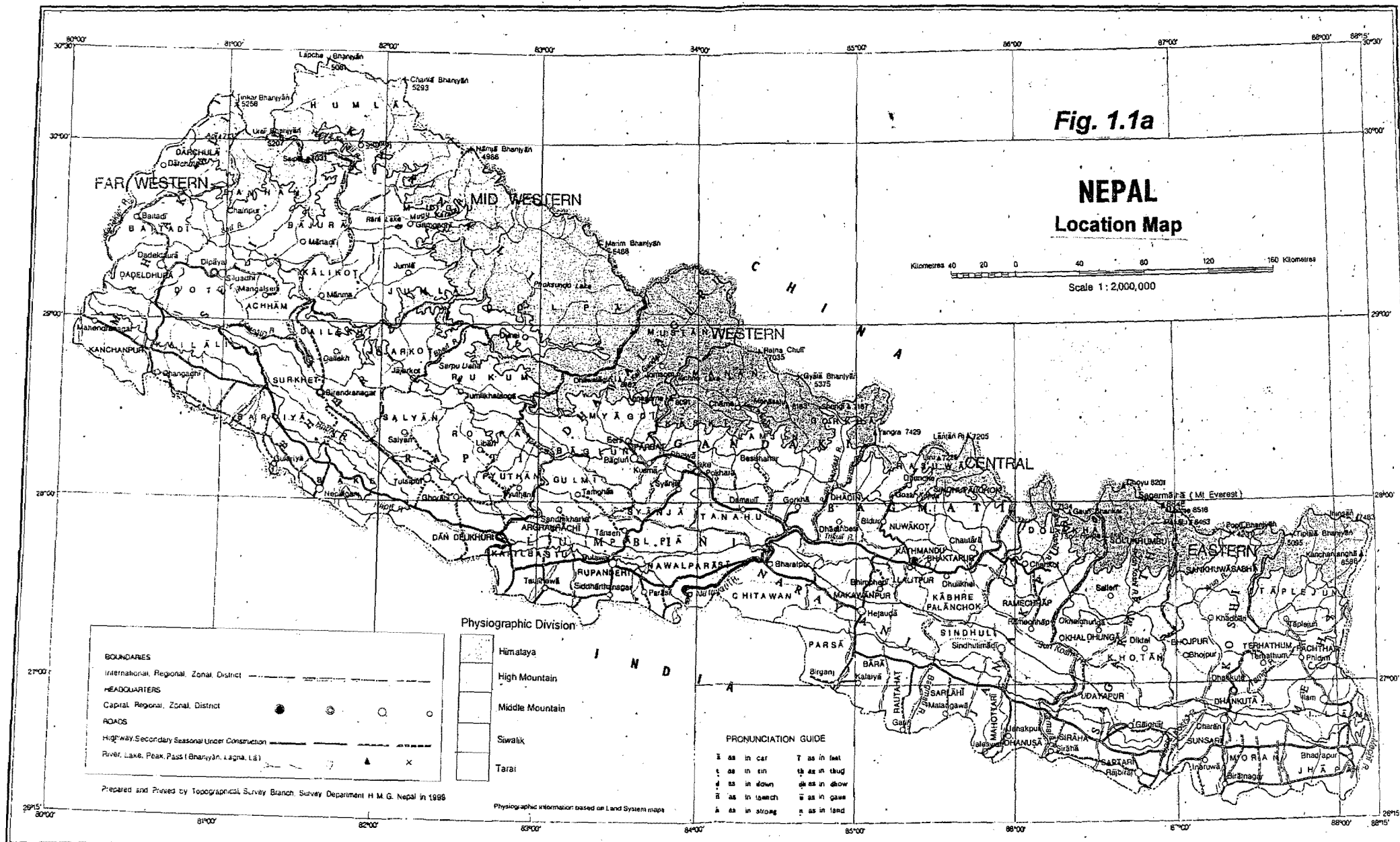
- the correlation between investment on roads and improvement of lives of rural poor
- the impact on movement of people, goods and services
- the issue of ability to afford in road construction
- identify the existing and potentials of development arising out of DBR

### 1.4.1 Scope of Works

The scope of works for the consultant under this study comprise:

- ◆ Study of existing economic activities that are effected by the road
- ◆ Study of potentialities created & identify the possible development projects e.g. tourism
- ◆ Field observation to assess various development activities created through this road

- ◆ Asses the impact on poverty situation and living standard of the people
- ◆ Assessment of environment in the project area and
- ◆ Policy recommendation to NPC for planning and financing the projects of similar nature in future



**Fig. 1.1a**  
**NEPAL**  
**Location Map**

Kilometres 40 20 0 40 60 120 160 Kilometres  
Scale 1:2,000,000

**BOUNDARIES**  
International, Regional, Zonal, District

**HEADQUARTERS**  
Capital, Regional, Zonal, District

**ROADS**  
Highway, Secondary, Seasonal, Under Construction

River, Lake, Peak, Pass (Bhanyān, Lāgha, Lā)

**Physiographic Division**

- Himalaya
- High Mountain
- Middle Mountain
- Sivalik
- Tarai

**PRONUNCIATION GUIDE**

ī as in car      t as in feet  
 ē as in em      th as in thud  
 ā as in down    dh as in show  
 r as in ranch    w as in gase  
 ā as in strong    s as in land

Prepared and Printed by Topographical Survey Branch, Survey Department H.M.G. Nepal in 1988

Physiographic information based on Land System maps

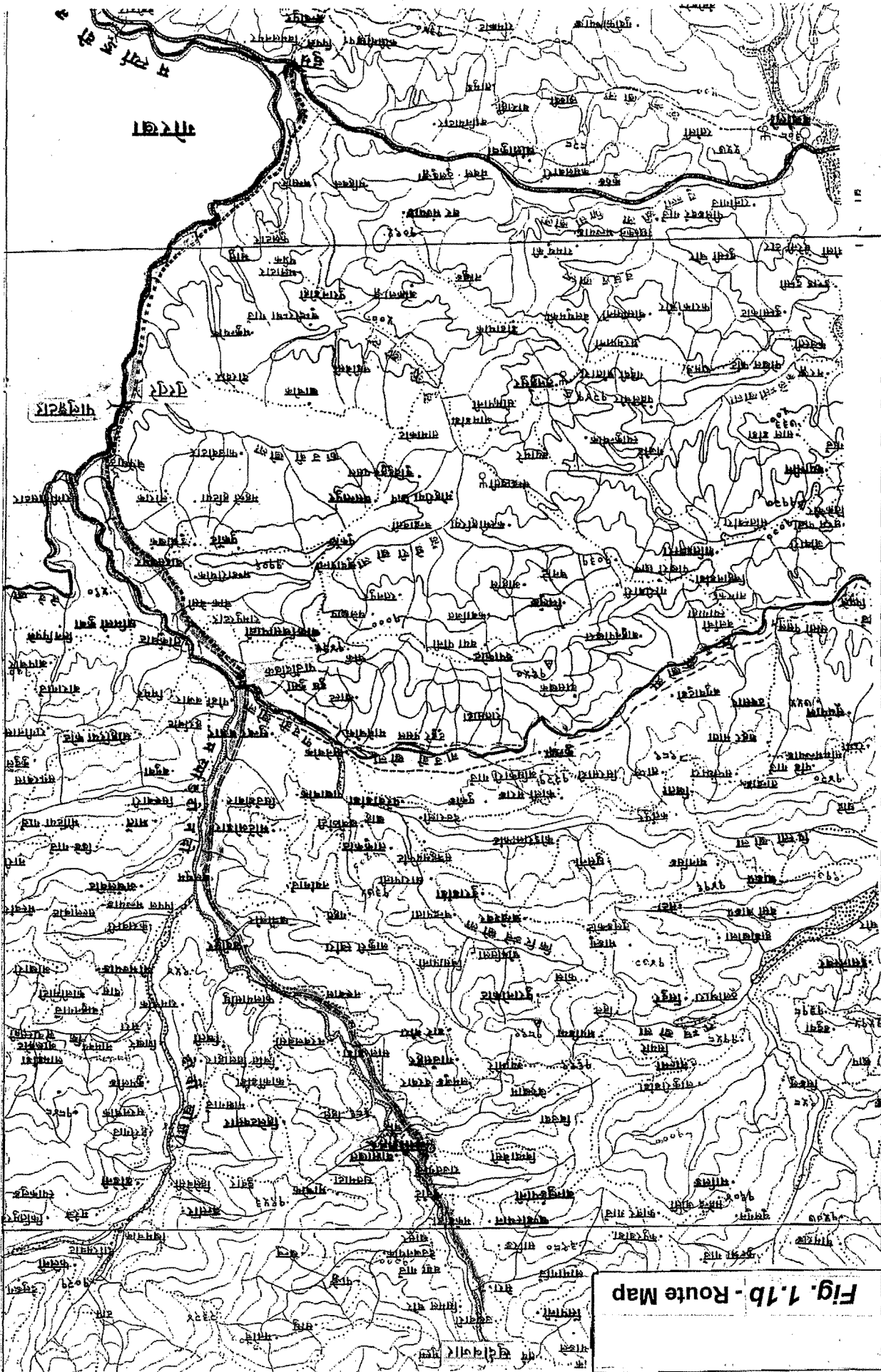


Fig. 1.1b - Route Map

### 1.4.2 Study Area

The area of study covers the influential areas of the whole length Dumre - Basisahar Feeder Road of some 43 km. This starts from Dumre Bazaar of Prithvi Highway, one of the small market centre of Tanahu and ends at Basisahar, a district headquarter of Lamjung via Turture Bazaar at 11 km. The influenced villages by this road are 5, 3 and 51 VDCs of Tanahun, Gorkha and Lamjung respectively as well as the whole area of Manang District. As per the existing report produced by the SILT Consultants (P) Ltd., the influenced population by this road is about 188,000 people in over 37,660 households based on population census of 1991. The revised population and households in the immediate influence area is 81414 and 16538 respectively. The population and households within the total influential and immediate influential areas are given in **Table 1.1 and 1.2** below.

**TABLE 1.1: Population and Number of Households within the Influence Area of Dumre-Besisahar Road**

DISTRICT/VDC	Population			House holds
	Male	Female	Total	
<b>GORKHA</b>				
Aanppipal	2328	2796	5124	1060
Palungtar	1970	2339	4309	867
Gaikhur	2284	2509	4793	948
<b>Total</b>	<b>6582</b>	<b>7644</b>	<b>14226</b>	<b>2875</b>
<b>TANAHUN</b>				
Bhanu	4923	5627	10550	2080
Purkot	2817	3290	6107	1307
Chok	2083	2531	4614	962
Bandipur	4859	5093	9952	1929
Rupakot	2100	2665	4765	937
<b>Total</b>	<b>16782</b>	<b>19206</b>	<b>35988</b>	<b>7215</b>
<b>LAMJUNG (51 VDCs)</b>	<b>63340</b>	<b>69257</b>	<b>132597</b>	<b>23284</b>
<b>MANANG</b>			<b>5363</b>	<b>1272</b>
<b>GRAND TOTAL</b>	<b>86704</b>	<b>96107</b>	<b>188174</b>	<b>34646</b>

Source: 1991 Population Census, CBS.

**Table 1.2: Population and Number of Households within the Immediate Influence Area of Dumre-Besisahar Road**

DISTRICT/VDC	Population			House holds
	Male	Female	Total	
<b>GORKHA</b>				
Aanppipal	2328	2796	5124	1060
Palungtar	1970	2339	4309	867
<b>Total</b>	<b>4298</b>	<b>5135</b>	<b>9433</b>	<b>1927</b>
<b>TANAHUN</b>				
Bandipur	4859	5093	9952	1929
Bhanu	4923	5627	10550	2080
Purkot	2817	3290	6107	1307
Chok	2083	2531	4614	962
Rupakot	2100	2665	4765	937
<b>Total</b>	<b>14682</b>	<b>16541</b>	<b>31223</b>	<b>6278</b>
<b>LAMJUNG</b>				
Sundar Bazaar	1674	2020	3694	785
Bhotewadar	1655	1975	3630	785
Udipur	1008	1226	2234	474
Gaunsahar	2743	3429	6172	1620
Besisahar	2716	2711	5427	1137
Chandisthan	751	857	1608	300
Khudi	1536	1676	3212	664
Tarkughat	1258	1392	2650	536
Dhamliikuwa	1808	2023	3831	792
Hiltaksar	916	1022	1938	365
Simpani	1507	1678	3185	607
Bajhakhhet	1506	1671	3177	625
<b>Total</b>	<b>19078</b>	<b>21680</b>	<b>40758</b>	<b>8333</b>
<b>GRAND TOTAL</b>	<b>38058</b>	<b>43356</b>	<b>81414</b>	<b>16538</b>

Source: 1991 Population Census, CBS.

## 1.5 METHODOLOGY

### 1.5.1 Study Methodology

As the project involves the study of the effectiveness of investment and potential for future development, primary and secondary data and information have been collected. Primary levels of information have been obtained from the Household Sample Survey, Focus Group Discussion (FGD), Key Informants and Field Observation. Similarly, secondary data and information have been obtained from concerned agencies like CMED/ NPCS, Department of Roads, district and field based offices of the related GOs and NGOs. The information collected and results have been analysed and duly presented in respective sections of this report.

### 1.5.2 Study Design

#### 1.5.2.1 Selection of the Study Cluster

For the Purpose of collecting quantitative information on various aspect of development of the study area, altogether seven growth points and its hinterland constituting a cluster have been identified during field visit. These clusters have been selected on following bases;

- Detail discussion with the key informants about the development of market area and human settlement in the study area;
- Observation of all the area from entry to exit point of the Dumre-Besisahar Road by field team;
- Settlement area development before and after construction of road;
- Entry and exit point of the road under study;
- Type of economic activities carried out in that area, topography and community;
- Limitation of time and resources available for the study.

The household survey has been carried out in all the seven cluster selected, that are Khudi, Besisahar, Bhotewadar and Sundar Bazar of Lamjung District, Bhanu (Turture) and Bandipur (Dumre) of Tanahu District and Palungtar of Gorkha District.

FGD has been conducted in four important places. Those are Besisahar, Bhotewadar, Turture and Dumre.

The key informants were selected for interview based on the standard criteria and their names and positions are as listed in the **Annex 5**.

#### 1.5.2.2 Sample Size

For the purpose of conducting household survey in all selected clusters, the sample size of the enumeration had been finalised by expert group. The sample size was finalised after careful consideration of total benefited population, limitation of time and resources, representation of households belonging to different strata, location including near the road,

edge of settlement and immediate hinterlands and nature of the study. Based on which, 120 households were selected for the survey, but only 119 household responded the questionnaire. This household sample survey supplemented by FGD, interaction with Key Informants and direct field observation by the consultant team has provided satisfactory levels of information for the proposed study. The sample sizes of the questionnaire survey in each selected cluster together with the population and household has been given below in table 1.3.

**Table 1.3: Population, household and sample size in the study clusters**

District	Point	VDC	Population	H/H	Sample	% of Rep. Of H/H
Lamjung	Khudi	Khudi VDC	3212	664	15	2.26
Lamjung	Besisahar	Besisahar VDC	5427	1137	30	2.64
Lamjung	Bhotewadar	Bhotewadar VDC	3630	785	15	1.91
Lamjung	Paudi Dhik	Sundar Bazar VDC	3694	785	14	1.78
Gorkha	Palungtar	Palungtar VDC	4309	867	15	1.73
Tanahu	Turture	Bhanu VDC	10550	2080	15	0.72
Tanahu	Dumre	Bandipur VDC	9952	1929	15	0.77
<b>Total</b>			<b>40,774</b>	<b>8247</b>	<b>119</b>	<b>1.44</b>

Within selected area, the enumerators had choices to select one among the 4-5 household randomly on their own judgement, for survey purpose. This technique had been principally used to ensure proportional representation of household adopting different economic activities.

### 1.5.3 Study Tools Used

#### 1.5.3.1 Study Indicators

As per TOR, a list of basic indicators has been discussed and developed for conducting the study. The indicators formulated the parameters based on the project location, road condition, people's participation, socio-economic characteristics and projects benefits including future potential brought about. The project indicators identified have been given in *Annex 2*.

#### 1.5.3.2 Observation

The Economist and social scientist together with the engineer visited the project area for 12 days to observe keenly the socio-economic, engineering and environmental activities that are carried in the influence area of the road in order to observe the changes in activities along the project area.

### **1.5.3.3 Household Sample Survey - Questionnaire**

A structured questionnaire was developed for the study after few rounds of discussion. The consultant team organised a detail orientation programme for enumerators about the purpose of field survey, questionnaires and techniques to cross check the informations provided by respondents.

The questionnaire was pre-tested in the site before starting actual survey. Then the enumerators were given brief orientation accordingly. The questionnaire included variables like demographic situation, socio-economic conditions, status of agriculture, livestock, forestry, industries and marketing practices, status of basic services and so on. The sample of questionnaire is included in **Annex 3**. The list of the respondents of household survey is given in **Annex 7**.

### **1.5.3.4 Focus Group Discussion (FGD)**

Total four focus group discussions were organised and conducted with different groups of people living at different points of the road. The FGDs were conducted in order to get correct information about the impact of the road on socio- economic activities, ideas on the study indicators and parameters, and generate new ideas for the future development potentials. The FGD was divided into two types; one group representing officials from government and non-government organisations (Gos, NGOs, CBOs) and other group representing local people, local elite, teachers, local leaders of major political parties and business people. The first type was organised at Besisahar, Langung District with the representatives of the governmental line agencies under the chairmanship of the DDC Chairman. The second type of FGD was conducted at three selected locations; Dumre, Bhodewodar and Turture. At Dumre the FGD was organised with the participation of the businessmen and social workers living in Dumre and in adjoining settlements. The meeting was organised with the help of the unit of the Chamber of Commerce of Dumre. Two other FGD were organised at Turture, a market centre of Tanahu and Bhotewadar- settlement of Lamjung. Both these settlements were selected because these are the major settlements lying between Dumre and Besisahar. These centres are the major market centres and the road directly and indirectly affects the people living in these two centres. Furthermore these centres act as the market nodes to serve a wide hinterland. The Consultants discussed with the officials of the DDC and officials of the government offices and the members of the Chamber of Commerce of Tanahu and Lamjung on the selection of the settlement for FGD and Household Survey. They also ratified that the selection of settlements for the survey by the consultants has been appropriate for generating the information sought.

The FGD guidelines have been given in **Annex 4**. The name of participants of FGD has been given in **Annex 6**.

### **1.5.3.5 Key Informants**

The consultants also interacted with a large number of key informants to assess the benefits and disbenefits of the investment on the project. The interaction also provided a lot of

insights into the possible new economic activities that can be carried in the area to utilise effectively the road. The list of the key informants with whom the interaction/interviews were taken is given in **Annex 5**.

### **1.5.3.6 Engineering Observation**

Highway Cum Civil Engineer had made a field visit along with other members of the team. The team examined the site conditions along the road and gathered information with regard to the relevant technical and environmental indicators identified. For this a detailed checklist was prepared. The technical team also visited the project office, Divisional Road Office so as to gather information with regard to organisation structure, staffing, equipment, use of resource and funds, delivery of services and its quality, maintenance plan and its schedules and appropriateness of technology and sustainability etc. The Highway expert also reviewed technical reports like feasibility study, appraisal, detailed design report, tender documents and project completion report, besides field observation, traffic counting, and recording of vehicular movement and photographs.

## **1.6 CONSTRAINTS AND LIMITATIONS**

The major constraints and limitations faced by the study team during the study has been followings:

- Unavailability of previous project documents regarding the construction of Dumre-Besisahar Road Project,
- Lack of complete data base and records in the government institutions and local government institutions,
- Insecurity of the study team while visiting peripheral area of the study points for household survey and observations,
- Limited study-time and finance available for the study.

## Chapter 2: Engineering Aspects

### 2.1 GENERAL BACKGROUND

Technical observations of the constructed road are important from the consideration of effectiveness of the road. From this point of view the general road alignment, condition of pavement and structures and traffic characteristics of DBR have been assessed. For engineering observation a team of expert inspected the road carefully and collected the data of the on road (pavement) as well as off road (roadside) condition of the road. To get the traffic data traffic survey was carried out. At the time of inspection, the team visited the Project Road Office to make inquiries and got information from the local people also.

### 2.2 ROAD ALIGNMENT

The Dumre-Besisahar Road is 42.8 Km long. The road starts at Dumre of Prithivi Highway at about 134 Km west of Kathmandu and ends at Besisahar the administrative headquarter of Lamjung District. The elevation of Dumre Bazaar is 400 m and Besisahar is 800m, which is the highest elevation of the road alignment. The road alignment aligned along the right bank of Marsyangdi River. The road mostly follows the old river terraces. The surface of the existing road alignment is paved types (DBST) and the state is all weather type. In most of the places the road alignment follows the gentle slopes in spite of very few place with sharp bends and grades.

### 2.3 ROAD STANDARD

The standard of the road are these as recommended by 'Design Standard for Feeder Roads -1994'. The standards are as follows: -

Right of way (m)	-30
Formation width (m)	-4.5
Carriageway width (m)	-4.5
Shoulder width (m)	--
Camber (%)	-4
Minimum horizontal curve radius (m)	-12.5
Minimum vertical curve radius (m)	-300
Maximum gradient (%)	-12

### 2.4 TRAFFIC STUDY

The 1992 traffic count by DoR reported a multi-modular distribution of traffic flow by month. By a method of linear extrapolation for the month of Feb, March, April the total annual flow of vehicles works out to 7310 (20 veh/day). Origin and Destination Traffic Survey was

carried out during this program and found that 81 vehicles of different types per day is moving on the road.

## 2.5 ROAD NETWORK AND EXPANSION

Dumre Besisahar is a transit road for a number of trackers going to Manang and beyond. This is the only moterable rout to go to Manang. Already 10 Km of road from Besisahar to Manang has been constructed and this road will go to Manang along the bank of Marshyangdi River.

## 2.6 ROAD FINANCING

The construction of Dumre-Besisahar Road started in the year 1971 (2028 B.S.) with the complete participation of local people and a jeepable track road was reached up to Bhanshar (3 km.) in the same year. Under the programme of "Back to the Village Campaign", the local people participated voluntarily to construct in their respective wards. A general alignment of the road was fixed by the Department of Roads in 1972-73 (2029-30 B.S.). DoR established the project office in the year 1977 (2034 B.S.). The road became vehicular up to the Besisahar in the fair weather only in the year 1986-1987. The World Bank agreed to finance for the improvement of this project only in 1992. The improvement work completed only in 1998-99 The improvement work has been completed in the year 1998-99. The total budget allocated for the construction of DBR since 1977-78 to 1998-99 has been presented in table given below.

