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District Transport Master Plan (DTMP)

VOLUME – I

MAIN REPORT



Ministry of Federal Affairs
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Department of Local
Infrastructure Development and
Agricultural Roads (DOLIDAR)



District Development
Committee,

Bajhang

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FOREWORD

It is my pleasure to introduce this District Transport Master Plan (DTMP) of Bajhang district. I believe that this document will be helpful in backstopping to Rural Transport Infrastructure Sector through sustainable planning, resources mobilization, implementation and monitoring of the rural road sub-sector development. The document is anticipated to generate substantial employment opportunities for rural people through increased and reliable accessibility in on-farm and off-farm livelihood diversification and commercialization and industrialization of agriculture sector. In this context, rural road sector will play a fundamental role to strengthen and promote overall economic growth of this district through established and improved year round transport services reinforcing intra and inter-district linkages .

Therefore, it is most crucial in expanding rural road networks in a planned way as per the District Transport Master Plan (DTMP) by considering the framework of available resources in DDC comprising both internal and external sources. Considering these aspects, DDC Bajhang has prepared the DTMP by focusing most of the available resources into upgrading and maintenance of the existing road networks. It is expected that this DTMP will be helpful in lobbying and facilitating the donor agencies through central government generating resources required through basket fund approach. Furthermore, this document will be supportive in avoiding pervasive duplication approach in resources allocation under the rural road network development of Bajhang District.

I would like to thank, Chief District Engineer, Mr. Narendra K.C Khadka, Engineer Mr. Lal Bahadur Thapa and other DDC and DTO staffs who directly and indirectly supported in the process of preparing this document.

I would, like to express my gratitude to SiDeF team - Mr. Hare Ram Shrestha, Project Director, Mr. Bhisma Dhoj Karki, Team Leader/Engineer, Mr. Ankit Shrestha, Engineer for their field work and continuous dedication, in bringing this DTMP to final stage.

My special thank goes to all the representatives of political parties and other DTICC members who played central role in providing constructive and valuable supports in preparing this document.

Any innovative and constructive suggestions regarding this document will be highly appreciated.


Subraj Katel
Local Development Officer
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PREFACE / ACKNOWLEDGEMENTS

This report on the of Preparation of District Transport Master Plan (DTMP) of Bajhang District has been prepared under the contract agreement between RTI SECTOR Maintenance Pilot for Office of District Development Committee, Bajhang District and SDeF, Kathmandu.

The consultant has prepared this report after extensive documentary consultation/ field work, road inventory study and interaction with stakeholders of the district.

We would like to extend our heartfelt gratitude to the RTI SECTOR Maintenance Pilot for entrusting us to carry out this task and extend our thanks to all the team of RTI sector Maintenance for the cooperation and guidance in accomplishing the work.

SDeF would like to express our gratitude to Mr. Yuwaraj Kattel, Local Development Officer, Mr. Narendra K.C., Chief DTO, Mr.Lal Bahadur Thapa, Engineer, and all the DDC and DTO staffs for their valuable suggestions and co- operation for the preparation of this report.

We also extend our sincere thanks to the representatives of political parties for their active and valuable participation in the process of DTMP preparation. We are grateful to all the local people and leaders who have rendered their valuable accompany to our team during execution of the works.

We thanks to our own team - Mr. Bhim Dhoj Karki, Team Leader/Engineer, Mr. Ankit Shrestha, Engineer and Binod Dhakal GIS expert and other support staffs who worked continuously to finalise the DTMP.

Hare Ram Shrestha
Executive Director
SDeF

EXECUTIVE SUMMARY

Bajhang District lies in located in northern part of Seti Zone. It is the most remote and least developed district Nepal. There is less development of the rural roads. Chainpur VDC is the district headquarter and is the key growth centre , centralized all facilities available in the district level . The district lies between 29° 29' to 30° 9' North latitude and 80° 46' to 81° 34' East longitude in range . The elevation of the district is 914.4 to 70104.4 meters at Saipal, Kanda VDC from the mean sea level . Most of the parts of the districts lies in the Himalayan and Mahabharata range and have steep slope . The total land area of the district is about 3422 Sq.Km. Out of the total area, 268.83 Sq.Km occupies Agricultural land, 1024.43 Sq.Km land area occupies Forest area and remaining 198.65 Sq.Km covers Grass Land. The average temperature of the district varies from minimum 2C to -7C to maximum 20 to 32C . The average annual precipitation is 50 to 150 ml The major river of the Bajhang District is Seti river. .