**Table 2.1 Dynamics of Expenditure on DBR**

Year	Amount	Price Index of Non-food Items	Amount Allocated @ Base Price
1977/78	702,961.00	58.10	1209915.66
1978/79	1,516,642.00	62.50	2426627.20
1979/80	1,448,047.00	67.30	2151630.01
1980/81	945,513.00	76.20	1240830.71
1981/82	1,486,134.00	83.40	1781935.25
1982/83	1,009,125.00	92.20	1094495.66
1983/84	7,560,528.00	100.00	7560528.00
1984/85	4,464,730.00	109.90	4062538.67
1985/86	4,172,782.00	121.70	3428744.45
1986/87	2,413,182.00	133.30	1810339.08
1987/88	4,788,443.00	145.30	3295556.09
1988/89	9,642,577.00	164.00	5879620.12
1989/90	3,041,591.00	177.20	1716473.48
1990/91	2,926,257.00	193.40	1513059.46
1991/92	2,517,785.00	222.40	1132097.57
1992/93	2,433,644.00	252.30	964583.43
1993/94	15,435,480.00	274.80	5616986.90

Year	Amount	Price Index of Non-food Items	Amount Allocated @ Base Price
1994/95	2,667,568.00	297.00	898171.04
1995/96	82,258,314.00	316.80	25965376.89
1996/97	73,816,560.00	341.20	21634396.25
1997/98	86,857,558.00	358.90	24201047.09
1998/99	195,377,290.00	377.20	51796736.48
<b>Total</b>	<b>507,482,711.00</b>		<b>171381689.52</b>

Sources: SILT, Soil Test and IRAD, 1994; Economic Survey 1999/2000; NRB, 1998.

The detail engineering survey done in 1982-83 estimated cost of Rs. 14,52,29,550.00 for the complete black top road with the construction programme of five years only. If we convert that estimate at the rate of base price cost, it comes only Rs. 15,75,157,80.91 at 1983-84 prices. The difference between the amount estimated and actual expenditure at rate of base price has been very low (Rs. 1,38,65,908.91 only). But if the total of current prices and time spent in the construction of the 42-km of road considered, then the total cost spent seems very high. The people of this corridor could have enjoyed the benefits of roads decade ago. Now they are lagged behind by more than ten years.

## 2.7 ROAD CONSTRUCTION AND MAINTENANCE

The road construction was started in 1970 by mobilising voluntary labour. In 1982 a local consulting firm was engaged to prepare the detailed design and quantity/cost estimate for the road and the road being constructed as per the design. The road opened to vehicular traffic up to Besisahar in the year 1989. The road was started to upgrade from fair weather status to an all weather status to an all weather feeder road standard from 93/94. Maintenance of the road is carried out by the Department of Roads after handing over by the contractor to the division road office. Few maintenance activities, which should be performed, are drainage clearance, boulder on the road surface should be removed, pavement surface damaged mostly on the or near the approach of the bridges should be repaired and materials from landslide should be cleared.

## 2.8 RIGHT OF WAY ENCROACHMENT

Encroachment within the right of way of the road is a major problem, which has been observed during the inspection time. If this problem do not be solved as soon as possible, this will be a big problem in the coming future. The data shows the houses constructed within the right of way in the major market areas.

### Building Constructed at the Right of Way of the Dumre-Besisahar Road

Place	Right-hand Side	Left-hand Side	Total
Sadbot	5	4	9
Bansar	12	16	28
Chambas	10	16	26
Turture	22	16	28
Bayasjagar	18	13	31

Kalimati	20	17	37
Paudidhik	18	13	31
Siundibar	10	12	22
Bhoteodar	19	14	33
Dalal	6	10	16
Besisahar	490	500	990

## 2.9 CONCLUSION

Based on the technical study of Dumre- Besisahar Road it has been observed that the general pavement condition of the road is good except on the bridge approaches. Most of the bridge approaches are damaged. Most of the retaining and cross drainage structures are in good condition although some failures have been observed. At some of the places it has been observed that due to the insufficient protection works on the heel side cutting road has started to damage by falling materials from the slopes. Road has been damaged mostly in the quarry site at 35 Km. This quarry site should be protected properly.

After handing over the road to the DoR, provision for the road maintenance works has been made in the form of government grants through the Divisional Road Office at Damauli. But for the sustainable operation of the road, funds for the road maintenance will have to be generated locally in the form of road tax and people's participation.

Problems of the road encroachment within the right of way have already been observed in the major market places. This problem should be solved as soon as possible otherwise this will be serious problem in the near future. Any houses and other structures should not be allowed to construct strictly within the right of way of the road.

Due to the roughness of the existing road and the absence of river crossing structures the time before upgrading was required to travel from Besisahar to Dumre took about 5 to 7 hours in winter and more in the rainy season. Now after upgrading the road and construction of necessary river crossing structures, this time has dropped down to about two third of time for each trip. Passenger and crew time losses due to road closer owing to flood and landslides has also reduced considerably after the road upgrading. The study of the traffic characteristics along the road indicates that the daily traffic flow has increased after upgrading the road three times but still traffic volume is below the design capacity. Most of the trucks returning from Besisahar to Dumre are empty. Increasing the economic activities in the area can only enhance this. Also, the completion of road extension to Manang will have a positive effect on generating additional traffic. Based on the Shaktiman Operation cost, the Vehicle Operating Cost (VOC) Before upgrading on economic terms is calculated NRs. 31.18 per Km which is now dropped to NRs. 10.33. The impact of such a reduction in VOC reduce the costs of transporting outputs, inputs and other goods by at least 50 percent

## CHAPTER 3: SOCIO-ECONOMIC ASPECTS

### 3.1 GENERAL BACKGROUND

The major activities of the study area are found to be agriculture, small business and services. Agriculture has been still a major occupation in the study area providing employment for 51 percent of the total surveyed households, it was 63 percent before construction of the DBR. It has been found that generally Newar, Thakali and Gurung families run retail trade, hotels and lodges, small manufacturing units, etc. The trend shows that the percentage of employment in agriculture has been decreasing where as percentage of employment in small business has been increasing (Table 3.18). Generally, a large percent of service holders have been engaged in army service in both Nepal and foreign countries. Presently, employment in gulf region as well as East Asian countries has attracted youths of this area. It is noteworthy to mention that such overseas employment has been one of the major sources of remittance in this area, however, it has adversely affected the agriculture sector due to shortage of labour for agricultural practices.

### 3.2 SOCIAL ASPECTS

#### 3.2.1 Demographic Situation

According to the Population Census 1991, there are 81,414 people live in the immediate influence area of the DBR. Among the population male are 38,038 and female are 43,356. The population and number of households within the immediate influence area have been presented on Table 1.2. According to the table there are 16538 household under immediate influenced area of DBR.

The household survey indicated that 63 percent people are in 15-59 age group. Only 5 percent people are above 60 years old and around 10 percent are under 5 years. Around 20 percent people are schooling age between 6 to 14 years old (Table 3.1)

**Table 3.1: Demographic Structure (Percentage)**

Area	Sex	Age Group				Total
		0 - 5	6 - 14	15 - 59	60 +	
Khudi	M	15.22	17.39	58.70	8.70	100.00
	F	17.07	19.51	58.54	4.88	100.00
	T	16.09	18.39	58.62	6.90	100.00

Besisahar	M	8.79	31.87	54.95	4.40	100.00
	F	12.79	12.79	67.44	6.98	100.00
	T	10.73	22.60	61.02	5.65	100.00
Bhotewadar	M	8.47	22.03	67.80	1.69	100.00
	F	16.95	30.51	49.15	3.39	100.00
	T	12.71	26.27	58.47	2.54	100.00
Paudidhik	M	2.63	26.32	65.79	5.26	100.00
	F	16.28	23.26	55.81	4.65	100.00
	T	9.88	24.69	60.49	4.94	100.00
Turture	M	9.62	25.00	63.46	1.92	100.00
	F	7.55	22.64	64.15	5.66	100.00
	T	8.57	23.81	63.81	3.81	100.00
Palungtar	M	2.86	14.29	80.00	2.86	100.00
	F	6.06	12.12	78.79	3.03	100.00
	T	4.41	13.24	79.41	2.94	100.00
Dumre	M	9.52	9.52	71.43	9.52	100.00
	F	7.50	7.50	75.00	10.00	100.00
	T	8.54	8.54	73.17	9.76	100.00
Total	M	8.54	22.59	64.19	4.68	100.00
	F	12.39	18.59	63.38	5.63	100.00
	T	10.45	20.61	63.79	5.15	100.00

The family size of the study area comes to 6.3 which is larger than that of Lamjung and Tanahun districts (5 and 5.4 respectively). The percentage of nuclear family is very high in all the study points. Almost 70 per cent of households in study area are nuclear family. This result clearly indicates changing socio-culture pattern and increasing process of urbanisation in the study area (Table 3.2)

**Table 3.2: Type of Family Structure**

Type of Family	Khudi	Besisa	Bhotew	Paudid	Turture	Palungt	Dumre	Total
Nuclear %	80	80.0	60.0	71.4	53.3	73.3	60.0	69.7
Extended %	20	20.0	40.0	28.6	46.7	26.7	40.0	30.3
Average Family Size	5.80	5.90	7.87	5.79	7.00	4.53	5.47	6.3

The sex ratio of the study area is 98 where as the ratio for the overall influenced area is 114. It is because the out-migration for abroad employment from the overall influential area has

been increasing. At the same time in-migration along the roadside has been increasing for seeking new economic activity. About 60 percent of the surveyed household were in-migrated after the beginning of the road construction (Table 3.3)

**Table 3.3: In-migration after road construction**

Area	Number	Percentage
Khudi	5	33.33
Besisahar	8	26.67
Bhotewadar	12	80.00
Paudidhik	6	42.86
Turture	12	80.00
Palungtar	14	93.33
Dumre	14	93.33
Total	71	59.66

The main reason of migration along the road was reported to be better economic benefit and activities followed by easy accessibility for school children and reduced travel time and cost (Table 3.4)

**Table 3.4: Reason for migrating to the present locality (In Percentage)**

Reasons/Area	Khudi	Besisahar	Bhote wadar	Paudi dhik	Turture	Palungtar	Dumre	Total
Easy accessibility to schooling children	60.0	-	25.0	16.7	58.3	57.1	28.6	36.6
Better accessibility to health service	40.0	-	-	16.7	16.7	21.4	8.3	12.7
Better economic benefits/activities	100.0	87.5	75.0	100.0	83.3	100.0	85.7	85.9
Time and cost saving in travelling and business	-	37.5	41.7	50.0	41.7	41.7	28.6	35.2
Other,		12.5	8.3		8.3	41.7	28.6	16.9

*Note: Figure do not add to 100 per cent due to multiple choices.*

### 3.2.2 Educational Status

In all study points, literacy rate is significantly higher than national average and district average. The household survey showed that the average literacy rate of study area is about 75 percent. The female literacy rate of this area is also very high (Table 3.5). The awareness of the people of study points in Tanahu Districts about education has been significantly very high since very beginning. Besides, majorities of families belonging to road heads area or its peripheral areas have some educational background. The discussion with focus group also indicated that the road accessibility have provided opportunities to enhance education to the people of this area. The people's tendency for schooling girl child has also increased significantly in study area after the construction of road (Annex 1).

**Table 3.5: Education Status of Study Area (In percentage)**

Details	Male	Female	Total
Total Literacy Rate	81.27	68.17	74.79
Adult Literacy Rate	84.8	67.8	76.4
School Going Children (6-14 yr.)	91.46	89.39	90.54
Attending Higher Education	15.93	12.81	13.83

The total adult literacy rate is higher than the average total literacy rate. It clearly indicates growing people's awareness about importance of education. Percentage of children attending school has been also very high. Discussion with the people of this area showed that people of this area have increased their priorities in sending their children to the school. People attending higher education is also very remarkable in this area. About 15.93 percent of total male and 12.81 per cent of total women have acquired higher education.

### 3.2.3 Health and Sanitation

It has been found in the study that health awareness after construction of DBR has increased however, it is difficult to presume that it occurred only from the road. The increasing literacy and income level along the road as well as efforts made by public sector has positive impact on this matter. It has been found that out of the total household, 79 percent household uses dehydration powder during diarrhoea, which were 39 without road construction. Noticeable changes have also occurred in the toilets users, only 51 percent household used toilets after construction of the road now more than 94 percent household use it (Table 3.6).

**Table 3.6: Improvement In Sanitation (In Percentage)**

Details	Khudi	Besisa	Bhote	Paudi	Turtu	Palun	Dumre	Total
<b>Before</b>								
Use of dehydration powder during	13.33	23.33	20.00	14.29	60.00	66.67	93.33	<b>39.50</b>
Use of safe drinking water	13.33	70.00	60.00	7.14	53.33	73.33	100.00	<b>56.30</b>
Existence of Toilets	13.33	66.67	46.67	14.29	46.67	53.33	100.00	<b>51.26</b>
<b>After</b>								
Use of dehydration powder during	93.33	43.33	86.67	85.71	80.00	100.00	100.00	<b>78.99</b>
Use of safe drinking water	46.67	90.00	80.00	57.14	80.00	100.00	100.00	<b>80.67</b>
Existence of Toilets	100.00	96.67	100.00	71.43	93.33	93.33	100.00	<b>94.12</b>

The number of households using traditional healer has been decreased to 27 from 57 percent, which can be considered as an increase in public awareness. The proportionate share of visitors to hospital has increased significantly in all study points. The result of household survey presented in table 3.8 shown that the households using modern hospital facilities reached to almost 98 percent after the construction of road. This might be due to easier access to hospital as compared to past.

**Table 3.7: Treatment place (In percentage)**

BEFORE	Khudi	Besisahar	Bhotew adar	Paudi dhik	Turture	Palungtar	Dumre	TOTAL
1. Hospital	20.00	83.33	86.67	50.00	80.00	86.67	100.00	69.75
2. Health Post	46.67	6.67	20.00	85.71	46.67	46.67	40.00	36.97
3. Sub-health Post	33.33	3.33	26.67	14.29	0.00	20.00	0.00	12.61
4. Private Clinic	0.00	0.00	40.00	7.14	13.33	6.67	60.00	15.97
5. Nursing Home	0.00	0.00	0.00	14.29	0.00	0.00	26.67	5.04
6. Traditional Faith Healer	93.33	0.00	66.67	100.0 0	66.67	80.00	53.33	57.14
AFTER								
1. Hospital	100.00	100.00	86.67	100.0 0	100.00	100.00	100.00	97.48
2. Health Post	100.00	0.00	33.33	100.0 0	60.00	66.67	26.67	47.90
3. Sub-health Post	0.00	0.00	20.00	21.43	0.00	0.00	0.00	5.04
4. Private Clinic	0.00	20.00	66.67	14.29	66.67	80.00	80.00	43.70
5. Nursing Home	0.00	6.67	6.67	7.14	13.33	26.67	33.33	12.61
6. Traditional Faith Healer	26.67	0.00	46.67	42.86	13.33	53.33	40.00	27.73

Note : Figure do not add to 100 percent due to multiple choices.

The road access has significantly contributed on choice of mode of transportation and health institutions. The time consuming and uncomfortable practice of carrying the patient by porter has been displaced by vehicle facilities. The travel time to reach modern health services has been significantly reduced. The households using private clinic and service of nursing home has also increased in all the study points except in Khudi area. This result clearly indicates that the Tendency of the people of this area for paying prices for better health services has been increasing. This might be due to the rising income level of the households after road construction.

Annex 1 shows that immunisation of child, ANC, PNC and knowledge of MCH has increased significantly after construction of road. In the same way, practice of delivery of child in hospital and health post has also gone up. As a result MMR and IMR has decreased significantly. These results clearly indicate growing awareness about the health education and availability of health services after the construction of road. The tendency of people having sterilisation after having desired number of children has also increased due to the growing awareness about the small family size.

### 3.2.4 Gender Issues

It has been observed that the gender relation has not yet changed substantially in the project area. Women are more involved in the household activities and the males are involved in the outside the home activities. Males also migrate to the urban areas of Nepal or India in search of jobs. The trend of sending girls to the schools is growing but still she has to do most of the domestic works. Child marriage has decreased significantly after the

construction of the road. The status of women in the society was very low previously, but it has increased after construction of road (Annex 1). The survey also shows that women's share in decision making about establishing business and industry, sale of productive assets, community forest, casting votes and involving women in income generating activities has increased after construction of roads. But male domination in decision making is still there among all the ethnic and social groups. However among the Gurungs the women are more influential in using the domestic resources.

### 3.2.5 Change in Social Behavior of the Youths

The FGD and discussion with key informants have shown that most of the youths of the influence area of DBR have an urge to work in foreign countries. They do not like to work in farm and in rearing livestock. In villages, real farmers who play with the soil are few. They are uneducated, illiterate and marginal. They are not in a position to change the pattern of cultivation and not ready to cultivate new crops.

In most of the cases Nepalese youths are acting as job seekers but not as job-creators. This has not led to the development of entrepreneur's class as in other countries.

There have been strong traditions among some groups of people of the influence area to work in foreign armies. The preference is for British Army where the salary and perks are extremely high compared to Nepali salary. Their second choice is to enter into Indian Army. If opportunities are not available to enter in to armies, the youths of the influence area of DBR prefer to go to West Asia or East Asia to work there as workers. Emigration has become a way of life among the Gurungs and Magar, but now-a-days people of the other social and cast groups have also started migrating out for better income and opportunities. The Nepalese working outside Nepal send substantial amount of money to maintain their family member back at home. The figure about the total remittance send to the influence area of the road is not available. But the information provided in the meetings with the key informants of Turture market centre has revealed that the branch of the Indian pensions camp of Turture distribute about NRs. 300 million twice a year as pension. The pension is distributed generally at the interval of six-months. It has been observed that in some villages 50 to 75 percent of the young male have emigrated out of the village and out of the country for employment. So the inflow of large amount of money into the villages as remittance has changed the activities and behaviour of such households. They enjoy buying foodstuffs and milk products rather than producing at home. The profuse inflow of remittance money has made the people lethargic. It has been informed in focus group discussion that in some villages, even productive land has been left fallow and people has been using imported powder milk than raring own livestock for milk.

## 3.3 ECONOMIC ASPECTS

### 3.3.1 Agriculture

Agriculture in this area comprised of cereals, vegetables, fruits (esp. orange) and herbal plants combined with livestock farming. The major cereals crops produced in this area are rice and wheat in lowlands and maize, potato and lentil in uplands. Orange is the major horticultural product in this area which has commercial significance. This product is traded to Kathmandu, Narayanghat and other major towns of the country. Besides, mango, litchi, papaya and banana are grown for local consumption. Some farmers have initiated cultivation of vegetable for commercial purpose to some extent where irrigation facilities are available. However, the area has not been developed as vegetable belt although it has potentialities to be developed as such belt. The major hindering factors for commercial farming of vegetables along DBR are found as:

- Lack of irrigation facilities in the upland along the road. In Lamjung and Tanahu districts there are many flat upland land where irrigation facilities are not available. If the pocket areas along DBR are to be developed commercially the most important requirement is irrigation.
- Rich farmers who are holding land along the roadside are reluctant to cultivate vegetables that demand for continuous work in the field. Rich farmers generally prefer to cultivate traditional cereal crops because this needs less labour compare to the cultivation of vegetables.
- The real farmers (whose only occupation is agriculture) do not have ample of land to cultivate commercial crops.
- The experience of district agriculture office has shown that if some extension facilities are provided to the real farmer, new crops can be cultivated as in Barangdi Phant which is a good example of cultivation of vegetables
- Another important element that was observed from the experience of vegetable cultivation in Tanahu district is the success of the farmers in vegetable cultivation is with those farmers who cultivate vegetable as one of the crops. The subsistence farmers adding vegetable cultivation in some portion of their land has gained more than the farmers who are entirely involved in vegetable cultivation commercially have. The first types of farmers are called as Bonus Farmers in Tanahu.

**Table 3.8: Major cropping patterns in Lamjung District and Tanahu District**

Lamjung District	Tanahu District
<p><b>High land:</b></p> <ul style="list-style-type: none"> <li>• Potato</li> <li>• Potato-Wheat/Millet-Potato</li> <li>• Potato-Potato</li> <li>• Herbs/ Vegetables</li> </ul> <p><b>Low land:</b></p> <ul style="list-style-type: none"> <li>• Paddy-Wheat/Mustard/Potato-Maize</li> <li>• Maize-Potato/Millet/Vegetables</li> <li>• Maize/Millet-Lentil-Mustard</li> </ul>	<p><b>High land</b></p> <ul style="list-style-type: none"> <li>• Maize-Mustard/Wheat/Potato/Millet/Lentils</li> <li>• Potato/Maize</li> <li>• Vegetables-vegetables</li> <li>• Maize-Millet-Potato</li> </ul> <p><b>Low land</b></p> <ul style="list-style-type: none"> <li>• Paddy-Wheat/Potato/Lentil-Paddy</li> <li>• Paddy-Vegetables/Wheat/Maize</li> <li>• Paddy-Mustard/Lentils/Wheat-Maize</li> </ul>

• Paddy-Paddy
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The noticeable change in cropping pattern before and after construction of DBR is commercial cultivation of vegetables and herbs. Different types of Herbs are available in the influence area of the road. Dabur Nepal, an Indian FDI has initiated the planting of two types of herbs in this area. One is Sylibum Meriyanum, a seasonal subtropical plant is grown in areas around 700 to 1000-meter above sea level. This product is used to make Liv 52, used for treating jaundice. Another herb plant is Hyper cum Perennial, known locally as 'Khareto' which is used to make medicine for treating blood pressure. This is a permanent crop, which is ready to harvest three years after its plantation, then after it can be harvested at the interval of every 6-month. As the company has been providing the required technical assistance and purchase guarantee of the products, few numbers of the farmer of Lamjung have started cultivation of these herbs recently

**Table 3.9: Percentage of Household Changing Cultivation Pattern.**

New Crops	Area							
	Khudi	Besisahar	Bhote wadar	Paudidhik	Turture	Palungtar	Dumre	Total
Paddy	0.00	20.00	6.67	7.14	0.00	6.67	13.33	9.24
Maize	0.00	6.67	13.33	7.14	0.00	13.33	6.67	6.72
Wheat	0.00	23.33	0.00	0.00	0.00	0.00	0.00	5.88
Vegetables	0.00	0.00	40.00	21.43	33.33	13.33	13.33	15.13
Fruits	0.00	0.00	46.67	0.00	0.00	0.00	0.00	5.88
Others	0.00	0.00	33.33	0.00	0.00	0.00	0.00	4.20

Table 3.9 has shown that percentage of household changing cropping pattern after road construction is not very high. Comparatively significant changes took place in vegetables cultivation. But, still local vegetable production is not sufficient to satisfy local demand. The potentiality for commercial cultivation of vegetables in most of the plain land along the roadside is very high, as the road has created accessibility to the market for the product. But very few households have been attracted in vegetable cultivation. The agriculture campus in Kuncha has not provided any technical support to the farmers of this area. The consultant feels that the concerned agency needs to develop a package of technical and financial services to motivate the farmers of this area to develop this area as a vegetable belt.

Noticeable changes have been taken place in practice of kitchen gardening in the study area. The number of household having kitchen garden has increased significantly in all the study points except in Dumre (Table 3.10). With the increase migration along the settlements along the roadside, demand for vegetables have been increasing even in the local markets. One of the progressive commercial vegetable-grower of Bhotewadar informed that he has been producing 2 tons of vegetable in one and half ropani of land and selling in the local market.

**Table 3.10: Kitchen Garden (In Percentage)**

Area	Before			After		
	Yes	No	Total	Yes	No	Total
Khudi	33.33	66.67	100.00	60.00	40.00	100.00
Basisahar	53.33	13.33	100.00	70.00	30.00	100.00
Bhotewadar	33.33	66.67	100.00	53.33	46.67	100.00
Paudidhik	42.86	57.14	100.00	78.57	21.43	100.00
Turture	33.33	66.67	100.00	46.67	53.33	100.00
Palungtar	40.00	60.00	100.00	60.00	40.00	100.00
Dumre	60.00	40.00	100.00	46.67	53.33	100.00
<b>Total</b>	<b>52.10</b>	<b>47.90</b>	<b>100.00</b>	<b>60.50</b>	<b>39.50</b>	<b>100.00</b>

Number of household cultivating different kinds of vegetables in kitchen garden have increased in most of the areas except in Basisahar where number of household cultivating radish, green vegetables, beans, peas and pumpkins has decreased after road construction. This may be due to changes in consumption behaviour of some kind of vegetables and the availability of seasonal vegetables supplied from other area (Table 3.11).

**Table 3.11: Vegetables Produced in Kitchen Garden. (In percentage)**

Vegetables	Khudi	Besisahar	Bhote wadar	Paudi dhik	Turture	Palungtar	Dumre	Total
<b>Before</b>								
Radish/Green Vegetable	33.33	66.67	33.33	42.86	33.33	40.00	46.67	45.38
Potato	33.33	33.33	33.33	14.29	6.67	13.33	26.67	24.37
Onion/Garlic	0.00	13.33	13.33	14.29	6.67	13.33	26.67	12.61
Tomato/cauliflower/	0.00	43.33	6.67	-	13.33	13.33	33.33	19.33
Beans/Peas	0.00	46.67	33.33	14.29	6.67	20.00	33.33	25.21
Pumpkins/Bitter Guards	0.00	43.33	26.67	-	20.00	26.67	33.33	24.37
<b>After</b>								
Radish/Green Vegetable	60.00	56.67	53.33	78.57	46.67	60.00	46.67	57.14
Potato	60.00	33.33	53.33	71.43	40.00	40.00	33.33	45.38
Onion/Garlic	60.00	46.67	26.67	64.29	33.33	46.67	40.00	45.38
Tomato/cauliflower/	60.00	70.00	26.67	78.57	40.00	33.33	46.67	52.94
Beans/Peas	20.00	30.00	40.00	64.29	46.67	66.67	40.00	42.02
Pumpkins/Bitter Guards	6.67	36.67	40.00	64.29	46.67	60.00	46.67	42.02

After the construction of DBR changes has been noticed in the use of improved varieties of seeds, chemical fertiliser and insecticides. The use of improved seeds increased to 58

percent of the total households, which were only 27 per cent before construction of DBR. Similarly, the number of the households using chemical fertilisers and insecticides has been increased dramatically during the same period. The users of chemical fertilisers has increased to more than 61 percent and users of insecticides increased to 51 percent of the total household which were only 32 percent and 25 percent respectively before construction of the road. (Table 3.12 & annex 1).

**Table 3.12: Use of Modern Inputs in Agriculture: (In Percentage)**

Details	Khudi	Besisah	Bhotew	Paudid	Turture	Palungt	Dumre	Total
<b>Past</b>								
1. Improved seeds	13.33	26.67	26.67	7.14	46.67	33.33	40.00	<b>27.73</b>
2. Fertiliser	6.67	33.33	53.33	7.14	46.67	33.33	40.00	<b>31.93</b>
3. Insecticides	6.67	36.67	20.00		26.67	33.33	40.00	<b>25.21</b>
<b>Now</b>								
1. Improved seeds	60.00	53.33	86.67	71.43	60.00	46.67	33.33	<b>57.98</b>
2. Fertiliser	66.67	53.33	86.67	85.71	66.67	46.67	33.33	<b>61.34</b>
3. Insecticides	40.00	46.67	86.67	50.00	60.00	46.67	33.33	<b>51.26</b>

The increase in number of household using modern inputs in agriculture indicates that the productivity of agriculture product has increased in this area.

### 3.3.2 Fruit Cultivation and other Cash Crops.

The information provided by District Agriculture Offices has shown that the prospect of fruit cultivation in these areas is very high. Lamjung is one of the major orange belts in the country and the quality of orange of this area is also very high. Interest of people in fruit cultivation is also increasing tremendously. In Lamjung the different varieties of fruits was cultivated on 476 hector of land in the year 1994-95, but it has increased to 1051 hector in 1998-99. In Tanahu District also the total area of fruit cultivation has increased from 1330 hector to 1532 hector during the same period. In both districts, among these fruits cultivated area, fruits of orange family have covered more than 50 per cent land. This whole region including Gorkha District is very famous for the citrus fruits.

The construction of DBR has facilitated transport of these fruits in the Kathmandu Valley and markets in tarai region. The interaction with the local people and interview with key informants indicated that the construction of this road has motivated to the people of this area for the commercial cultivation of the fruits and the recent improvement of roads has accelerated this motivation.

The climatic condition and type of land of this area is very suitable for the cultivation of coffee and cardamom. The Horticulture Officer of District Agriculture Office of Lamjung District informed that they implemented a small package programme in some of the area to motivate farmers in cultivation of coffee and cardamom during the year 1998-99. The Office is also providing training to the farmers (DADO, Lamjung: 1999). But this programme dose

not seems sufficient. So a comprehensive programme should be developed and implemented to provide technical and financial support to the farmers of this area.

### 3.3.3 Livestock

Farmers usually keep cattle, buffaloes goats, and others domestic animals to meet the requirement of milk and manure. Besides male cattle are raised for ploughing purposes. It is interesting to note that the percentage of households rearing cattle, buffaloes, goat, and sheep has decreased after the construction of the road. However, the percentage of households keeping chicken, duck and pig has increased to some extent (Table 3.13).

**Table 3.13: Livestock Rearing Household (In percentage)**

	Khudi	Besisahar	Bhote wadar	Paudidhik	Turture	Palungtar	Dumre	Total
<b>Livestock</b>	<b>BEFORE</b>							
1. Oxen	33.33	30.00	53.33	64.29	26.67	13.33	13.33	32.77
2. Cow	20.00	16.67	46.67	42.86	20.00	6.67	13.33	22.69
3. Buffalo	53.33	43.33	60.00	71.43	40.00	20.00	13.33	42.86
4. Goat	46.67	23.33	66.67	57.14	26.67	13.33	6.67	32.77
5. Chicken	33.33	13.33	13.33	42.86	33.33	0.00	0.00	18.49
6. Sheep	20.00	6.67	0.00	0.00	0.00	0.00	0.00	4.20
7. Duck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8. Pig	0.00	0.00	6.67	7.14	0.00	0.00	13.33	3.36
9. Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>AFTER</b>							
1. Oxen	33.33	20.00	26.67	35.71	6.67	6.67	0.00	18.49
2. Cow	6.67	6.67	0.00	21.43	0.00	0.00	6.67	5.88
3. Buffalo	53.33	40.00	33.33	78.57	33.33	20.00	13.33	38.66
4. Goat	33.33	16.67	26.67	50.00	6.67	13.33	13.33	21.85
5. Chicken	20.00	10.00	6.67	71.43	33.33	6.67	13.33	21.01
6. Sheep	20.00	0.00	0.00	0.00	0.00	0.00	0.00	2.52
7. Duck	0.00	0.00	6.67	0.00	0.00	6.67	0.00	1.68
8. Pig	0.00	3.33	0.00	7.14	6.67	6.67	13.33	4.20
9. Others	0.00	3.33	0.00	0.00	0.00	0.00	0.00	0.84

From the discussion with the Focus group it has been found that most of the cattle and buffaloes reared in these area are of local varieties. So productivity of livestock has been

very low in this area. Besides, increasing scarcity of fodder has resulted in increase in cost of livestock feedings. Hence livestock-rearing practice has decreased significantly in this area.

**Table 3.14: Livestock Rearing Situation. (In percentage)**

Area	Before			After		
	Yes	No	Total	Yes	No	Total
Khudi	60.00	40.00	100.00	66.67	33.33	100.00
Basisahar	80.00	20.00	100.00	50.00	50.00	100.00
Bhotewadar	86.67	13.33	100.00	53.33	46.67	100.00
Paudidhik	85.71	14.29	100.00	92.86	7.14	100.00
Turture	40.00	60.00	100.00	33.33	66.67	100.00
Palungtar	20.00	80.00	100.00	20.00	80.00	100.00
Dumre	13.33	86.67	100.00	20.00	80.00	100.00
Total	57.98	42.02	100.00	47.90	52.10	100.00

Almost 58 per cent of surveyed household used to rear livestock before construction of road, but it has decreased to 48 per cent after road construction (Table 3.14). Due to decreasing trend in rearing cattle and buffaloes, there has been acute scarcity of milk and milk products in the local market. Thus most of the teashops of Lamjung area use imported powder milk for tea, but in Dumre and some other part of the Tanahu District milk is supplied from dairy of Chitawan.

Farmers are aware with potential economic opportunities from the livestock. So some of the progressive farmers of Bhotewadar have formed milk co-operative and have planned to establish a chilling plant. They have been seeking technical and financial assistance from concerned agencies. As the metallic road has provided the facility for transporting milk easily to Pokhara and other cities they hope that the establishment of chilling plant will promote the development of livestock commercially. So the concerned agencies should intervene in this area to provide technical and financial support, and marketing knowledge to the people of this area. The farmers should be motivated for commercial livestock farming by replacing the traditional varieties of livestock by improved varieties. The experience of Ilam District should be cashed in this area for the livestock development. In Ilam, the cultivation of vegetables and cash crops led to the development of fodder trees and that led to the promotion of livestock development.

### 3.3.4 Industry

There is no large-scale industry in the study area. However, there are some micro-enterprises producing mainly woollen products, wooden furniture, cement blocks, bakery products, etc. The immediate vicinity of DBR in Lamjung is famous for production of woollen

rugs and blankets. Within recent two/three years period workshops for manufacturing grill products have been established in almost all the settlements along the road. Besides, gold ornament making is another important economic activity carried by local group known as 'Sunwar'. Such micro enterprises have been established in some rural market centres such as Dumre, Besisahar, Turture, and Bhotewadar. The construction of road has facilitated use of cycle and motorcycles for local transport within the market centres. This has also developed the cycle repair centres at different localities.

The record of the Cottage and Small Industry District Office of Lamjung has shown that 90 industries were registered within 1998/99 while in 1997/98 some 82 industries were registered. Out of the total household surveyed, only three percent have their own micro enterprises. The FGD with Governmental Official in Basisahar indicated that most of the entrepreneur lack required technical and marketing knowledge. So these industries use to collapse during their infancy.

### **3.3.5 Tourism**

Tourism is one of the important activities promoted by the construction of road. About 15000 tourists visit Manang and parts of Annapurna Conservation Area Project (ACAP). The construction of metallic road has made the market areas along the road as tourist centres. Now-a-days tourists are coming from Kathmandu or Pokhara come to Besisahar during mid-day and from their some tourists walk to nearby settlements such as Khudi, Bhulbhule. While those who go for long distance trek rest at Besisahar and start for trekking next day morning. The hotel and lodge owners of Dumre and Besisahar have said that the construction of metallic road has caused for the reduction of their business because tourists do not stay there at these days. But during the visit of the consultant, it was found that one of the popular hotels of Besisahar was having some foreign tourists and Nepali visitors who had occupied almost all the rooms at the hotel. Besides the lodge operator was paying rent of Rs. 18000/- per month for using the building. If the business was dull how he could pay the rent. This indicates that the hotel owners at present could not enjoy the fruits of monopoly as they used to enjoy in the past when there were few numbers of hotels and restaurants. At present, several tourist type hotels have been opened and keen competitions among them have developed causing lesser occupancy in the hotels and lodges. The price of the room has found to be a little higher than its price in Pokhara compared to the facilities and services provided by them. The tourism business has become very competitive in these areas, as many new tourism entrepreneurs have been attracted to this area. So it is high time for businessmen of tourism sector to change their traditional monopoly attitude and become competitive by offering better services at lower prices to attract more tourists.

It has been found that the lodges, hotels and restaurants of Besisahar put the price tag of their services and products as per the decision of the Tourism Development Board. The businessmen of this sector informed that this arrangement has avoided the practice of bargaining the price of services and products to attract the tourists. At the same time tourist feel safe that they are not cheated by the hotel and lodge keepers and the restaurants operators.

It is very difficult to calculate the total amount of expenditure made by the foreign tourist visiting in this area. So it is not possible to figure out amount of foreign exchange earnings in this area. But the informations provided by the household survey and discussion with the focus groups give some indications about the increase in foreign exchange earnings after the construction of the roads. The household survey indicates that the numbers of foreign tourist, the number of tourist class hotels, lodges and restaurant, and employment of local people in tourism sector has increased after the construction of the road (annex 1). The focus group discussion has also supported these informations. These Informations clearly indicate that the foreign exchange earnings has increased after the construction of the roads.

### 3.3.6 Income and Expenditure Pattern

Agriculture was the major economic activities, which generate income of the household of the study area before construction of the road. Almost 63 per cent of the total households were engaged in agriculture activities besides other activities. Employment within the country and outside the country was in second position followed by business. Industrial activities were almost non-existence in this area. After the construction of road the dominance of agriculture sector has been replaced by business sector and now business is the one of the income earning activities of the almost 71 per cent of the surveyed household in the study area.

**Table 3.15: Economic activities, which generate family income (In percentage)**

Before	Khudi	Besisahar	Bhote wadar	Paudidhik	Turture	Palungtar	Dumre	Total
<b>Agriculture</b>	53.33	86.67	60.00	85.71	53.33	40.00	40.00	<b>63.03</b>
<b>Business</b>	13.33	33.33	40.00	21.43	26.67	20.00	73.33	<b>32.77</b>
<b>Industry</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
<b>Service</b>	46.67	20.00	33.33	42.86	40.00	60.00	6.67	<b>33.61</b>
<b>Labour</b>	0.00	0.00	0.00	7.14	0.00	0.00	0.00	<b>0.84</b>
<b>Others</b>	0.00	0.00	0.00	7.14	0.00	0.00	0.00	<b>0.84</b>
<b>After</b>								
<b>Agriculture</b>	60.00	66.67	46.67	100.00	20.00	26.67	26.67	<b>51.26</b>
<b>Business</b>	46.67	60.00	80.00	57.14	86.67	80.00	100.00	<b>71.43</b>
<b>Industry</b>	0.00	10.00	0.00	7.14	0.00	0.00	0.00	<b>3.36</b>
<b>Service</b>	26.67	6.67	20.00	21.43	0.00	26.67	6.67	<b>14.29</b>
<b>Labour</b>	0.00	0.00	0.00	14.29	0.00	0.00	0.00	<b>1.68</b>
<b>Others</b>	20.00	0.00	0.00	28.57	13.33	20.00	0.00	<b>10.08</b>

Although employment in the foreign countries and with In the country has been attracting significant number of working youth of Lamjung and Tanahu District, but its dominance is decreasing in the study points. This may be because of new economic opportunities available in this area due to improvement of road. Agriculture sector has been still playing a significant role in the family income of this area as more than 50 per cent of household are engaged in this sector (Table 3.15 & 3.16)

**Table 3.16: Sources to meet expenditure (in Percentage)**

Sources/Percent	0	1-10	11-25	26-50	50-75	76-100	Total
Agriculture:	0.00	4.20	6.72	15.97	13.45	15.97	56.30
Business	0.00	4.20	5.88	12.61	13.45	41.18	77.31
Services:	0.00	3.36	3.36	5.88	0.00	0.84	13.45
Others:	0.00	9.24	5.04	2.52	0.84	2.52	20.17

Noticeable changes have been occurred in the expenditure pattern of the households of the study area especially in education, transportation, food and utilities. Previously more than 50 per cent of total households used to spend less than 10 percent of total expenditure in education and about 20 per cent household did not spend even any amount in the education. But after the construction of road, almost 67 per cent of house hold in surveyed area used to spend 11-25 per cent of total expenditure and percentage of household not spending any amount in education has decreased to 4.2 per cent. Households spending 11-25 percent on utilities were less than 2 per cent before road construction, but it has increased to 33.61 per cent.

**Table 3.17: Share of Different items in expenditure (In percentage)**

Items/Percentage	0	1-10	11-25	26-50	50-75	76-100	Total
<b>Before</b>							
Food	0.00	0.00	23.53	51.26	22.69	2.52	100.00
Education	20.17	51.26	26.05	2.52	0.00	0.00	100.00
Transport	17.65	70.59	10.92	0.84	0.00	0.00	100.00
Festivals	0.84	48.74	48.74	1.68	0.00	0.00	100.00
Cloth/ Wearing	1.68	50.42	47.90	0.00	0.00	0.00	100.00
Building Maintenance	38.66	46.22	14.29	0.84	0.00	0.00	100.00
Utilities	31.93	66.39	1.68	0.00	0.00	0.00	100.00
Others	21.85	76.47	1.68	0.00	0.00	0.00	100.00
<b>After</b>							
Food	0.00	0.00	16.81	68.91	14.29	0.00	100.00
Education	2.52	24.37	68.07	5.04	0.00	0.00	100.00
Transport	2.52	63.87	31.09	2.52	0.00	0.00	100.00

Items/Percentage	0	1-10	11-25	26-50	50-75	76-100	Total
Festivals	1.68	63.87	33.61	0.84	0.00	0.00	100.00
Cloth/ Wearing	2.52	37.82	59.66	0.00	0.00	0.00	100.00
Building Maintenance	23.53	54.62	21.01	0.84	0.00	0.00	100.00
Utilities	10.92	55.46	33.61	0.00	0.00	0.00	100.00
Others	10.08	58.82	30.25	0.84	0.00	0.00	100.00

Table 3.17 shows that dominance of households spending 26-50 per cent of expenditure in food has not changed even after road construction. But house holds spending 50-60 per cent in food has decreased from 22.69 to 14.29 per cent and households spending almost all amounts in food has decreased to zero from 2.52 per cent. This figures clearly indicates that people of this area are aware of need of education for their children and standard of living of people of this area has been improving (Table 3.17)

### 3.3.7 Employment Pattern

Study points are settlements along the roadside. So business has dominated in the employment pattern of study area. Almost 54 per cent of total employed has been involved in business sector. The construction of road has created more business opportunities along the settlement of road. So large numbers of people have been attracted to this sector. One interesting point to be noted here that both male and female are equally active in business sector where as agriculture sector has been dominated by female. The discussion with the local people has indicated that male population's interest in agriculture is decreasing. They are more attracted to employment in non-agricultural activities within and outside the countries. This may be the major cause for low response in changing cropping pattern of this area even after construction of road. This increasing feminisation of agriculture sector can be a serious problem for the development of agriculture sector of this area (Table 3.18).

**Table 3.18: Sectoral Employment**

(In Percentage)

Types	Male	Female	Total
<b>Agriculture</b>	29.30	46.79	38.02
<b>Business</b>	54.78	53.21	54.00
<b>Industry</b>	1.91	0.00	0.96
<b>Labour</b>	0.64	0.00	0.32
<b>Service</b>	13.38	0.00	6.71

Industrial sector has not been developed in this area. Due to the limited local demand people are not interested to take risk by establishing industries. So employment in industrial sector is very low. There is very good potentiality to establish traditional cottage and handicraft industries in a commercial way. But due to lack of proper knowledge about the

potential market, people are not interested to be involved this sector. Most of the household of this area use remittance from foreign employment and pension in adding physical facilities or in business. People having higher income from business and employment are gradually quitting agriculture sector leaving their land without cultivating any crop.

Annex 1 indicates that unemployment situation has increased in the study area. Previously it was very negligible. The interaction with the elite groups and key informants of this area argued that most of the youths are not interested to be engaged in agricultural work as they feel this work as a low grade job. This tendency has been developed mainly due to the demonstration effects of the people working in foreign countries. Besides, most of these youth have acquired incomplete general education and lacks technical education to start new venture of their own. So they use to remain unemployed rather than to be engaged in traditional household jobs.

### 3.3.8 Food Insufficiency

One of the direct impacts of road has been seen in food sufficiency duration within the study area. The percentage of households with food sufficiency from own agriculture produce has declined after the construction of road. This could be due to shifting of farm family economy to market economy system as the construction of road has opened up new opportunities which provides higher benefit than traditional agriculture sector. The other cause might be increasing tendency of literate young generation to seek other jobs than being engaged in agriculture or cereal production activities.

**Table 3.19: Food sufficiency duration. (In percentage)**

Duration	Khudi	Besisahar	Bhote wadar	Paudi dhik	Turture	Palungtar	Dumre	Total
<b>Before</b>								
1. More than 12 months	20.00	46.67	26.67	0	26.67	6.67	20.00	24.37
2. Up to 12 months	6.67	30.00	26.67	21.43	26.67	20.00	26.67	23.53
3. Up to 9 months'	26.67	3.33	0	21.43	6.67	6.67	0.00	8.40
4. Up to 6 months	6.67	3.33	6.67	35.71	13.33	6.67	0.00	9.24
5. Up to 3 months	6.67	3.33	6.67	7.14	0.00	0.00	0.00	3.36
6. No Production	33.33	13.33	33.33	14.29	26.67	60.00	53.33	31.09
<b>After</b>								
1. More than 12 months	13.33	26.67	6.67	0.00	6.67	0.00	0.00	10.08
2. Up to 12 months	0.00	10.00	13.33	21.43	20.00	20.00	20.00	14.29
3. Up to 9 months	33.33	16.67	6.67	21.43	6.67	6.67	6.67	14.29
4. Up to 6 months	13.33	13.33	6.67	35.71	20.00	0.00	6.67	13.45
5. Up to 3 months	6.67	3.33	20.00	14.29	6.67	6.67	0.00	7.56

6. No Production	33.33	30.00	46.67	7.14	40.00	66.67	66.67	40.34
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Table 3.19 has shown that the percentage of households reporting food surplus has declined in almost all study location. Previously about 24 per cent of household had food surplus; it declined to only 10 per cent after road construction. This decline has been partially adjusted by increments in food self-sufficiency up to 12, 9, 3 months. Households having no food production increased from 31.09 per cent to 40.34 percent after road construction.

It seems paradoxical as the percentage of household using modern agriculture inputs has increased in the study area (table 3.12), on the other hand, foods sufficiency situation of the same households has declined (table 3.19). The discussion with the focus group and key informants indicated that increasing feminisation in agriculture sector has resulted in decrease in cropping intensity. The marginal farmers have adopted modern inputs in agriculture for increasing productivity, but they have their limitation due to size of land holdings. Besides, scarcity of agriculture labour has also resulted in high cost in cultivation and the benefits from other economic activities offered by the access of roads have become higher than benefits from agriculture sector. So most of the households have not changed their cropping pattern even after starting using of modern inputs in agriculture. The increasing trends of people to be involved in other sector than agriculture sector as described in occupation pattern section also support the causes of decline in food self sufficiency of this area.

**Table 3.20: Sources to manage food insufficiency. (In percentage)**

Details/Area	Khudi	Besisahar	Bhote wadar	Paudi dhik	Turture	Palungtar	Dumre	Total
<b>Before</b>								
Alternative jobs or work like Business	13.33	10.00	6.67	21.43	26.67	26.67	80.00	24.37
Loan from Bank & Local	13.33	0.00	0.00	14.29	0.00	6.67	0.00	4.20
Service	40.00	0.00	0.00	21.43	13.33	40.00	0.00	14.29
Labour work	0.00	3.33	6.67	14.29	0.00	0.00	0.00	3.36
<b>After</b>								
Alternative jobs or work	40.00	43.33	33.33	42.86	60.00	66.67	86.67	56.30
Loan from Bank & Local	26.67	6.67	6.67	28.57	0.00	6.67	0.00	10.08
Service + Pension	60.00	0.00	40.00	35.71	13.33	33.33	0.00	22.69
Labour work	0.00	3.33	0.00	21.43	0.00	0.00	0.00	3.36

The informations provided by the household survey about the sources to manage food insufficiency also showed that business has become the major sources to manage food sufficiency after road construction (Table 3.20). The share of pension and remittance from employment has also been significant in this respect.

### 3.3.9 Changes in living standard

Noticeable changes have occurred in the living standard of the households of the study area. The construction of DBR has raised the permanency in the settlement of households of study area. Tendency of constructing cemented and concrete house has been increasing. The household survey showed that more than 57 percent of household have purchased land and added own shop after construction of the DBR. Almost 44 percent of household shift from brick house to concrete house after construction of the road. (Table 3.21)

**Table 3.21: Addition of Assets/Economic Activities after road construction****(Percentage)**

Details	Changes	Khudi	Besisa har	Bhote wadar	Paudi dhik	Turture	Palung tar	Dumre	Total
1. House	From straw roof to	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	From slate roof to tin roof	66.67	33.33	6.67	92.86	6.67	20.00	0.00	31.93
	From clay house to brick house	0.00	0.00	6.67	21.43	46.67	33.33	0.00	13.45
	From brick house to concrete house	20.00	70.00	40.00	42.86	33.33	26.67	46.67	43.70
2. Shop in premises	Own shop	46.67	60.00	66.67	50.00	60.00	40.00	60.00	57.14
	Shop in rent	0.00	0.00	13.33	7.14	33.33	40.00	40.00	16.81
	No shop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Purchase of land		73.33	43.33	66.67	50.00	60.00	73.33	53.33	57.98
4. Vehicle (No)	Cycle	6.67	10.00	20.00	21.43	20.00	20.00	26.67	16.81
	Tractor	0.00	0.00	6.67	0.00	0.00	0.00	0.00	0.84
	Motor cycle / Scooter	0.00	3.33	20.00	7.14	6.67	0.00	0.00	5.04
	Motor / Jeep	0.00	3.33	0.00	0.00	0.00	0.00	0.00	0.84
	Truck / Bus	0.00	3.33	6.67	0.00	0.00	0.00	0.00	1.68
5. Industry		0.00	10.00	0.00	7.14	0.00	0.00	0.00	3.36

The construction of road has offered opportunities for additional income for the household along the settlements in roadside. Hence, noticeable changes occurred in addition of physical facilities, vehicles and domestic amenities by the households of study area.

**Table 3.22: Domestic Amenities Added after Road Construction (In Percentage)**

Particulars	Khudi	Besisahar	Bhote wadar	Paudidhik	Turture	Palungtar	Dumre	Total
1. TV	33.33	80.00	73.33	28.57	73.33	93.33	80.00	68.07
2. VCR	6.67	0.00	40.00	7.14	6.67	0.00	6.67	8.40
3. Radio	100.00	90.00	100.00	92.86	53.33	100.00	100.00	90.76
4. Electricity	66.67	90.00	100.00	78.57	93.33	100.00	100.00	89.92
6. Private Tap	46.67	70.00	46.67	21.43	53.33	0.00	20.00	41.18
7. Iron	6.67	63.33	86.67	14.29	66.67	80.00	93.33	59.66
8. Pressure	86.67	96.67	100.00	71.43	80.00	86.67	100.00	89.92
9. Rice Cooker	13.33	70.00	53.33	21.43	33.33	46.67	60.00	46.22

Particulars	Khudi	Besisahar	Bhote wadar	Paudidhik	Turture	Palungtar	Dumre	Total
10. Refrigerator	13.33	33.33	40.00	28.57	33.33	26.67	26.67	29.41
11. Fan	26.67	50.00	86.67	21.43	93.33	100.00	100.00	66.39
12. Heater	6.67	20.00	20.00	7.14	0.00	0.00	20.00	11.76
13. Others	13.33	0.00	0.00	21.43	0.00	0.00	0.00	4.20

Almost 90 percent of the household have added radio, electricity and pressure cooker after construction of the road in the surveyed area. More than 65 percent of the household start to use television and fan after construction of the road. (Table 3.22). The increase in use of household appliances clearly indicates rising income level of lower middle class household of this area.

The analysis of the informations gathered from household survey, FGD and interaction with key informants shows that the construction of road has provided alternative jobs and economic opportunities to the people of this area. Only 3.36 per cent of total households have been found to be involved in labour work for managing food insufficiency and only 0.32 per cent of households' major income is from labour (table 3.18 and 3.20). The scarcity of labour in this area for agriculture activities indicates that majority of people have other means for their livelihood. The improvement of road has contributed for the easy availability of the commodities at competitive prices as producers and distributors have started supplying commodities directly in this area. Besides, the transportation cost of the commodities has gone down significantly after the construction of the road. This gives an indication that the poverty situation of this area has decreased substantially after the construction roads.

### 3.3 PEOPLE'S PARTICIPATION IN DEVELOPMENT ACTIVITIES

As discussed in the chapter one of this report, the construction of DBR started in the year 1971 with the complete participation of local people. Under the then programme of 'Back to the Village Campaign', the local people participated voluntarily in their respective wards. The people's participation for the construction of this road continued till the FY 1979-80. The household survey and FGDs also indicated that there has been high tradition of people participation in this area. Several types of Civil Society Organisations have been found in this areas through which people of this area have been participating in development activities in the society. The most common CSOs found in this area are:

- Community Forest Group
- Mothers Group
- Local NGOs/Clubs
- Chamber of Commerce
- Local Area Improvement Committee

The effort of community forest group in Lamjung District has been found to be very effective and successful compare to other points of study area. FGD has shown that people of this

area are highly interested to form and participate in Community Forest Group. After the construction of road the tendency for forming mothers group has also increased significantly. Women of every ward of all the VDCs have formed Mothers Group. But these groups are mostly involved in two types of activities. First, they collect fund in the form of donations there by organising entertainment programs. Secondly they spend most of these fund in the construction and maintenance of temples cultural places. They are not yet attracted towards development activities. The local elite of these areas is found to be worried to find way to turn their efforts in other development activities. The activities of the mothers group could be directed towards development involving them in the following activities:

- Forming saving and credit groups of the members of the mothers group (Ama Samuha). This would help in empowering the women.
- Provision of training of the members of mothers group in operating various incomes generating activities.
- Orienting the mothers group to channalize their investment in social and developmental activities than building temples and organising religious ceremonies.
- Initialling literacy campaign and make aware to the members of mothers group to reduce the dropouts of their children from the school.

Few numbers of local NGOs and clubs have been found in study area. But their activities are limited and they are not enthusiastic as they used to be in early 1990s. Most of local clubs is involved in sports activities and cultural programmes. NGOs could be involved in the development works to be initiated in the valley by the line agencies of the government. Chamber of Commerce has been found in all market centres along the roadside. Although these organisations are loosely organised, but it has been found to be influential group in the society and involved in various kind of development activities in the local area. The formation of Chamber of Commerce has become possible only after the construction of road as it provided opportunities for market based economic activities.

Small local units like local area improvement committees have been found in various study points. These units have been generally formed for improvement of local area. So there scope of works and area has been very limited. Due to local interest and homogeneous group, the working spirit of these units has been found to be very strong. So these unit could be used for getting local participation in implementation of various kind of development programs by the concerned agencies.

### 3.4 CHANGES IN SERVICE DELIVERY

Discussion with the concerned governmental officers and local elite in the study area has indicated that the service delivery system by the various institutions has been enhanced after the construction of road. Mainly following institutions are involved in the service delivery activities in this area:

- Government offices
- Local Government Institutions
- Private Sector Organisation
- Non-Governmental Organisation

Most of the developmental line agencies of the government have their district offices in this area. The access of road has facilitated these institutions in provision of service delivery to the people. FGD with the governmental officers in Lamjung indicated that service delivery has become efficient and effective after improvement of roads. Demands for different kinds of developmental programmes have increased significantly as it become easier for service receiver to reach service providers in the district.

The discussions in previous sections have also indicated that essential service like health, education and agriculture extension services have become easily accessible in the study area after road construction. The proportion of households using hospital service has increased significantly after road construction (table 3.8). It also indicates increasing awareness of people about health services. In the same way, the education situation has also seemed to be very good in this area compare to national average (table 3.6).

The local government institutions like DDCs and VDCs of these areas have been found to be very energetic and interested in development of this area. But these institutions do not have enough resources to facilitate in service delivery system by themselves. They have to depend on offices of line agencies. They could just request these offices for the provision of services in their areas. The FGDs indicated that these offices of line agencies lack co-ordination among themselves and with the local government institutions. It has been found that the service delivery system could be made more efficient and effective with the better co-ordination among these offices and institutions.

The private sector organisations of these areas have been dominated by the business undertakings owned by individual households. These organisations have been involved in service delivery for profit motives. The consultant group found private medical shops and dispensary in all the settlements in the study area. Most of the people in Besisahar and Khudi and Dumre have invested in hotel and restaurant providing services to the visitors in this area. People of this area have also invested in public transportation providing services in transportation of good and passengers. Recently Dabur (Nepal) Pvt. Ltd. has been providing extension and technical services to the farmers interested in herb plantations. The unit of chamber of commerce of this area has also involved in service delivery by way of helping to establish educational institutions. Besides, private organisations have established private boarding school, higher secondary school and collage. Very few NGOs are actively

working in this area to facilitate service delivery system of this area. Some of local NGOs have been involved in adult and women literacy campaign, and women income generating activities.

### 3.5 DEVELOPMENT OF URBAN CENTRES

Construction of all weather road provides opportunities for opening of several new economic activities. Since the beginning of the construction of the DBR, several settlements have been developed along the roadside area. Some of these settlements have been existed before beginning of the construction of DBR, but development of all the settlements took momentum with the construction of the road. Interaction with the local elite in several points of the roads and household survey clearly revealed the fact that people started migrating in these centres to exploit the new economic opportunities available and easy access for education facilities after construction of road. This aspect has been already discussed in previous section also. The improvement of the DBR in black top level has develop confidence among the inhabitants and they started investing more in land and housing giving permanency in the settlements in this area. The consultant group found significant number of businessmen migrated in these areas from Kathmandu Valley, Dhulikhel and from market centre of Tarai region. The major urban centre developed in the study area are as followings:

#### Dumre

This is the entry point of the Dumre - Besisahar Road. This is a trading centre that has emerged after the construction of Prithvi Rajmarg. Interaction with local elite revealed that the trend of constructing big cemented buildings in this area got momentum only after the construction of the Chundi Bridge of Dumre-Besisahar Road. It has been found that the wholesalers and hotel businesses were enjoying monopoly having high profit before the improvement of the DBR. Now, their monopoly has declined due to direct supply of goods to Besisahar other parts by distributors and producers from Narayanghat, Pokhara and Kathmandu. The tourists and the Nepalese commuters also do not stop at Dumre rather moves towards Besisahar. Consequently rooms of hotels and lodges are not occupied as it used to be in the past and few lodges have been also closed. On the contrary new business like teashops, restaurants, repair workshops are growing. Land price at the main market centre of this area is high. Land is priced on the basis of frontal faced towards the road. The price per 1.5 feet is about Rs. 100,000. Oranges and soybeans produced in upland of this area are mostly exported through Dumre. The consultant team found poultry farms (having about 2000 layers), grill industries, furniture industries, ice cream factories, bakeries, expeller and seller mill, animal feed industry in Dumre. Some public offices also existed in Dumre such as post office, Office of Nepal Telecommunication Corporation, Office of Road Department of HMG/N, a branch of Nepal Bank Ltd. and few offices of Bio-gas Companies.

**Bhansar**

Bhansar is located on a flat upland. It is a cluster settlement having mainly agriculture-based income. After the improvement of road few retail shops have been established and people also started constructing cemented house in this area. From Bhansar a branch road moves towards Chundi, Ramgha, the birthplace of Bhanu Bhakta Acharya. There is a public high school and a boarding school.

**Ambote**

This is a small settlement. From here a trail goes towards Gorkha. There is one suspension bridge across river Marshyangdi.

**Khahare**

After the construction of the road few houses have been constructed in this area. Along Khahare the land is more irrigated. There are some spring sources of water.

**Chyambas**

This is a small cluster settlement having mainly agriculture-based income. This is an old settlement and after the construction of road few cemented houses have been constructed. Since it is located at high altitude mainly maize, upland paddy (Ghaiya), black grams are cultivated.

**Turture**

This is a Market settlement. This settlement caters the need of Palungtar of Gorkha district and some parts of Tanahu districts. Turture is having about 252 households most of them are engaged in trading business. The commercial activities of Turture were initiated around 1970, when some Newar businessmen of Gorkha came there and established their shops. The commercial activities at Turture have increased due to the location of the Pension Distribution Office of Indian Army. The pensions to the retired personnel of Indian Army of this area are distributed from this place twice a year.

**Bali Phant**

It is an agriculture-based small settlement having of irrigation facilities in this area. Generally paddy is grown in summer and wheat and oilseeds in winter. People of this area have started commercial cultivation of vegetables. This area has potentiality to be developed as a vegetable belt. The concerned agencies need to develop and brings a comprehensive package for this area.

**Bayis Jangar**

This is an old settlement and this settlement has widened after the construction of road. From here a branch road (gravelled) goes towards the western part of Tanahu. This centre also serves the settlements in the Eastern part of Lumjung viz.

Dhamilekuwa, Sainlitar, Alhatar, Bichaur, Borang etc. People of Lamjung and other part of Tanahu visiting to the hospital at Anppipal of Gorkha moves through this settlement. A police post is also located here.

### **Kalimati**

This is a completely new settlement developed only after the construction of DBR. A branch road (earthen) moves out towards West from Kalimati. People of this area have also started cultivating vegetables for commercial purposes. But they complained that they could not receive extension services from agriculture offices.

### **Paundi Dhik Pul**

This is also a small market centre bordering between Tanahu and Lamjung districts. From here, a gravelled road goes to Sunder bazaar where a Campus of the Institute of Agriculture and Animal Sciences is located. At Paundi Dhik Pul the DDC used to collect road toll but from 11 Magh 2056 (Jan 25, 2000) DDC has stopped the collection of road toll. The Chamber of Commerce also collects 10 paisa per Rs. 100 of rupees worth of goods. It raised about Rs. 300,000 during 1955/56. However, this year the tempo of collecting donation by the Chamber has slowed down.

### **Seunde Bar**

It is also a small market centre. People of this area have established a cinema hall, a boarding school and one public school. Besides, a 10 + 2 school and an Education Campus has also been established in this area. Many new RCC buildings have been built in this settlement. The residents of eastern Lamjung who work in British Army have built most of these houses. The office of the Middle Marshyangdi Hydropower project is also located here.

### **Bhotewadar**

It is an old settlement of Lamjung, but more houses have been built with the beginning of construction of the road. This market centre serves north-eastern part Lamjung. There are four boarding schools in Bhotewadar. A police check post is also located here.

### **Udipur**

It is an old settlement. Substantial changes have not occurred in Udipur after construction of road. Recently NEA has acquired land in Udipur to resettle the Project affected people of Phalega Sangu/ Dalal.

### **Phalega Sangu/Dalal**

This is also an old settlement. People use this area to go to north eastern part of Lamjung. The dam site of Middle Marshyangdi will be located in Phalega Sangu/Dalal. So the lower part of settlements will be shifted from here. A Sellar mill is also located here.

**Gairi**

This is a new settlement, where new cemented houses have been constructed after construction of road. A stone crusher is also located here.

**Bhakunde**

With the construction of road the settlement is growing at a faster rate. A high school is also located here. A rice and flourmill has been established in this area. A PCO is also located here.

**Besisahar**

Besisahar is a growing market cum administrative centre. It is the district headquarters of Lamjung district. First it acts as a service centre to the northern and eastern parts of Lamjung and Manang district as a whole, secondly it acts as the administrative service centre to extend governmental services to the district as a whole. Thirdly it is growing as a district level urban centre to provide various sorts of services to the people of Lamjung. The settlement is widening and high story buildings have been being constructed in this area. The new buildings are mostly RCC buildings. Land price is as high as 125,000 per Hath (1.5 feet) front faced, while along the inside road land costs from Rs. 15,000 to Rs. 30,000. There are few industries such as bakery, grill and shutter industries. Sweater is knitted widely within the market centre. It is also an educational centre where many schools and a college are located. A film hall is also located here.

**Khudi (Beyond Besisahar)**

This is located at about 5 km north from Besisahar and is connected by an earthen road. It is a new settlement, few cement buildings have been constructed here. This area has been growing as a market centre supplying goods to the northern part of the Lamjung and Manang district. Tourists visiting to ACCP region for trekking purposes go through this area, so a number of hotels have been developed in this area.

**3.6 GENERAL CHANGES THOROUGH DUMRE BESISAHAR ROAD**

The time line analyse of the road indicates that the survey work of Dumre- Besisahar road was initiated around 1968, when the construction Prithivi Rajmarg who initiated. The purpose of building this road was to connect the district headquarters of Lamjung. In the beginning this road was known as Bandipur - Dumre - Besisahar road. The district headquarters of Tanahu was shifted from Bandipur to Damauli (currently known as Byes Municipality) in 1968 (2025 B.S.). The construction of Kathmandu-Pokhara High- Way took approximately four years. With the operation of the Prithivi Highway, the constructions of works of Dumre Besisahar road were also accelerated. The construction of this road was initiated with complete people's participation in 1971. The road was undertaken by Department of Roads in the year 1977-78 only. From the FY 1986-87, this road became vehicular up to the Besisahar in fair weather. The construction of this road got momentum

only when the World Bank provided loan for the improvement of this road at black top level. Almost 450 million Nepalese rupees was spent through IDA loan, out of which NRs. 150 million was spent for blacktop and the remaining NRs 300 million for constructing the structure of the road and building bridges.

Before the completion of the metallic road the bus fare from Dumre to Besisahar per passenger used to be Rs. 70.00, now it is Rs. 29.00 to 32.00. The price of transporting 1 Kg. of goods used to be Rs. 0.6 to 0.7 rupee but now it has come down to Rs. 0.35.

The construction of permanent road, and bridges, has developed the feeling of stability among the residents of the influence area, consequently more investment has been made in the construction of RCC buildings in almost all the market centres lying along the road. With the initiation in the construction of Chundi bridge in 1993/94 residents of Dumre had initiated the construction of big RCC buildings. Even one mini-market centre has been constructed with the investment of local people. The construction of DBR has created specific infrastructure for the development of several branch roads. In 1987 the first vehicle was taken to Besisahar. It was the Jeep of the Cottage Industry Office of HMG/Nepal with the construction of the road the following activities were developed:

- Local workers are hired for the operation and maintenance of the road.
- Passenger transport has been increasing
- Prices of the imported products have become cheaper.
- Many perishable products like vegetables, potatoes are brought to the market centres.
- New products are not yet developed to be exported out side the influence area.
- Agriculture production has not changed substantially because of no change in the technique and pattern of cultivation.
- Land prices in the market centre along the road crossing have gone up more than 10times within last 10 years. Fertiliser and Input depots have not been developed leading to poor yield of crops.

The construction of DBR has opened up the whole Marshyangdi Valley, which comprises area of Tanahu, Lamjung and Gorkha Districts. This road has geared the economic activities in this area. But, still some bottleneck has existed due to non-availability of means to connect the area in Gorkha District by Moterable Bridge. So it is necessary to built a bridge in to connect Turture and Palungtar as soon as possible

This road has helped to create specific infrastructure for the creation of development Middle Marshyangdi Hydropower. Further it has opened other sites for the construction of hydropower dam by the private sector. Lamjung takes one of such initiative. Which is planning to channelize private sector investment in hydropower development in Ngadi Hydropower Project.

The construction of DBR has not only brought boon but also some curse. The opening of the rural areas have brought social perversions of urban areas such as crimes, alcohol consumption, prostitution (not open), accidents, pollution. The poor people are more taxed

because they could use their own labour to carry goods needed for their domestic consumption, now they have to pay for transportation. In addition some poor people who used to work as porter now do not have work because trucks transport goods (Annex 1).

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## Chapter 4: Environmental and Other Observation Record

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### 4.1 GENERAL

The road construction has important implication on the status of ecosystems related to broad spectrum of social, physical, chemical and biological environments. The present environment status of the road and the changed observed in the area due to the construction of the road are highly important for the future development planning in the area.

### 4.2 SOCIO-ECONOMICS, CULTURAL (Landuse and Human Settlement)

Besisahar has become an attention to migrate people from remote areas due to the following reasons:-

- Availability of high productive agricultural land;
- Increased access to markets for local produce and products;
- Headquarter of Lamjung district;
- Access to new employment opportunities;
- Better access to health care and other social services;
- Easy access from Prithivi Highway after upgrading the road;
- Business opportunities;
- Gaining popularity for permanent residency along the road corridor.

### 4.3 SURFACE WATER DRAINAGE MANAGEMENT

Discharge of large quantities of high velocity storm water and diversion of spring water come during the monsoon to natural drainage channels and gullies results in overloading of natural drainage capacity. Due to proper management of water drainage system, It is not visible; severe erosion, few gullies formation, few slope instability and sedimentation problems.

### 4.4 GEOLOGICAL (LAND SLIDE & SLOPE CONDITION (OUT/FILL) RETAINING STRUCTURE

Dumre –Besisahar road was constructed as an earthen/graveled road and was started to upgrade as black topped from 1995. Before upgrading there were no bridges and road come into operation as a fair weather road. The major stretch of the road has passed through steep slopes and has invited to some extend the land slide problems after the road construction. Major land slide problems were seen at Khurhure & near Dalal Bazaar and few

problematic landslide prone areas have been identified, should be properly protected. Problem of land slides and soil erosion have increased after the road construction referring

Loss of trees, vegetation, and topsoil, which promotes erosion and instability, has not been identified with an exception of few area which can be brought to control with due care.

#### **4.5 QUARRY SITE (SLIDE, DUST)**

Two numbers of quarry sites had been used at the time of upgrading. One quarry site was outside the road area. The quarry site was at 12-km east from Dumre, there is no any serious problem according to local people. But another quarry site is just along the roadside and is an active landslide. People are still getting material from this source. As said by the local people, this quarry site at Khurkhure did not have any problem earlier but now it is a serious problem and should be protected as soon as possible.

#### **4.6 WASTE DISPOSAL**

No any major/serious problems observed.

#### **4.7 VEHICULAR POLLUTION (AIR, SMOKE, NOISE)**

Dumre –Besisahar road was a graveled road before upgrading. Dust raised from the road and flown by vehicles especially during the dry season deteriorated the air quality of the road corridor. After the road has been black topped thus problems has been solved. It is clearly shown in Annex 1 that the noise and smoke from vehicles have been increased marginally due to the increase of the number of vehicles.

#### **4.8 BIOTIC –ENVIRONMENT**

Although the road corridor passes through cultivated and settlement areas, wildlife like tiger etc. are not seen and hence there is no problems of considerable impact.

#### **4.9 OTHER ENVIRONMENTAL ISSUES**

- 1) There was no any problem of labor camp location and management.
- 2) In most of the road projects, preparation of bitumen requires energy to emulsify it. Fuel wood is normally used for bitumen emulsification. This activity of work shall naturally induced to destroy forest resources, but this type of problem has not been seen.
- 3) Explosives and its management - Explosives had been used at the time of construction. There were not any serious problems on the storage and use of these materials even

having greater risks of fire and explosion hazard. Migration of these materials from spills and leaks to receiving water bodies could possess serious health threat to the users.

#### 4.10 PERCEPTION ON ENVIRONMENT

**Public:** - people have positive attitudes toward road. Road construction has made their life easier and has opened many opportunities to increase earning capacities. But people are little bit suspicious about things like accident and deforestation (due to easy access) may increase. Of course, pollution has increased to some extent in terms of noise, dustiness.

**DoR Division & other Officials:** - they have also positive views on most of the aspects towards the road construction. Dust pollution was much higher while it was a gravel road.

## CHAPTER 5: MAJOR FINDINGS ON EFFECTIVENESS OF INVESTMENT

Major findings of effectiveness of investment have been analysed considering the existing impact of the road and the possibilities for the development of new economic activities in the influence area of the road. Furthermore the analysis has been made on the basis of the potential resources base of the influence area of the road.

### 5.1 MAJOR DEVELOPMENT AND IMPACT DUE TO ROAD

The major development and impacts of the road have been analysed taking into consideration the impact of the road on different sectors of the economy. From this it has been tried to identify the benefits of the road to the people of the influence area. It has also been tried to assess the benefits accrued from the road. Followings are the major changes that took place after the construction of road in this area.

- With the construction of the road the farmers have shown interest in changing the pattern of cultivation. Initially the project area was involved in maintaining the life through people of the traditional farming. With the construction of the permanent black topped road now the farmers have started cultivating new varieties of cereal crops. Improved varieties of seeds are being used. The cultivation of fruits has been increasing significantly. The road has helped to increase the service delivery of the District Agriculture Development Offices. Due to the access of road, the farmers are showing interest vegetables cultivation. Cash Crops such as coffee and cardamom has been introduced in this area.
- The construction of all weather road has encouraged a large number of investors to invest in various means of transportation. Consequently investment in buses and trucks have been made. About 17 percent of sample household have invested in bicycle, 5 percent households invested in two-wheeler, 0.8 percent household invested in motor Jeep and about 1.7 percent households have invested in tractors/bus (Table 3.21).
- With the construction of black topped road the new employment opportunities have been created. The transportation related works have been created opportunities to work as drivers, cleaners, and mechanics. Automobile repair workshops have been established at different market centres along the road. The operation and maintenance workers are hired regularly by DBR office. Various kind of business activities have increased in this area.
- It has also opened up avenues for alternative economic opportunities for the people of this area. They have transformed their activities from traditional agriculture based economy to market based economic activities. This fact has been proved from the previous discussion about the increase in the number of households involved in business and industry, and decrease in agriculture sector.

- Along the road there are 17 market centres of various size from Dumre to Besisahar. The growth of these centres became possible only due to the construction of roads. The expansions of these market centres have been taking momentum after the improvement of this road. People have started constructing modern cemented buildings in this area. In addition the construction of gravelled road beyond Besisahar for about 5 km has also led to the growth of small market centres between Besisahar and Khudi. (Detail description of the market centres along DBR is presented in Section 3.6).
- The initiations of Middle Marsyangdi Hydro Electricity Project become possible due to the construction of this road. The construction of this road has contributed significantly in lowering the cost of this project. The completion of this project will significantly contribute in accelerating the growth and development of this region.
- Establishment of private boarding school, private higher secondary school and private campus in this area become possible only after the construction of the road. In the absence of the road these activities would not have taken place in this area.
- The construction of road has motivated people of this area to build pillar structured and cemented house. It gave them permanency in the settlement in this area. It has also helped in urbanisation in this area.
- The construction of road has led to development of new markets in this area. The transportation cost of the commodities has also come down. So the availability of all sorts of basic commodities become possible in this area. It has also contributed in easy access to the fertiliser and insecticides to the farmers.
- Increase in the number of hotels, restaurant and teashops are also outcome of the road. Due to increase in facilities to the tourist, the number of tourists has also increased in this area.
- The construction of road has significantly changed the living standard and life style and food habits of the people of this area. Substantial number of people has started using modern domestic amenities. People have started sending their children in good standard school for better education.
- The construction of road has influenced awareness of women and gender equality. Status of women has increased significantly. The tendency to send girl child in to the school increased significantly.

## 5.2 FUTURE POTENTIALITIES OF DEVELOPMENT

The permanent structure of the road has been completed very recently. It has not yet been able to bring substantial changers in the socio-economic life of the people of the project area. Even before improvement of road to black top level and the construction of bridges, the road had provided some services to the people but the service used to be intermittent and its quality used to be poor. The vehicle operating cost used to be very high. During the rainy season the road used to remain closed for some time. So the people of this area had to face inconveniences in their day to day life. The improvement of this road has solved these problems. People of this area are very enthusiastic for full utilisation of this road

through initiation of various economic activities in this area. After having intensive discussion with the local elite and government officials in FGD and field observation, following major development potentialities have been identified to utilise the road up to its optimum capacity.

### **5.2.1 Opportunities for the Commercialization of Agriculture**

The construction of the road along the valley of Marsyangdi has opened the fertile land of the valley and other upland. This has created environment for the commercialisation of agriculture along the immediate influence area. Commercial cultivation of horticultural products and vegetables can be started immediately. Department of Agriculture has to integrate the activities of the District Agriculture Offices of Tanahu and Lamjung to implement special agriculture development program along the DBR corridor.

The comparative advantages in commercial cultivation of herbs in this area should be explored. The initiative taken by Dabur Nepal in the cultivation of herbs in Lamjung needs to be expanded both by the line agencies of the government and the private sector. Besides, potentiality of commercial cultivation of coffee and cardamom in this area seems very high due to climatic condition and slop of land. So the concerned agency should develop necessary training and financial and technical packages to motivate the farmers of this area to cultivate these cash crops.

### **5.2.2 Opportunities for Industrial Development**

For the effective utilisation of the road the volume traffic flow must be increased. The increase in the traffic flow can be attained with the development of industries in the Valley. Considering the existing level of development and the capacity of the entrepreneurs of the area, there is high possibility of developing an industrial district in the border area of Tanahu and Lamjung. The establishment of light consumer goods industries and agro-based industries seems to be highly feasible in this area. Besides, there is possibility for some service industries to meet the requirements of the hinterland. So the concerned agency should take immediate initiation to conduct a feasibility to establish an industrial estate in this area. A joint venture of the government and the private sector can be an appropriate model for the establishment of the Industrial estate. The local level private sector is found to be eager in initiating new economic undertakings. The inflow of remittances from the residents of Lamjung and Tanahu could be transferred to these activities. It was observed during the field study that these people are seeking opportunities for investment. If the opportunities are available locally for productive investment these investors can be easily tapped.

### **5.2.3 Openings for Tourism Development**

The DBR corridor is an important approach road for the movement of the trekkers going to the Manang and Mustang from the eastern part of Annapurna Conservation Area Project (ACAP). It is estimated around 15 Thousand of tourist move along the corridor. The crux of

the matter is that there is the need for the retention of the tourists for more days along the corridor there by creating facilities needed for the tourists. The best way to attract the tourists would be to open resort type hotels, as along the Prithivi Highway, in the Marshyangdi valley. The climate and environment in this area is very suitable for opening resorts. Even the internal tourists and tourists from South Asian countries can be attracted. The second attracting factor will be to promote rafting along river Marsyangdi. But future of promoting rafting in this area is very low, as the construction dam for the hydropower project will create hindrance for the rafting.

#### **5.2.4 Development of Mountaineering School**

Mountaineering is being developed in Nepal. Many Nepalese have started scaling tall Himalayan peaks. This has encouraged Nepalese youths to opt mountaineering as a sport. There is need for the establishment of a mountaineering school in accessible parts of the country and the area should be close to the high mountains lying in the leeward side of the Himalayas. The appropriate place for the establishment of a mountaineering school with a good museum would be in the areas north of Basisahar, which is approachable by road, and this area will be near to Manang where the students and the trainees can do practice of climbing high mountains. This would add a new dimension in the economic activities in the influence area of DBR. Establishment of mountaineering school in this area can attract number of students from Asian countries as well as European countries.

#### **5.2.5 Development of Livestock**

If the commercialisation of agriculture of the Marsyangdi valley were promoted with the development of livestock it would be more beneficial. The experiences of Ilam district have revealed that the cultivation of vegetables and other cash crops led to the development of fodder trees that led for the promotion of livestock. Ilam produces substantial amount of milk and export to various districts of Tarai. At present some poultry farms are established in the corridor at DBR to meet local demand for meat and eggs. But cattle rearing are not well promoted in both the districts. In livestock, part of the Marshyangdi valley lying within Tanahu district is better developed than the part of the valley lying in Lamjung district. Livestock development would be another area for the effective utilisation of the fund invested for the construction of DBR.

### **5.3 LOCAL RESOURCES UTILIZATION**

#### **5.3.1 Use of Local Savings**

There is a strong tradition among the males of Lamjung and Tanahu to work in foreign countries. A large number of them had worked in Gorkha army of Britain and India and still many are working in foreign armies. With the openings of markets of Arabian countries for foreign labour Nepalese have also entered in large labour numbers in Arabian countries. Some are also working in Japan, Korea, Malaysia and Singapore. While some others are in the developed countries viz. Australia, Britain, Germany, United States etc. Those who can

not go to the third countries migrate out into India to work in business houses, in plantation farms and as workers in construction projects. These people are sending large amount of money for their family and for investing within the country. From Turture Pension Distribution Office of Tanahu alone about Rs.320 million worth of pension is distributed. During the FGD sessions many participants have reported that people serving in foreign countries have bought and are buying land in the urban centres lying between Dumre and Besishar road and have constructed and have been constructing many new cemented houses. These facts have indicated that the people of the influence area have large amount of financial resources that can be used for productive investment.

### **5.3.2 Use of Natural Resources**

The important natural resources of the influence area are; climatic variation, flat land of the valley, water of river Marsyangdi. These natural resources can be properly utilised with the cultivation of high value crops. The availability of diversified climate has also created specific atmosphere for the cultivation of horticultural crops. The flat land can be effectively utilised for the location of industry. The availability of water along the valley has enhanced the resources endowment of the area.

### **5.3.3 Utilization of the Local Entrepreneurship**

In the promotion of modern economic activities there is the need for active entrepreneur class. Along the market centres there are traditional and new groups of traders who can act as the catalyst for the development of industries and new form of business activities. The Chamber of Commerce of both the districts are active and a unit of the Chamber is being created in almost all the large market centres along the road. This also indicates the concern of the businessmen to utilise the local entrepreneurship for the utilisation of the road up to its optimum capacity. The FGD conducted at four market centres have also shown that the businessmen of the project are very much concerned in the optimum utilisation of the road.

### **5.3.4 Raising of Revenue for O&M**

The operation and maintenance of the road should get due priority to utilise it effectively. In this regard it would be appropriate to collect toll from the vehicles. The toll fund should be separately kept and should not be sent to the general revenue of the government. The fund from the toll should be utilised for the regular operation and maintenance of the road. This will utilise the road judiciously and the maintenance and operation can be done at low cost. In order to make sustainability of the operation and maintenance of the road the local community should be involved in this activity. The total involvement of the community should be made within five years period. In the first year the community should share 10% of the O&M cost, in the second year next 15%, in the third year next 20%, in the fourth year next 25% and in the fifth year next 30 %. In this way by the end of the five-year the community can take the total responsibility for the operation and maintenance of the road. National

Planning Commission can take up this road as a case for the hand over of the O&M management to the community.

### **5.3.5 Using of the Income User Charges in Tourism**

There is no clarity on the purpose of user charges in the tourism. This amount has not been utilised for the environmental mitigation and development of local area. There is no clear policy on type of beneficiary of such user charges. So all possible sources of user charges in tourism should be tapped and these revenues should be utilised for environment management and development of impact area. Hence, certain portion of the revenue raised from tourist visiting in ACAP area should be utilised in operation and maintenance of DBR.

## **5.4 LESSONS LEARNED**

The construction of DBR has provided various types of lessons to the planners, policy makers and the implementers of the road development program. The consultants have recorded the following major lessons:

### **5.4.1 Stability in Investment with Black Topped Road**

The FGD indicated that the construction of the permanent all-weather road has led people to build big and tall cemented buildings. New economic activities have been created in the market centres. In-migration of people from the rural areas to the urban centres has been taking place. The people along the market centres lying between Dumre and Basisahar have been building many new cemented residential buildings. It has increased the permanency in settlement of the people in this area.

### **5.4.2 Small Amount of Fund Allocation for Long Time is Ineffective**

Prior to the mobilisation of World Bank loan the construction activity of the road was funded with the fund of HMG/ Nepal. The dynamics of expenditure in the project presented in Table 2.1 indicate that the allocation made in small quantity in a road project do not bring effective results. The benefits reaped from the investment done in the last six seven years are found to be effective than the investment made for 22 years. This road could have completed one and half decade ago, but allocation of small amount of budget by HMG/N led to delay in the completion. The people of this area lagged behind by more than a decade.

### **5.4.3 A Comprehensive Development Program of Investment in Road for Its Effective Utilization**

The economic opportunities created with the construction of DBR could be exploited effectively if complementary economic activities were created simultaneously during the last phase of construction work. A co-ordinated effort of all the line agencies of the government was not initiated. Consequently new economic activities could not be initiated even after the

completion of the road. It has realised that if a comprehensive program for the increase in the production of agricultural and industrial products is not formulated and implemented the road can not be effectively utilised. Hence this road has also provided an important lesson that the work of the line agencies need to be co-ordinated to implement a comprehensive program when the construction of the road is completed.

#### **5.4.4 Involvement of the Local Community in Operation and Maintenance of the Road**

The operation and maintenance of the road is the major task where the government is incurring large amount of financial resources every year. Still the allocated money will not be adequate to maintain properly the road. In order to protect the road and to collect money from the users of the road it would be wise to involve the community in the management of the regular operation and maintenance work.

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## CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

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### 6.1 RECOMMENDATIONS

The construction of Dumre-Besisahar Road is a major infrastructure development in this area, which has opened up number of opportunities for the economic development of this area. But still the opportunities provided by this road have not been exploited effectively. There are a lot of unexplored areas of activities, which significantly contribute in the development of this area. So in order to translate these opportunities in accelerated economic growth, a set of recommendations made on the basis of the study.

#### Recommendation for Immediate Action:

- The encroachment of the right way of the DBR by the local resident in almost all the settlements along the roadside could be a serious problem in near future. It could be a hindrance for the expansion of this road. So the concerned line agency should tackle this problem as soon as possible.
- To improve the environmental condition and stability of the road, trees need to be planted along the road.
- Due to the climatic condition of this area, there is high potentiality for the commercial cultivation of different kind of high value added herb, coffee and cardamom. So the concerned line agencies should introduce a package to motivate farmers in this area as soon as possible.
- The area covered by Dumre - Besisahar Road, its extension towards north and its newly built branches have really opened the Marshyangdi valley for the installation of new economic activities. Still the local people have not been able to explore and exploit the opportunities available. So the various services provided by concerned line agencies, local government institutions and CBOs should be co-ordinated to develop a integrated plan for the optimum utilisation of available resources.
- It is necessary to think about the sustainable operation and maintenance of the road as soon as possible. Because this has become a big problem in every completed road in Nepal. For the sustainability of operation and maintenance of the road, concerned agency and NPC should consider involving local community in this activity. The local community should not be given full responsibility immediately, rather the responsibility should be handed over phase wisely within five years so that they could get time to develop their capability.
- Another important element that needs to be introduced is the promotion of entrepreneurship. Transforming farmers into entrepreneur is really a difficult work. The farmers will have to work mostly during the sowing and harvesting seasons, while and entrepreneur perusing any business activities related with agricultural or non-agricultural

activities will have to work all through out the year. In addition they will have to bear the shocks of the market. Due to lack of program for due promotion of entrepreneurship program in the area, the Indian immigrants have been operating new income generating activities such as teashop, meal shops, vegetables shops, repair and maintenance shops.

### **Recommendation for Medium-term Action:**

- The planning to use whole Marshyangdi Valley will be incomplete if its major part lying in Gorkha District is left untouched. That area seems isolated due to absence of connection from DBR. So at least one bridge Turture and Palungtar to connect this area should be constructed as soon as possible.
- Most of the youth migrated in foreign countries for employment lack necessary technical skills. They have been engaged there as unskilled labour at cheap wages. So a vocational training institute should be established in this area to train the youths.
- The local people working in local government institution found to be very enthusiastic for the development of this area, but their capability to work is very low. So the concerned agencies should launched an urgent programme to enhance their capability.
- Most of the big landowner of this area fear to give their land for cultivation on rent, rather they prefer to keep their land barren. Most of these landowner has shifted their occupation from agriculture to market based economic activities. But those who are in agriculture profession and want to cultivate vegetables, herbs and other cash crop can not get land in rent. This has become major problem in the agriculture sector of most of the hilly region of Nepal. So the concerned agency should take immediate action to bring new Act about provision of leasing the land by the landowners.

### **Recommendation for Long-term Action:**

- Marshyangdi River Valley Integrated Agriculture Development Program (MRVIADP) should be launched where road led agricultural horticultural and livestock development action plan is to be developed. This initiative is to be taken by the Ministry of Agriculture that needs to be supported by other line ministries. The implementation of the MVIADP is to be done by creating an authority. The authority should not create its own paraphernalia but should work with the local organisation of the government private sector and non-governmental organisations. The valley development approach would be a new method of intervention to gear up production and increase productivity.
- After the development of commercial cultivation of agriculture products, the development of livestock farming can be enhanced in this area. Because the development of agriculture cultivation leads to availability of fodder trees and grass which can lead to the development of livestock farming. So the development of hybrid livestock farming can be possible in this area in future. But the concerned agencies need to bring a package of training and technical cum financial assistance to motivate farmers.

- After the completion of Middle Marshyangdi Hydro Project, establishment of an Industrial Estate at Paudi Dhik area, which is boarder between Tanahu and Lamjung, could be feasible. Small and medium size industries seem to be viable to be located within the industrial estate, which can be named as Marshyangdi Industrial Estate. This will lead to the development of economic activities in other parts of the valley.
- There is high potentiality for the establishment of mountaineering school in this area. This can attract a number of sport tourists in this area. In this case, the example of mountaineering school in Darjeeling of India can be a model. Private sector can be motivated in this area.
- There is good potentiality for the opening of resort hotel in the Marshyangdi Valley as along the Prithibi Highway. The area is very suitable to attract tourists to spend their vacations. The internal tourists and tourists from South Asian Countries can be probable clients for this area.

## **6.2 CONCLUSION**

The construction of DBR has opened up new avenue of the economic opportunities along the Marsyangdi Valley. The people of this area have waited a long time for the completion of this road. This road has pushed up the expectation and changed the attitude of the people who dream all round development of the area. It has been found that the residents of this area are very active and motivated to bring and adopt new changes. The construction of this road has led to significant positive social changes. People's awareness about health, education and status of women is very noteworthy.

This road became fair weather vehicular a decade ago, the improvement of this road has been completed just a year ago. So the people of this area have not enjoyed the benefits of this road completely. But the construction of road only is not enough to for the sustainable economic development in this area. It may rather bring a lot of negative activities in the society. So it is necessary to bring a comprehensive packages for enhancing economic activities along with the construction of road. The activities of concerned agencies providing services in this area must be co-ordinated for effective utilisation of the available resources and integrated development. The findings of this study and recommendations made can help in long way in setting up development priorities and approaches.

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**ANNEX**

**Annex 1 - Socio-economic and Environment  
Situation**

## ANNEX -1

Socio-economic and environment situation before and after the road facility from Dumre to Besisahar Road										
Socio-cultural changes	Before					After				
	High	Medi	Low	Negl	Score	High	Medi	Low	Negl	Score
1. Schooling of girls	7.56	8.40	77.31	6.72	258	67.23	30.25	2.52	0.00	434
2. Child marriage	16.81	29.41	43.70	10.08	301	0.84	2.52	17.65	78.99	149
3. Better status of women	0.84	15.13	56.30	27.73	225	33.61	54.62	11.76	0.00	383
4. ANC/PNC	0.00	10.92	36.13	52.94	188	4.20	57.98	30.25	7.56	308
5. Delivery of child in health post/hospital	1.68	10.92	50.42	36.97	211	31.09	44.54	23.53	0.84	364
6. Immunization to all children	1.68	16.81	63.03	18.49	240	62.18	30.25	7.56	0.00	422
7. Knowledge about MCH	1.68	10.08	21.85	66.39	175	16.81	27.73	47.90	7.56	302
8. Use of contraception for birth spacing	0.84	13.45	33.61	52.10	194	7.56	61.34	29.41	1.68	327
9. Sterilization after having desired number of children	2.52	21.01	52.10	24.37	240	15.13	72.27	11.76	0.84	359
10. Small family size	1.68	12.61	50.42	35.29	215	22.69	65.55	10.92	0.84	369
11. MMR	34.45	47.90	8.40	9.24	366	0.00	31.09	48.74	20.17	251
12. IMR	26.05	51.26	14.29	8.40	351	2.52	34.45	41.18	21.85	259
13. Decision power to women in:					0					0
1. Establishing business industry	3.36	10.08	21.85	64.71	181	25.21	52.10	22.69	0.00	360
2. Sell of product assets	3.36	10.08	36.13	50.42	198	18.49	56.30	24.37	0.84	348
3. Casting vote	2.52	12.61	63.87	21.01	234	77.31	21.01	0.00	1.68	445
4. Involving women in income generating activities	3.36	16.81	36.97	42.86	215	36.97	48.74	14.29	0.00	384
5. Community forest	0.00	3.36	28.57	68.07	161	52.10	37.82	10.08	0.00	407
14. New economic opportunities	5.04	16.81	58.82	19.33	247	32.77	57.98	9.24	0.00	385
15. Unemployment	3.36	9.24	48.74	38.66	211	46.22	38.66	15.13	0.00	394
16. Agricultural products & productivity	12.61	40.34	45.38	1.68	314	12.61	45.38	36.97	5.04	316
17. Livestock farming	47.06	35.29	12.61	5.04	386	5.88	19.33	50.42	24.37	246
18. Vegetable farming	10.08	26.89	46.22	16.81	274	26.05	43.70	18.49	11.76	338
19. Business volume	0.00	21.01	39.50	39.50	216	34.45	53.78	10.08	1.68	382
20. Industries	0.00	1.68	26.05	72.27	154	4.20	18.49	31.93	45.38	216
21. Use of fertilizer	5.04	15.13	44.54	35.29	226	48.74	36.97	10.08	4.20	393
22. Use of improved seed	3.36	9.24	42.86	44.54	204	49.58	42.02	7.56	0.84	405
23. Use of insecticides	2.52	24.37	27.73	45.38	219	31.93	45.38	18.49	4.20	363
24. Electrification	8.40	4.20	7.55	79.83	168	83.19	15.97	0.84	0.00	455

## ANNEX -1

Socio-economic and environment situation before and after the road facility from Dumre to Besisahar Road										
25. Price of land	7.56	7.56	45.38	39.50	218	76.47	21.01	2.52	0.00	445
26. Social deterioration like prostitution, drug addicts	0.84	6.72	36.97	55.46	182	6.72	37.82	42.02	13.45	283
27. Crime rate	0.00	2.52	42.02	55.46	175	5.04	35.29	50.42	9.24	281
28. Market price of essential commodities	1.68	20.17	68.91	9.24	255	20.17	55.46	23.53	0.84	351
29. Disputes among higher caste and lower caste	4.20	36.97	41.18	17.65	271	0.84	22.69	43.70	32.77	228
30. Availability of domestic amenities like radio, cycles, iron, home appliance heater, stove, presser cooker	8.40	3.36	35.29	52.94	199	90.76	8.40	0.84	0.00	464
31. Cinema, video, TV	5.88	6.72	21.01	66.39	181	52.94	32.77	14.29	0.00	403
32. Number of foreign tourist	16.81	32.77	41.18	9.24	306	25.21	44.54	19.33	10.92	338
33. Hotels/ lodges and restaurant (tourist standard)	1.68	43.70	48.74	5.88	287	18.49	42.86	31.93	6.72	325
34. Jobs in tourism for local people	5.88	26.05	42.02	26.05	252	5.04	34.45	36.13	24.37	262
35. Living standard of local people	2.52	14.29	47.90	35.29	219	27.73	66.39	5.88	0.00	383
36. Skill development opportunities	0.84	10.08	42.02	47.06	196	21.01	68.91	10.08	0.00	370
37. Environment problems and changes:					0					0
1. Noise problem - could not sleep well	0.00	0.00	36.97	63.03	163	6.72	27.73	46.22	19.33	264
2. Air pollution (smoke)	0.00	0.00	26.89	73.11	151	3.36	41.18	33.61	21.85	269
3. Dust Pollution	4.20	5.04	31.09	59.66	183	7.56	43.70	26.89	21.85	282
4. Respiratory diseases	0.00	7.56	37.82	54.62	182	3.36	29.41	43.70	23.53	253
5. Increasing congestion in the area	0.00	9.24	35.29	55.46	183	19.33	49.58	21.01	10.08	331
6. Destroyed agricultural land	1.68	8.40	33.61	56.30	185	12.61	57.14	30.25	0.00	336
7. Destroyed forest	1.68	15.13	51.26	31.93	222	10.08	50.42	36.13	3.36	318
8. Depletion of flora & fauna	0.84	8.40	37.82	52.94	187	10.08	49.58	27.73	12.61	306
9. Destroyed scenic beauty of the area	0.00	1.68	67.23	31.09	203	5.88	43.70	42.86	7.56	295
10. Loss of historical/cultural items	0.00	3.36	66.39	30.25	206	4.20	25.21	60.50	10.08	266
11. Preservation of historical and cultural monuments	1.68	26.05	63.87	8.40	263	10.92	53.78	27.73	7.56	319
12. Encroachment of land	0.84	19.33	42.02	37.82	218	2.52	50.42	43.70	3.36	300
13. Soil erosion	0.00	11.76	61.34	26.89	220	1.68	47.06	45.38	5.88	291
14. Land slides	0.00	15.13	46.22	38.66	210	10.08	55.46	24.37	10.08	316
15. Disposing garbage in open space	5.88	11.76	36.13	46.22	211	5.88	35.29	56.30	2.52	291
16. Defecation in open place	6.72	21.01	42.86	29.41	244	1.68	52.94	41.18	4.20	300
17. Problems of dispersed and unplanned settlements	0.00	9.24	44.54	46.22	194	25.21	42.02	30.25	2.52	345

**Annex 2- Guideline on Project Indicators**

**Annex - 2**

## **Guidelines on Project Indicator**

### **1. Based on Location**

- Land use pattern including agricultural land forest
- Land productivity
- Land ownership and value
- Environment of the precious ecology in the area and availability of the natural resources along the road and it's vicinity
- Major development activities along the road alignment and its' vicinity
- Road quarries, management of excavation of materials and general aesthetics
- Development cost, environment preservation cost and prospect of cost recovery.

### **2. Road Indicators**

- General conditions of the road alignment
- General pavement and shoulder conditions
- Protection works, slope stabilization techniques including bio-engineering and gabion works
- Major bridges
- Other cross drainage works like culverts, causeways and drainage outlets
- Land slide
- Repair and maintenance

### **3. Based on People's Participation**

- Participation in preservation
- NGO participation
- Participation in environment preservation and maintenance

### **4. Based on Socio-economic, Culture and Religion**

- Demographic structure (age, sex, household size, family size etc.)
- Socio-cultural variable (religion, ethnicity, socio-cultural status and beliefs, education and gender issues)
- Health (health facilities, consciousness, accessibility of health services, family planning, sanitation, drinking water and it's services)
- Economic variables (type of occupations, side occupation, income and expenditure, dependency ratio, dependency ratio, farming practices and other economic activities)

Annex - 2

**5. Based on Project Benefits**

- Access, saving in the cost and time of transportation and ease in the transportation of goods to and from the influence area.
- Road side development including market centers and industries
- Changes in the agricultural practices due to ease in transportation of the products and availability of fertilizers and other agricultural inputs
- Extension of the physical amenities in terms of health care, education and recreational facilities
- Enhancement of the land value and changes in the land use pattern
- Generation of the employment opportunities
- Saving in the vehicle operation and maintenance cost
- Saving in travel time
- Sustainability of the road side development

# Annex 3- Questionnaire (Household Survey)

## Questionnaire

(All responses will be kept strictly confidential and will be used only for research purpose)

1. Name the house hold head: \_\_\_\_\_ Name of the Respondent: \_\_\_\_\_
2. Age of h/h: \_\_\_\_\_
3. Existing occupation: \_\_\_\_\_ Previous occupation: \_\_\_\_\_
4. VDC: \_\_\_\_\_
5. Ward No.: \_\_\_\_\_
6. Type of family:    1. Nuclear                      2. Extended
7. Size of family: \_\_\_\_\_

Age	Illiterate		Literate		Primary		Secondary		Secondary Plus (SLC)		Total	
	M	F	M	F	M	F	M	F	M	F	M	F
0 - 5												
6 - 14												
15 - 59												
60 +												

Age	Agriculture & Livestock farming		Business		Industry		Labour		Service		Total	
	M	F	M	F	M	F	M	F	M	F	M	F
10 - 14												
15 - 59												
60 +												

8. Are you a residence of this region before  after  the construction of road?
9. If after, from where and when have you migrated?
1. Area: \_\_\_\_\_
2. Year: \_\_\_\_\_

## Annex - 3

10. What is the main reason for migrating to the present locality?

1. Easy accessibility to schooling children
2. Better accessibility to health service
3. Better economic benefits/activities
4. Time and cost saving in traveling and business
5. Other, please specify .....

11. Please state your economic activities, which generates your family income.

Before	After

12. What you added after road construction?

Details	Changes	If changes Yes otherwise No
A. Physical facilities		
1. House	1. From straw roof to	
	2. From slat roof to zinc roof	
	3. From clay house to brick house	
	4. From brick house to concrete house	
2. Shop in premises	1. Own shop	
	2. Shop in rent	
	3. No shop	
3. Purchase of land		
4. Vehicle (No)	1. Cycle	
	2. Tractor	
	3. Motor cycle / Scooter	
	4. Motor / Jeep	
	5. Truck / Bus	
5. Industry		

13. What is your family's monthly expenses in the following items?

Items	Before	After
1. Food		
2. Education		
3. Transport		

## Annex - 3

4. Festivals		
5. Cloth/ Wearing		
6. Building Maintenance		
7. Utilities		
8. Others .....		

14. How do you meet your family expenses maintain their share in percentage?

1. Agriculture:
2. Business:
3. Services:
4. Others:

15. What domestic amenities you have added after the road construction?

Particulars	At Present	
	Yes	No
1. T.V.		
2. VCR		
3. Radio		
4. Electricity		
5. Television		
6. Private Tap		
7. Iron		
8. Pressure cooker		
9. Rice Cooker		
10. Refrigerator		
11. Fan		
12. Heater		
13. Others .....		

16. Do you have toilet at present?

1. In the Past:            1. Yes                            2. No
2. At Present:            1. Yes                            2. No

17. Where children go for defecation?

Details	In the Past	At Present
1. Open space		
2. Toilet		
3. Pit latrine		
4. Other specify .....		

## Annex - 3

18. Use of:

Details	Past		Now	
	Yes	No	Yes	No
1. Use of dehydration powder during the diarrhea	1	2	1	2
2. Use of safe drinking water	1	2	1	2
3. Improved seeds for agriculture	1	2	1	2
4. Fertilizer	1	2	1	2
5. Insecticides	1	2	1	2
6. Sending school to daughters	1	2	1	2
7. Others	1	2	1	2

19. Have you changed the pattern of cultivation after the construction of road? If so what crops you have introduced?

20. Do you have kitchen garden?

1. Before:                      1. Yes              2. No  
2. After:                      1. Yes              2. No

21. What do you usually produce?

1. Before:  
1. After:

22. Do you have livestock rearing?

1. Before:                      1. Yes              2. No  
2. After:                      1. Yes              2. No

23. If yes, please mention the stock.

Livestock	Before (in number)	Now (in number)
1. Oxen		
2. Cow		
3. Buffalo		
4. Goat		
5. Chicken		
6. Sheep		
7. Duck		
8. Pig		
9. Others		

## Annex - 3

24. Do you sell:

Details	Before		Market	After		Market
	Yes	No	If Yes,	Yes	No	If Yes,
1. Milk						
2. He/she buffalo						
3. He/she Goat						
4. Chicken						
5. Eggs						
6. Pig						
7. Paddy						
8. Wheat						
9. Maize						
10. Millet						
11. Potato						
12. Lentil						
13. Soybean						
14. Vegetables						
15. Others						

CodeMarket: 1. Local (Adjourning market) 2. Outside (using mean of transport)

25. If you have food insufficiency, how do you manage?

Details	Before	After
1. Alternative jobs or work like ....		
2. Loan		
3.		
4.		

26. What is the food sufficiency duration of your family?

Duration	Before	After
1. More than 12 months		
2. Up to 12 months		
3. Up to 9 months		
4. Up to 6 months		
5. Up to 3 months		

## Annex - 3

27. Your treatment place:

Places	Before	How long does it take	After	How long does it take
1. Hospital				
2. Health Post				
3. Sub-health Post				
4. Private Clinic				
5. Nursing Home				
6. Traditional Faith Healer				

28. What basic changes do you perceive in socio-economic and environment situation before and after the road facility from Dumre to Besisahar?

Socio-cultural changes	Before				Now			
	High	Medi	Low	Negl	High	Medi	Low	Negl
1. Schooling of girls	1	2	3	4	1	2	3	4
2. Child marriage	1	2	3	4	1	2	3	4
3. Better status of women	1	2	3	4	1	2	3	4
4. ANC/PNC	1	2	3	4	1	2	3	4
5. Delivery of child in health post/hospital	1	2	3	4	1	2	3	4
6. Immunization to all children	1	2	3	4	1	2	3	4
7. Knowledge about MCH	1	2	3	4	1	2	3	4
8. Use of contraception for birth spacing	1	2	3	4	1	2	3	4
9. Sterilization after having desired number of children	1	2	3	4	1	2	3	4
10. Small family size	1	2	3	4	1	2	3	4
11. MMR	1	2	3	4	1	2	3	4
12. IMR	1	2	3	4	1	2	3	4
13. Decision power to women in:	1	2	3	4	1	2	3	4
1. Establishing business industry	1	2	3	4	1	2	3	4
2. Sell of product assets	1	2	3	4	1	2	3	4
3. Casting vote	1	2	3	4	1	2	3	4
4. Involving women in income generating activities	1	2	3	4	1	2	3	4
5. Community forest	1	2	3	4	1	2	3	4
14. New economic opportunities	1	2	3	4	1	2	3	4
15. Unemployment	1	2	3	4	1	2	3	4
16. Agricultural products &	1	2	3	4	1	2	3	4

## Annex - 3

productivity								
17. Livestock farming	1	2	3	4	1	2	3	4
18. Vegetable farming	1	2	3	4	1	2	3	4
19. Business volume	1	2	3	4	1	2	3	4
20. Industries	1	2	3	4	1	2	3	4
21. Use of fertilizer	1	2	3	4	1	2	3	4
22. Use of improved seed	1	2	3	4	1	2	3	4
23. Use of insecticides	1	2	3	4	1	2	3	4
24. Electrification	1	2	3	4	1	2	3	4
25. Price of land	1	2	3	4	1	2	3	4
26. Social deterioration like prostitution, drug addicts	1	2	3	4	1	2	3	4
27. Crime rate	1	2	3	4	1	2	3	4
28. Market price of essential commodities	1	2	3	4	1	2	3	4
29. Disputes among higher caste and lower caste	1	2	3	4	1	2	3	4
30. Availability of domestic amenities like radio, cycles, iron, home appliance heater, stove, presser cooker	1	2	3	4	1	2	3	4
31. Cinema, video, T.V.	1	2	3	4	1	2	3	4
32. Number of foreign tourist	1	2	3	4	1	2	3	4
33. Hotels/ lodges and restaurant (tourist standard)	1	2	3	4	1	2	3	4
34. Jobs in tourism for local people	1	2	3	4	1	2	3	4
35. Living standard of local people	1	2	3	4	1	2	3	4
36. Skill development opportunities	1	2	3	4	1	2	3	4
37. Environment problems and changes:	1	2	3	4	1	2	3	4
1. Noise problem - could not sleep well	1	2	3	4	1	2	3	4
2. Air pollution (smoke)	1	2	3	4	1	2	3	4
3. Dust Pollution	1	2	3	4	1	2	3	4
4. Respiratory diseases	1	2	3	4	1	2	3	4
5. Increasing congestion in the area	1	2	3	4	1	2	3	4
6. Destroyed agricultural land	1	2	3	4	1	2	3	4
7. Destroyed forest	1	2	3	4	1	2	3	4
8. Depletion of flora & fauna	1	2	3	4	1	2	3	4

## Annex - 3

9. Destroyed scenic beauty of the area	1	2	3	4	1	2	3	4
10. Loss of historical/cultural items	1	2	3	4	1	2	3	4
11. Preservation of historical and cultural monuments	1	2	3	4	1	2	3	4
12. Encroachment of land	1	2	3	4	1	2	3	4
13. Soil erosion	1	2	3	4	1	2	3	4
14. Land slides	1	2	3	4	1	2	3	4
15. Disposing garbage in open space	1	2	3	4	1	2	3	4
16. Defecation in open place	1	2	3	4	1	2	3	4
17. Problems of dispersed and unplanned settlements	1	2	3	4	1	2	3	4

29. What are the major problems of the area, at present? Please state them priority wise.

30. In your opinion, what economic and development activities could be more beneficial to flourish in your area? What is the reason for suggesting them?

<b>Suggested Potential Economic Activities Suggestion</b>	<b>Reason</b>	<b>for</b>
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31. What will be the extent of community participation in the area?

## **Annex 4 - Focus Group Discussion Guidelines**

## Annex - 4

**Focus Group Discussion (FGD) Guidelines**

1. Welcome
  - 1.1 Welcome to the participant with "Namaste" with introduction of moderator/note taker.
  - 1.2 Briefing about the objectives of the study.
  - 1.3 Getting the introduction of all participants.
  - 1.4 Tentative time: One hour
2. Issues
  - 2.1 What major change did you perceive from the road?

Issues	Before	After
<b>Demograph</b>		
1. Family size		
2. Out migration of people		
3. In migration of people		
<b>Social</b>		
4. Child marriage, multi-wives marriage with consent.		
5. Equal treatment to son and daughter.		
6. Use of alcohol		
7. Community development program		
8. Changes food habits		
9. Accessibility to health/education		
10. Arrival of NGOs, development programs		
11. Amusement		
12. People's participation		
13. Conflict among ethnic group		
14. Prostitution		
15. Gambling		
16. Preservation of historical cultural monuments		
<b>Health and Sanitation</b>		
17. ANC/PNC		
18. Immunization/MCH		
19. Use of contraception, sterilization		
20. Delivery of child in household		
21. IMR, MMR		
22. Disposal of water		
23. Drainage		
<b>Status of Woman/Gender</b>		
24. Schooling daughter.		
25. Women literacy		

## Annex - 4

26. Helping & supporting women in domestic work (child care)		
27. Women's decision role		
<b>Economics</b>		
28. Changes in occupation structure		
29. Enhanced living standard		
30. Market extension & development		
31. New economic venture, high employment opportunities		
32. Business volume		
33. Changes income		
34. Changes expenditure		
35. Changes domestics amenities		
36. Changes property acquisition/dispose		
37. Agricultural pattern, cropping, land use, productivity		
38. Use of improved seeds, fertilizer, insecticides		
39. Livestock farming vegetables farming		
40. Irrigation / water supply		
41. Increase/decrease in industries		
42. Travel time		
43. Cost of production, carrying cost, intransit loss/damages		
44. Land price change in percentage		
45. Communication-fax, telephone, postal service		
46. Banking service & credit facilities		
47. Increase in market price of essential commodities		
48. Electrification		
49. Tourism development (tourist number, lodge/hotel, restaurant & based industries) and cooperation		
50. Dried up old market and developed new market		
51. Loss of agriculture land		
52. Loss of economic opportunities		
53. Unemployment		
54. Change in the composition of export		
55. Change in the composition of import		
<b>Environment</b>		
56. Distance of forest		

## Annex - 4

57. Cleanness of area		
58. Noise and vibration ,sounds of sleep		
59. Vehicle emission, dusts and diseases- such as respiration, eye, hearth		
60. Depletion of flora and fauna		
61. Deforestation/reforestation		
62. Encroachment of land/forest		
63. Land slide		
64. If there are any other changes, please specify		

3. What are the pros and cons, strengths and weakness, opportunities and threats of the road in the development of the area?
4. What economic and development activities in the area are noticed with the arrival of road:
5. What are the existing major problems of the areas?
6. What could be the best potential economic activities, which can be developed in the area?
7. How they should be explored & promoted?
8. How development activities can be sustained?
9. Community participation, sufficiency of indigenous resources, contribution which can be expected from people.
10. How has the road helped in alleviating poverty in the influence area?
  - During the construction phase
  - Post construction phase
11. Impacts on environment due to the construction of road?
  - Positive impact
  - Negative impact

## 12. Conclusion

Thank you for your participation and giving your valuable time, idea and suggestion to make this study more meaningful and success.

**Annex 5 - List of Key Informants**

## Annex - 5

## List of Other Informant Contacted

S.N.	Name	Designation and Address
1.	Chiz Kumar Piya	- Former President, Chamber of Commerce, Besisahar
2.	Prem Shrestha	- Hoteler, Besisahar
3.	Ram Prasad Ghale	- Herb collector
4.	Durga Prasad Dawadi	- District Agriculture Officer, Tanahu
5.	Purna Chandra Bhattra	- LDO, Tanahu
6.	Rishi Bhakta Wagle	- Program Officer DDC, Tanahu
7.	Bishwa Bahadur Adhikari	- Chairman DDC, Tanahu
8.	Prem Poudyal	- Engineer Road, Tanahu
9.	Bhagwan Upreti	- Account Officer, Road Office
10.	Ashok Shrestha	- President , Chamber of Commerce, Damauli
11.	Lal Bahadur Thapa	- Ward member, Byas Municipality
12.	Tek Bahadur Nepali	- Campus Chief, Lamjung Campus, IAAS, Kuncha
13.	Madan Singh	- Police Inspector, Bhotewadar
14.	Shiva Ghimire	- Field Staff of SILT Consultants
15.	Bhim Nath Khanal	- Vegetable grower, Bhotewadar
16.	Soory Thapa	- Field Staff, SILT Consultants
17.	Prem Shrestha	- Hoteller Paundi Dhik, Responsible for collecting business Tax collected by Chamber of Commerce
18.	Krishna Kumar Shrestha	- Member 10 no. Ilaka Tanahu District
19.	Ram Narayan Yadav	- Extension Promotion Officer, Dabur Nepal.

**Annex 6- Form for Listing FGD Participants**

**Annex - 6****List of Focus group Participants**

Name and Designation of the Participants of Focus Group Discussion held with the Government line Agencies and other Institutions of **Besisahar**.

<b>S.N.</b>	<b>Name</b>	<b>Designation</b>
1.	Jamindra Man Ghale	- DDC Chairman, Lamjung
2.	Govinda Khanal	- CDO
3.	Kalika Prasad Ghimire	- LDO
4.	Pravakar Dhungana	- District Education Officer
5.	Binod Dev Panta	- Officer, District Cottage Industry Office
6.	Tilak Bahadur Khatri	- Engineer, District Irrigation Office
7.	Parasu Ram Shrestha	- Public Health Officer, District Health Office
8.	Prem Raj Devkota	- Assistant Agriculture Extension Officer, District Agriculture Office
9.	Basanta Shrestha	- Assistant Horticulture Development Officer, District Agriculture Office
10.	Ms. Dhanudevi Piya	- Staff Nurse, Besisahar

**Annex - 6**

Name and Designation of the Participants of Focus Group Discussion held at Bhotewadar.

S.N.	Name	Designation
1.	Govinda Bahadur Kunwar	- Head Master, Bhakti Higher Secondary School
2.	Mukti Adhikari	- Secretary, Chamber of Commerce unit Bhotewadar
3.	Uttar Kumar Shrestha	- Science Teacher, Bhakti Higher Secondary School
4.	Hari Prasad Lamichhane	- Social Worker
5.	Buddhi Lal Shrestha	- Businessman
6.	Brikha Bahadur Lama	- Businessman
7.	Narahari Adhikari	- Social Worker
8.	Hari Kumar Shrestha	- Social Worker
9.	Khadga Bahadur Thapa	- Social Worker
10.	Tirtha Raj Adhikari	- Social Worker
11.	Bhagwat Poudyal	- Staff, Grameen Vikas Bank Unit, Bhotewadar
12.	Damodar Adhikari	- Social Worker
13.	Hari Prakash Adhikari	- Social Worker
14.	Krishna Babu Shrestha	- Campus Chief, Bhakti Adarsh Campus, Bhotewadar, Lamjung
15.	Ashakaji Shrestha	- Businessman/Industrialist
16.	Bhim Nath Khanal	- Farmer
17.	Madhukar Sapkota	- Farmer
18.	Hari Subarnakar	- Businessman (Gold and Silver)
19.	Mana Bahadur Gurung	- Businessman
20.	Shesh Kanta Khanal	- Teacher
21.	Kriti Nath Sapkota	- Teacher
22.	Narayan Kunwar	- Teacher
23.	Ram Krishna Adhikari	- Teacher
24.	Purna Kanta Sapkota	- Teacher

**Annex - 6**

Name and Designation of the Participants of Focus Group Discussion held at Turture.

<b>S.N.</b>	<b>Name</b>	<b>Designation</b>
1.	Ramesh Shrestha	- Chairman, Chamber of Commerce unit, Turture
2.	Indra Lal Shrestha	- Businessman
3.	Buddhi Lal Shrestha	- Businessman
4.	Gopal Krishna Shrestha	- Businessman
5.	Ismail Sekh	- Businessman
6.	Laxmi Kumar Shrestha	- Resident
7.	Babulal Shrestha	- Hotelier
8.	Mohan Vilas Silwal	- Businessman
9.	Kuhar Lal Shrestha	- Businessman
10.	Raju Shrestha	- Businessman

## Annex - 6

## Name and Designation of the Participants of Focus Group Discussion held at Dumre.

S.N.	Name	Designation
1.	Ram Chandra Adhikari	- Social Worker
2.	Raj Kapoor Piya	- Petroleum dealer
3.	Radhye Shyam Pradhan	- Vice Chairman, Chamber of Commerce Unit, Provision store
4.	Bihari Lal Shrestha	- Cloth trader
5.	Subodh Adhikari	- Stationary dealer
6.	Shamsher Gurung	- Trader
7.	Damodar Mishra	- Bookseller
8.	Udesh Kumar Shrestha	- Trader (Fancy Clothes)
9.	Ms. Hari Priya Pandey	- Social Worker
10.	Shree Bhakta Acharya	- Social Worker
11.	Ram Piya	- Businessman
12.	Om Kumar Shrestha	- Businessman
13.	Ms. Bishnu Thapa	- Meal Shop Owner
14.	Parasu Ram Adhikari	- Hotel Owner
15.	Kedar Prasad Sharma	- Social Worker
16.	Vikash Kumar Shrestha	- Ice Cream Industry Owner

**Annex 7 - Form for Listing of Respondents**

## Annex - 7

## List of the Respondent

## Bandipur V.D.C., Dumre, Tanahu

S.N.	Name of the Respondent	Ward No.
1.	Raj Kumar Kauastha	4
2.	Keshab Adhikari	1
3.	Laxmi Raj Bhandari	1
4.	Shambhu Adhikari	1
5.	Jiban Shrestha	4
6.	Narendra Lal Pradhan	4
7.	Tek Nath Bartaula	1
8.	Binod Shrestha	1
9.	Devi Ranabhat	1
10.	Shiv Kaji Piya	1
11.	Ghanshyam Shrestha	1
12.	Thik Bahadur Joshi	1
13.	Saraswoti Giri	1
14.	Deepak Shrestha	1
15.	Harimaya Shrestha	4

## Bhanu V.D.C., Turture, Tanahu

S.N.	Name of the Respondent	Ward No.
1.	Mina Pradhan (Shrestha)	8
2.	Mina Pande	8
3.	Keshab Lal Shrestha	8
4.	Ram Maya Shrestha	8
5.	Rishi Rom Devkota	8
6.	Babu Kaji Shrestha	8
7.	Bishnu Maya Shrestha	8
8.	Krishnalal Shrestha	8
9.	Rabilal Gurung	8
10.	Resham Raj Shrestha	8
11.	Yek Bahadur Thapa	8
12.	Gopal Neupane	8
13.	Ganesh Bahadur Thapa	8
14.	Uma Shrestha	8
15.	Chij Maya Shrestha	8

## Palungtar V.D.C., Gorkha

S.N.	Name of the Respondent	Ward No.
1.	Dhan Man Lama	9
2.	Man Bahadur Tamang	9
3.	Asmita Gurung	9
4.	Achan Shekh	9
5.	Dhana Laxmi Shrestha	9
6.	Karma Singh Tamang	9
7.	Bharat Tamang	9
8.	Prem Adhikari	9
9.	Bikash Shrestha	9
10.	Sita Shrestha	9
11.	Mira Khanal	9
12.	Sarala Adhikari	9
13.	Ram Mati Shrestha	9
14.	Kaji Shrestha	9
15.	Yam Kumar Malla	9

## Bhotewadar V.D.C Lamjung

S.N.	Name of the Respondent	Ward No.
1.	Surya Kumar Shrestha	8
2.	Givinda Bahadur Kuwar	5
3.	Ram Bahadur Ghimire	5
4.	Tula Ram Pariyar	8
5.	Bimala Shrestha	5
6.	Nirmala Adhikari	8
7.	Manjul Shrestha	8
8.	Indra Bahadur Thapa	8
9.	Rakshmi Adhikari	8
10.	Sita Bishwokarma	8
11.	Chandra Bahadur Thakuri	8
12.	Pitamber Shrestha	2
13.	Ram Dev Ram	5
14.	Shankha Man Shrestha	8
15.	Mukti Adhikari	8

## Annex - 7

## Khudi V.D.C., Lamjung

S.N.	Name of the Respondent	Ward No.
1.	Upendra Raj Pokherel	1
2.	Talchini Katila	1
3.	Singh Bahadur Tamang	1
4.	Chet Narayan Katila	1
5.	Bhim Bahadur Banuja	1
6.	Ishwar Shrestha	1
7.	Narayan Thapa	1
8.	Dharma Jung Gurung	2
9.	Indra Prasad Upadhyia	1
10.	Padam Bahadur Tamang	7
11.	Dhan Pasi Gurung	9
12.	Mohan Tamang	1
13.	Om Bahadur Chhetri	1
14.	Tuk Bahadur Rimal	1
15.	Top Bahadur Thapa	1

## Sundar Bazar V.D.C., Lamjung

S.N.	Name of the Respondent	Ward No.
1.	Dhan Bahadur Gherti	9
2.	Tej Prasad Joshi	9
3.	Shiva Kumari Gauli	8
4.	Full Maya Rana	8
5.	Man Bahadur Gharti	8
6.	Buddhi Maya Thapa	8
7.	Bishnu Hari Adhikari	9
8.	Ram Chandra Pokherel	8
9.	Dharma Kumari Pokherel	8
10.	Ram Krishna Shrestha	8
11.	Santa Bahadur Magar	9
12.	Prem Lal Shrestha	8
13.	Shambhu Lal Shrestha	8
14.	Gam Bahadur Bhujel	9

## Besisahar V.D.C., Lamjung

S.N.	Name of the Respondent	Ward No.
1.	Ishwor Prasad Shrestha	2
2.	Mak Bahadur Ghale	2
3.	Bikash Shrestha	2
4.	Omdi Gurung	2
5.	Tika Ram, Wagle	2
6.	Kendra Bahadur Siluwal	1
7.	Ramesh Kumar Piya	1
8.	Netra Bahadur Basnet	2
9.	Sanad Kumar Shrestha	2
10.	Chankh Rana	2
11.	Bishnu Rana	2
12.	Raj Kumari Rana	2
13.	Chhabi Lal Ghimire	3
14.	Ishwor Bahadur Ghimire	2
15.	Shyam Bahadur Sunuwar	3

## Besisahar V.D.C., Lamjung

S.N.	Name of the Respondent	Ward No.
16.	Hem Nath Baral	2
17.	Netra Bahadur Ghimire	2
18.	Durga Bahadur Khatri	3
19.	Laxmi Prasad Timilsina	1
20.	Dik Bahadur Adhikari	9
21.	Tika Adhikari	9
22.	Gopal Man Shrestha	9
23.	Narayan Bahadur Suyal	9
24.	Hari Prasad Gurung	9
25.	Krishna Dharni	9
26.	Tek Bahadur Sarki	9
27.	Prem Bahadur Kuwar	9
28.	Radheshyam Shrestha	9
29.	Budha Raj Khaniya	9
30.	Tuk Man Pariyar	9

**Annex 8 - Forms for Engineering Observation  
Records**

## Engineering Observation Record

Chainage	On Road ( Pavement Condition)	Chainage	Off Road ( Road Side) Condition	
			LHS	RHS
0+00	Dumre Bazar			
0+45	Chundi Bridge	1+695		Land slid,l=150m h=7m
2+00	Hump			
2+310	Hump			
2+820	Bhansar Market W= 6 m.	3+400		Land slide l=10m, h=3m
		3+815		Damaged side drain l=30m
		3+815		Land slide l=75m, h=25m
		4+050		Land slide l=15m, h=3m
4+055	Road undulation L=10 M.			
4+278	Road undulation ( Shoving)L=10 M.	4+705		Land slide l=30m, h=10m
		4+585		Land slide l=50m, h=25m
		5+205		Land slide l=20m, h=4m
6+320	Ambot Market W= 3.6 M.			
7+750	Hump			
7+850	Hump			
8+150	Khahare Market W= 3.6 M.			
8+850	Hump			
9+050	Champas Market W= 3.6 M.	10+010		Land slide l=5m, h=15m
		10+085		Damaged gabion wall l=5m, h=2m
		10+215		Land slide l=20m, h=4m
		10+310		Land slide l=10m, h=2m
		10+050		Land slide l=10m, h=3m
12+000	Turture Market W=6.5 M.			
12+000	Hump			
12+105	No pavement on left & right	13+775		Land slide l=5m, h=3m
	approach of the bridge	14+935		Land slide l=15m h=3m
18+485	Pot hole on approach of causeway	19+830		Damaged gabion wall l=50m, h=2m
		19+830		Land slide l=60m, h=5m
19+950	Pot hole on approach of Chiti Khola			
19+950	Chiti Khola	20+255		Land slide l=10m, h=2m
		20+380		Land slide l=20m, h=1m
21+485	Kalimati Market W=5.5 M.	21+485		Disposal of Land slide materials on the road side
		21+485		Land slide l=15m, h=5m
		22+165		Safety sign missing
		22+785		Disposal of Land slide materials on the road side
		23+675		Damaged gabion wall l=20m, h=2m
		23+675		Damaged gabion wall l=10m, h=2m
		23+835		Damaged side drain l=30m
		23+935		Land slide l=15m, h=5m
		20+380		
23+885	Bleeding on the left and right approch of Paundi Khoia Bridge L=250 M.			
24+185	Pothole L=20m			
24+471	Paundi Dhik Market W=7m	25+235		Damaged side drain l=15m
		25+535		Damaged side drain l=15m
		25+585		Damaged side drain l=10m
		25+595		Damaged side drain l=15m
		25+615		Damaged side drain l=10m
		25+635		Damaged side drain l=10m
		25+685		Damaged side drain l=15m
25+895	Pot hole on approach of causeway			
26+585	Pot hole on the centre of the road			

Chainage	On Road ( Pavement Condition)	Chainage	Off Road ( Road Side) Condition	
			LHS	RHS
27+425 29+035 29+600	Pot hole on approach of causeway Bhoteodar Market W= 7.5m. Pot hole on approaches of causeway and on causeway slab	29+605 29+815 29+915 30+050 30+150 30+150 30+150	Damaged side drain l=30m Damaged side drain l=20m Damaged gabion wall l=20m, h=2m Damaged side drain l=15m Land slide l=10m, h=3m Damaged side drain l=15m Damaged side drain l=15m	
30+515	Edge Break l=10m	30+802 30+905	Damaged side drain l=15m Land slide l=2m, h=3m	
30+940	Pot hole on causeway slab	31+350 31+450 31+550 32+428 32+730 33+500	Damaged side drain l=15m Damaged side drain l=15m Damaged parapet l=5m Damaged side drain l=15m Land slide l=500m, h=50m Land slide l=2m, h=3m	
32+730 32+730 33+600	No pavement l=500m Khurkhure quarry Pothole L=15m	33+650	Damaged gabion wall l=5m, h=2m	
33+650 33+850 34+800	Damaged pavement l=10m Dalal Bazar W= 7m Pothole L=5m	34+800 35+100	Damaged side drain l=15m Land slide l=100m, h=50m	
35+100 35+550 35+550 35+980 35+980 36+050 37+310 37+320 37+340	No pavement l=500m Edge Break l=15m Big boulder on the road Big boulder on the road No pavement l=50m Edge Break l=15m Pothole on the road L=5m Patch Repair Pothole L=10m	37+340 37+350 37+660	Land slide l=15m, h=5m big boulder Land slide l=20m, h=5m	
37+350 37+660 37+700 38+800	Pothole L=10m Pothole L=20m Edge Break l=15m Edge Break l=5m	39+200	Land slide l=100m, h=25m	
39+860	Bridge approach	40+000	Land slide l=10m, h=6m	
40+060 40+270	Damaged road l=2m Damaged road l=10m	40+850 40+900	Damaged gabion wall l=15m, h=2m Land slide l=20m, h=5m	
40+850 40+900 40+925 41+050 42+800 42+800	Damaged road l=50m Patch Repair Pothole on approach of bridge Minor stripping on c/line Besisahar Market w=7m Manange Chautara	41+050	Side Drain full of debris	

## Annex - 8b

## Use of Local Resources

**1. Availability & use of local manpower during construction:**

70 to 80 nos. labours were in daily use during construction time and 300 to 400 at the pick construction time. Most of them were from side of Lamjung District (locally available labours were less than required and further they all were not used either). The reason of scarcity of local manpower is attraction of overseas employment to the young people and comparatively less wages in construction site.

**2. Availability and use of local materials during construction /maintenance:**

There were two nos. of quarry site, which had been actively used at the time of construction. Khairi Khola quarry was situated at 12 Km. East from Dumre. From this quarry site construction material like boulders, gravel, sand, aggregates had been used for the sector from km 0+00 to km 24+00. Khurkhure quarry site which is along the road had been used to the sector km 24+00 to km 42+800. Chips for Surface Dressing had been used from Kotre River near Pokhara. Cement, reinforcement, and bitumen had been purchased from big towns of Nepal or India.

**3. Use of local technology during construction maintenance and operation:**

Hand crushing of aggregates, making of masonry and so on had been used as local technology to mention.

**4. Use of equipment during construction/ maintenance:**

Sufficient equipments had been used at the time of construction for example; Dozer, Grader, Roller, Compressor, Bitumen Distributor, Water Tanker, Chip Spreader, Boiler, Tripper, Mini tripper, Loader, Cursor plant etc.

**5. Budget allocation/ financing- year wise if possible:**

Total budget was 45 Crore (450 Millions), 300 million for Structure and 150 million for pavement works. —

93/94 15435480

94/95 2667568

95/96 82258314

96/97 73816560

97/98 86857558

98/99 195377290

**6. Traffic growth/ projection record:**

Before construction:- approx. 30 veh/day

After construction: - 81 Veh/day

## Hourly Traffic Flow and Vehicle Classification Count ( Dumre- Beshisahar Road)

Counting Station: *Bhoteodar*Date *16-01-2057*Weather: *Fear*Surveyor : *Shiva Ghimire*

S.N.	Time Ranges		Vehicle Class						
	from	to	Truck	Bus	Minibus	Jeep	Tractor	Car	Moter cycle
1	4:00	5:00							
2	5:00	6:00							
3	6:00	7:00	1	4			1	1	2
4	7:00	8:00		2					3
5	8:00	9:00		2		2		1	
6	9:00	10:00				2		1	
7	10:00	11:00	2	3		3	1	1	
8	11:00	12:00	2	4		2		1	
9	12:00	13:00	1	1				1	
10	13:00	14:00	3	2				2	
11	14:00	15:00	3						
12	15:00	16:00		1					
13	16:00	17:00	2	1	1	1			
14	17:00	18:00			2	1			
15	18:00	19:00	1	6		3		1	
16	19:00	20:00	4	2		2		1	
17	20:00	21:00		1		1		1	

## Origin and Destination Survey of the Vehicles along ( Dumre- Beshisahar Road)

Counting Station: *Bhoteodar*

Date 16-01-2057

Weather: *Fear*Surveyor : *Shiva Ghimire*

S.N.	Origin	Destination	Vehicle Class						Total	Type of goods carried	Quantity in tone
			Truck	Bus	Minibus	Jeep	Tractor	Car			
1	Kathnmandu	Udipur	1	1						Poll/passenger	20n/20
2	Besisahar	Kathnmandu				1				pepole	4
3	Besisahar	Sundar Bazar		1							30
4	Besisahar	Narayanghat		1							40
5	Besisahar	Kathnmandu		1		1					45
6	Besisahar	Kathnmandu		1							42
7	Paudi	Besisahar		1							20
8	Besisahar	Pokhara		1				1			42
9	Besisahar	Kathnmandu		1				1			45
10	Udipur	Bahadur	1							poll	20
11	Dumre	Besisahar	1			1					5
12	Dumre	Besisahar	1							rice	20bag
13	Narayanghat	Besisahar	1					1	1	Glass	5 tone
14	Dumre	Besisahar	1							rice	25 bag
15	Besisahar	Narayanghat	1							empty	
16	Kathnmandu	Besisahar						1			5
17	Besisahar	Bhoteodar				1					3
18	Dumre	Besisahar		1							30
19	Besisahar	Narayanghat	1			1				empty	
20	Pokhara	Besisahar		1				1			40
21	Kathnmandu	Besisahar		1							50
22	Narayanghat	Besisahar		1							39
23	Khairani	Besisahar		1		1					35
24	Kathnmandu	Besisahar		1							48
25	Kathnmandu	Besisahar	1					1		goods	5 tone
26	Besisahar	Dumre	1							empty	
27	Kathnmandu	Besisahar		1							47
28	Kathnmandu	Besisahar						1			5
29	Narayanghat	Besisahar	1							rice	25 bags
30	Dumre	Dalal	1							rice	24 bags
31	Pokhara	Besisahar						1		rice	3 tone
32	Dumre	Besisahar		1							35
33	Kathnmandu	Besisahar		1							46
34	Narayanghat	Besisahar	1							rice	29 bags
35	Dumre	Besisahar	1							rice	20 bags
36	Pokhara	Besisahar			1	1					25
37	Narayanghat	Khudi	1								41
38	Kathnmandu	Besisahar			1						20
39	Narayanghat	Besisahar		1							39
40	Pokhara	Besisahar	1							goods	7 tone
41	Besisahar	Narayanghat		1							25
42	Siudibar	Bagaicha							1		1
43	Paudi	Besisahar							1		2
44	Besisahar	Kathnmandu			1						24
45	Besisahar	Narayanghat				1					3
46	Sundar Baza	Besisahar						1		empty	
47	Siudibar	Bagaicha							1		2



## Passenger Movement Record Dumre-Besisahar Road

Transport: Bus/Minibus/car/jeep

Time Period:- 11:30 AM-2:00 PM

Seat Capacity:56

From: Kathmandu To(end destination):Dumre

Dumre to Besisahar

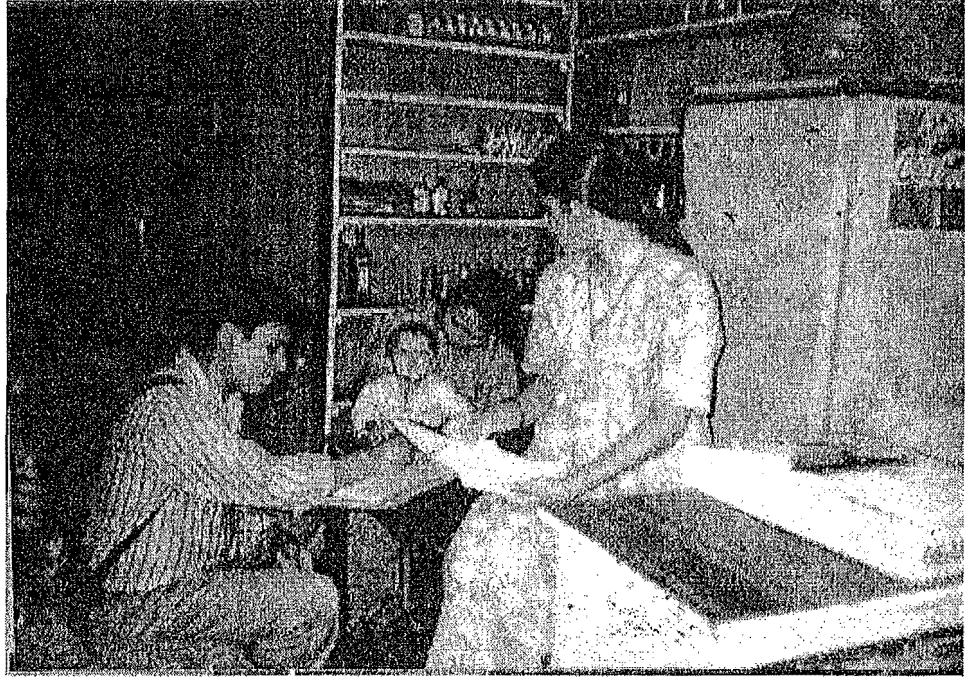
Surveyor: Ganesh Babu Lohani

Weather:

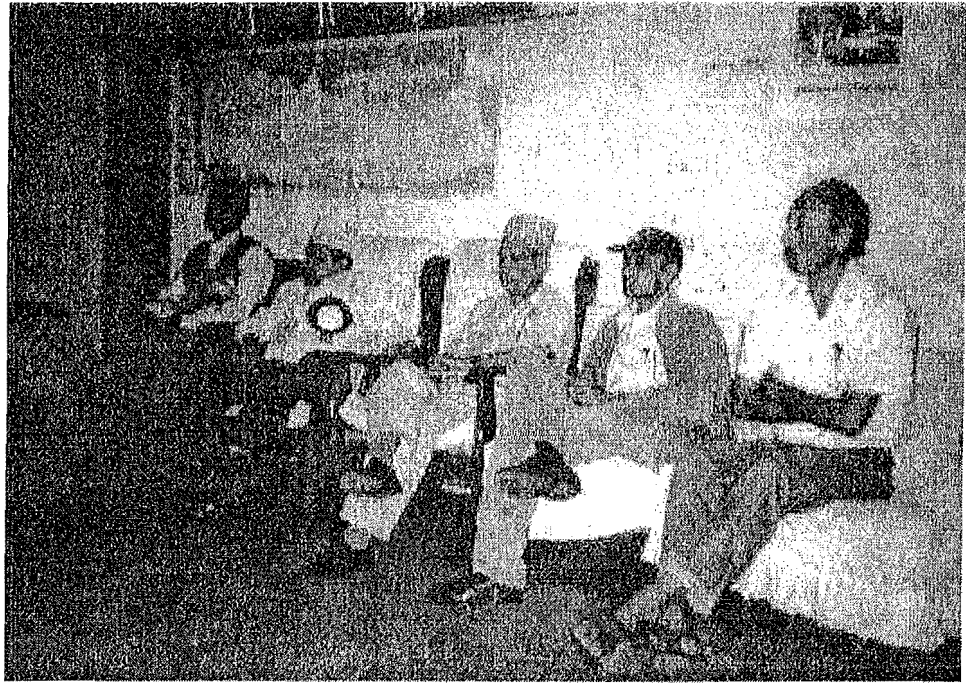
Date:- 056-01-16

No.	Stoppage	Passenger In		Passenger Out		Remarks
		Number	Reason for travel	Number	Reason for travel	
1	Dumre	46				मानिसहरुलाई Randomly सोध्दा
2	Bhansar	2				बसमा चढ्नु र बसबाट ओर्लनुको निम्न
3	Chambas	2		2		कारणहरु बताएका छन्,
4	Turture	6		4		१. घर फर्कन
5	Bierjagar	5		7		२. परिक्षा दिन जान
6	Kalimati	3		4		३. जिल्ला सदरमुकाम जान
7	Paudi	8		7		४. आफ्नो नातेदार कहाँ जान
8	Sendibar	5		8		५. रासायनिक मल किन्न जान
9	Bhotebazar	9		9		६. Cinema हेर्न जान
10	Getipur	5		6		
11	Phalaya Saghu	3		4		
12	Bhakhude	2		2		
13	Ranikua			2		
14	Besisahar			41		

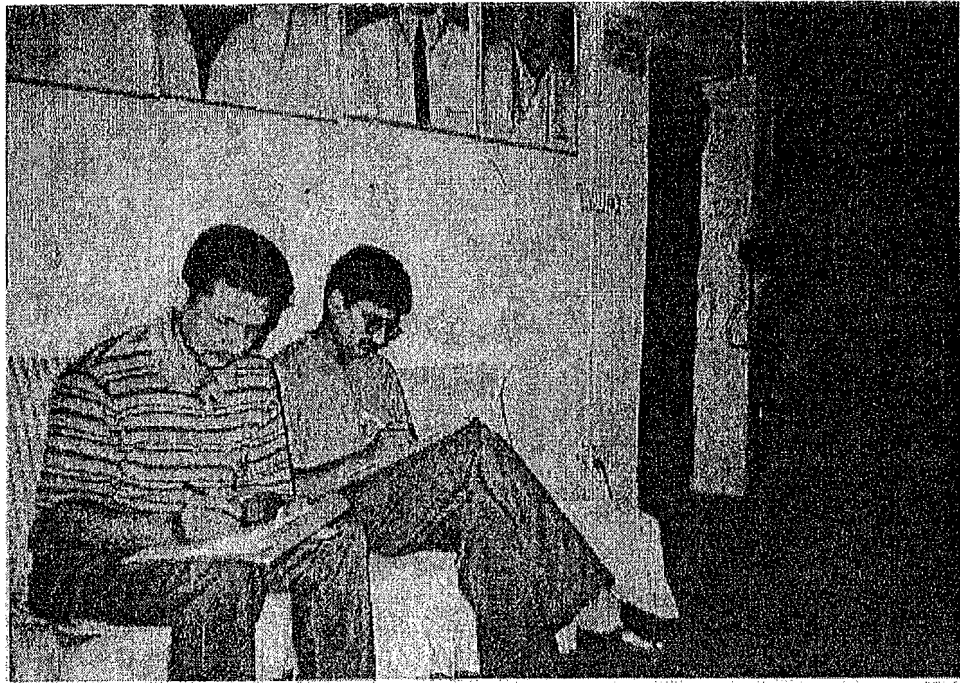
**Annex 9 - Field Visit Photographs**



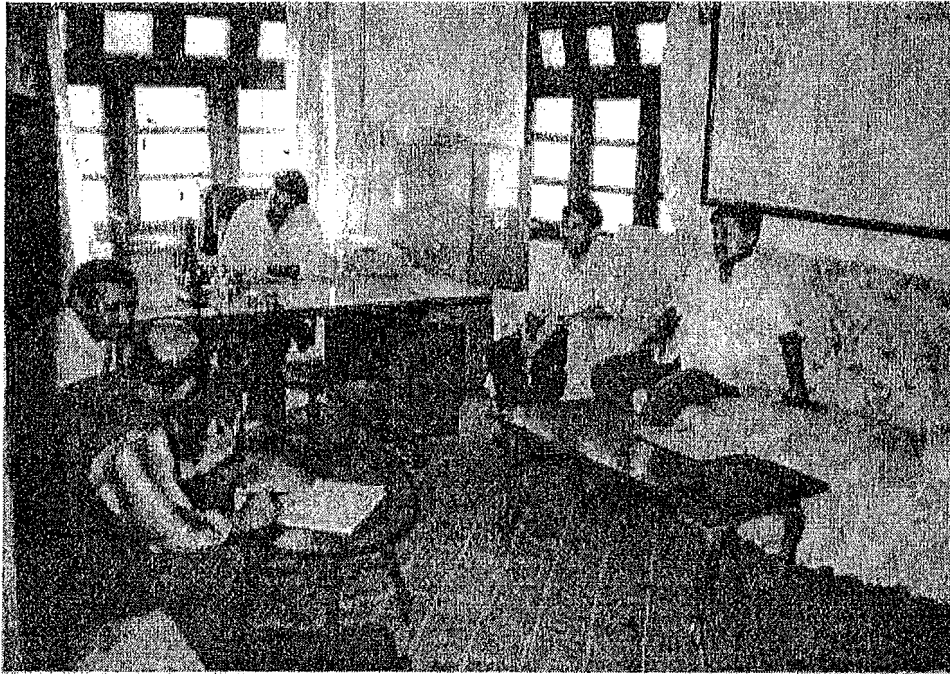
**Photo 1:** One of the enumerator asking questions of survey to one of the woman entrepreneur at Dumre.



**Photo 2:** Focus Group Discussion at Besisahar



**Photo 3: Members of field team taking note in FGD in Besisahar.**



**Photo 4: Discussion at the office of LDO in Tanahu.**



**Photo 5:** Field team discussing about various aspects of field visit at Dumre



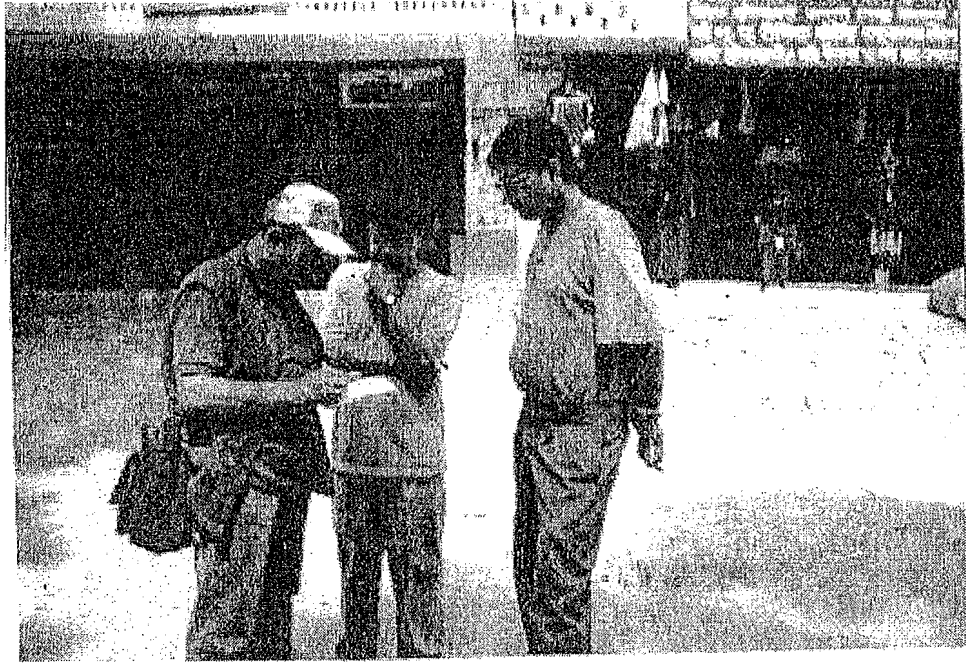
**Photo 6:** Enumerator asking question of survey to one of the respondent at Turture.



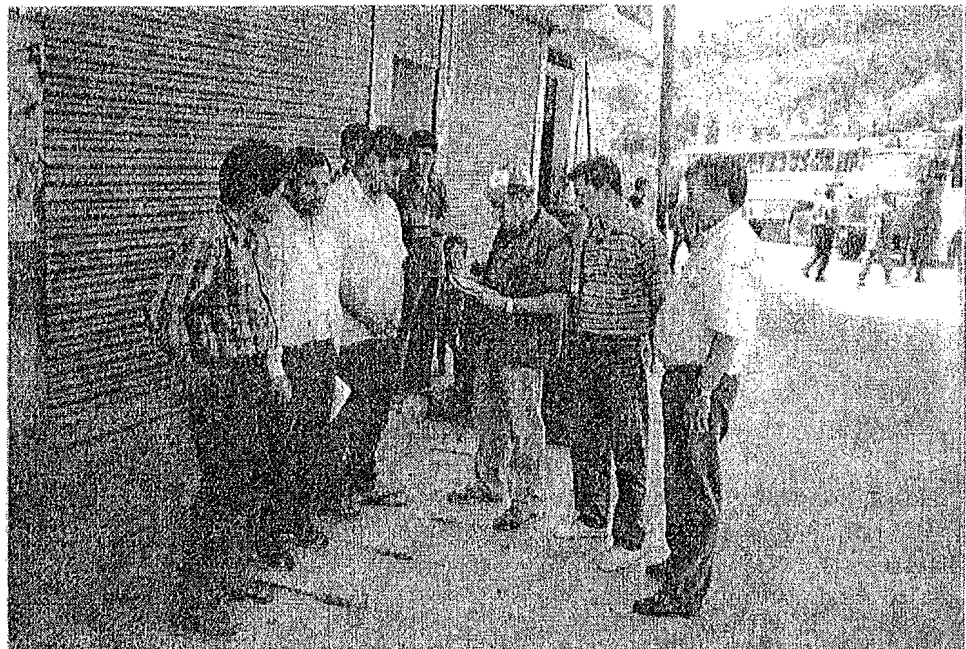
**Photo 7: Team leader taking interview with DDC Chairman in Besisahar.**



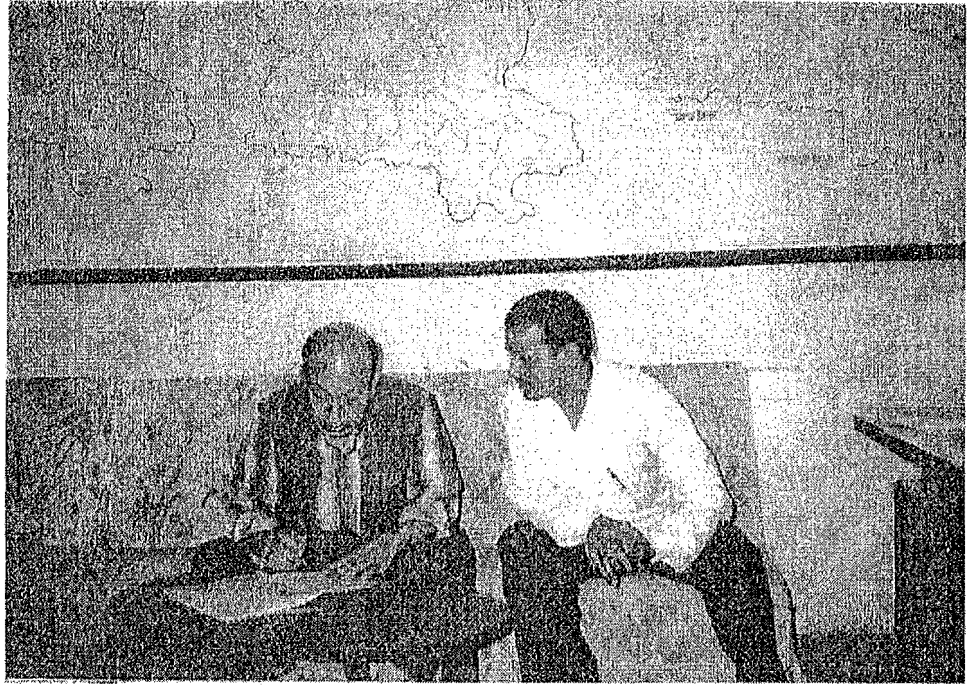
**Photo 8: One of the enumerator filling questionnaire at Dumre**



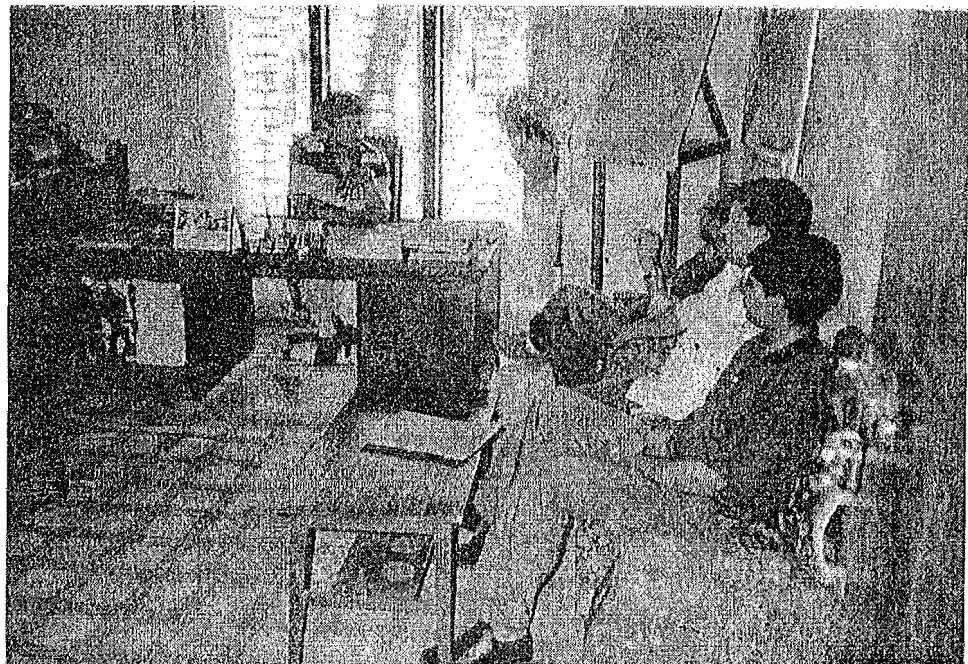
**Photo 9:** The team leader taking interview with one of key informants at Bhotewadar.



**Photo 10:** Team leader taking interview with one of the key informants at Besisahar



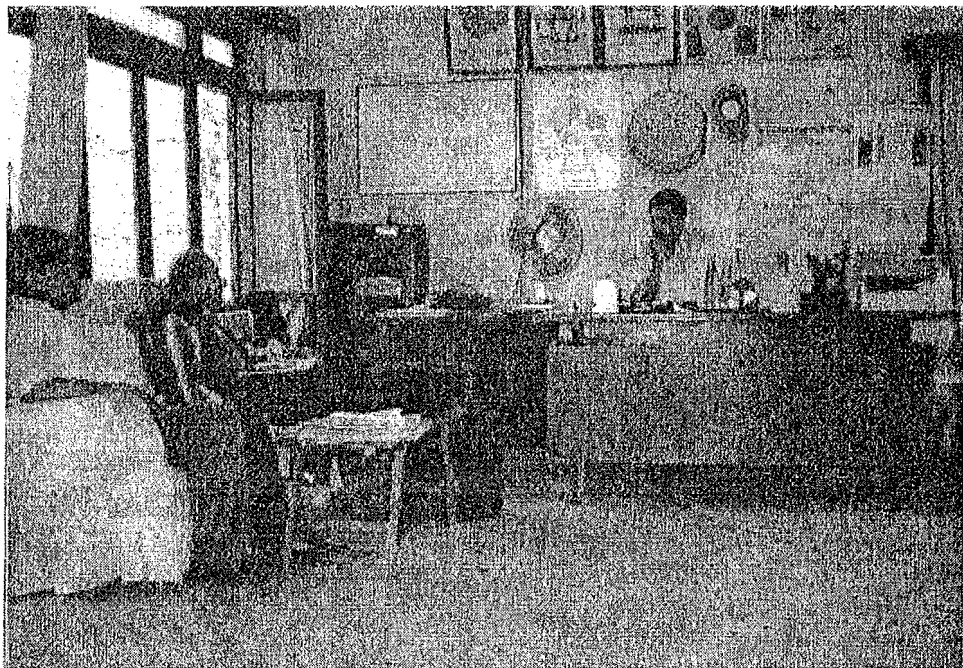
**Photo 11: Team leader taking interview with one of the key informants at Dumre.**



**Photo 12: Field team discussions with District Agriculture Office at Damauli.**



**Photo 13: Informal discussions with key informants at Besisahar.**



**Photo 14: Team leader taking interview with DDC Chairman in Damauli.**