The total population of the Bajhang district is 194,701 (CBS 2011) comprising of males 92,794 (47.65%) and females 102,365 (52.45%) inhabit in 33,786 households within the 47 VDCs of the district.

The district inventory identified just over 209.46 km of roads, including 79.98 km of strategic roads. In coordination with the DTICC and DDC, 13 rural roads with a length of 126.19 km were identified as making up the district road core network (DRCN). These roads are not motor able roads currently, as they have width of 2-3m only. The existing DRCN roads link up 47 of the VDC headquarters. All of the DRCN roads are earthen fair-weather roads.

| Road Class | Total length | Black Top | Gravel | Earthen |
|----------------------------|---------------|--------------|-------------|---------------|
| Strategic road network | 79.98 | 79.98 | - | - |
| Urban roads | - | - | - | - |
| District road core network | 131.55 | - | - | 131.55 |
| Village roads | 3.27 | - | 1.19 | 2.07 |
| Total | 214.80 | 79.98 | 1.19 | 133.62 |

| Improvement type | Requirement | Cost (NPR) |
|-------------------------|----------------------|-----------------------|
| Bridges | 1709 m | 236,400,000 |
| Slab culverts | 29 m | 4,350,000 |
| Causeways | 109 m | 1,090,000 |
| Hume pipes | 27 units | 270,000 |
| Masonry retaining walls | 2800 m ³ | 28,000,000 |
| Gabion retaining walls | 16520 m ³ | 82,600,000 |
| Lined drains | 105750 m | 105,750,000 |
| Widening | 125.391 m | 3,134,775 |
| Rehabilitation | 85.96 km | 68,768,000 |
| Gravelling | 131.551 km | 328,877,500 |
| Blacktopping | 0 km | - |
| New construction | 421.54 km | 15,890,010,000 |
| Total | | 16,749,250,275 |

For 5-years planning the total budget estimated is NPR 901,116 of which 80% of the total road sector budget has to be taken for DRCN roads which come to be NPR 720,892,000 where as the total estimated cost of DRCN road is NPR 16,749,8250,275. This clearly shows that budget allocation is not sufficient for all interventions. Hence, budget allocation is done based on the ranking priority as well as the priority that are envisaged from DDC authority to give high priority for improvement of DRCN of hilly remote area VDCs whatsoever the ranking result arrive at.

Since budget is not sufficient to allocate for all the inventions for DRCN roads as estimated, budget has been allocated to some realistic basis and worked out manually.

For 5-years DTMP, the estimated costs for conservation, improvement and new construction is NRS 39,465,000 NRS 859,240,000 and NRS 15,890,010,000 respectively. While the total cost for the conservation for five years is NRS 197,327,000.

After DTMP the status of the DRCN roads are somehow changed the fair weather road have decreased by 54% i.e. from 131.55km to 60.78 km. All- weather gravel road is now increased by 70.77 Km i.e. from 0% to 54%.

ABBREVIATIONS

| | |
|---------|---|
| DDC | District Development Committee |
| DOLIDAR | Department of Local Infrastructure Development and Agriculture Road |
| DOR | Department of Road |
| DTICC | District Transport Infrastructure Coordination Committee |
| DTMP | District Transport Master Plan |
| DTPP | District Transport Perspective Plan |
| GIS | Geographical Information system |
| GPS | Global Positioning System |
| GON | Government of Nepal |
| LGCDP | Local Governance and Community Development Programme |
| MFALD | Ministry of Federal Affairs and Local Development |
| SWAp | Sector Wide Approach |
| VDC | Village Development Committee |

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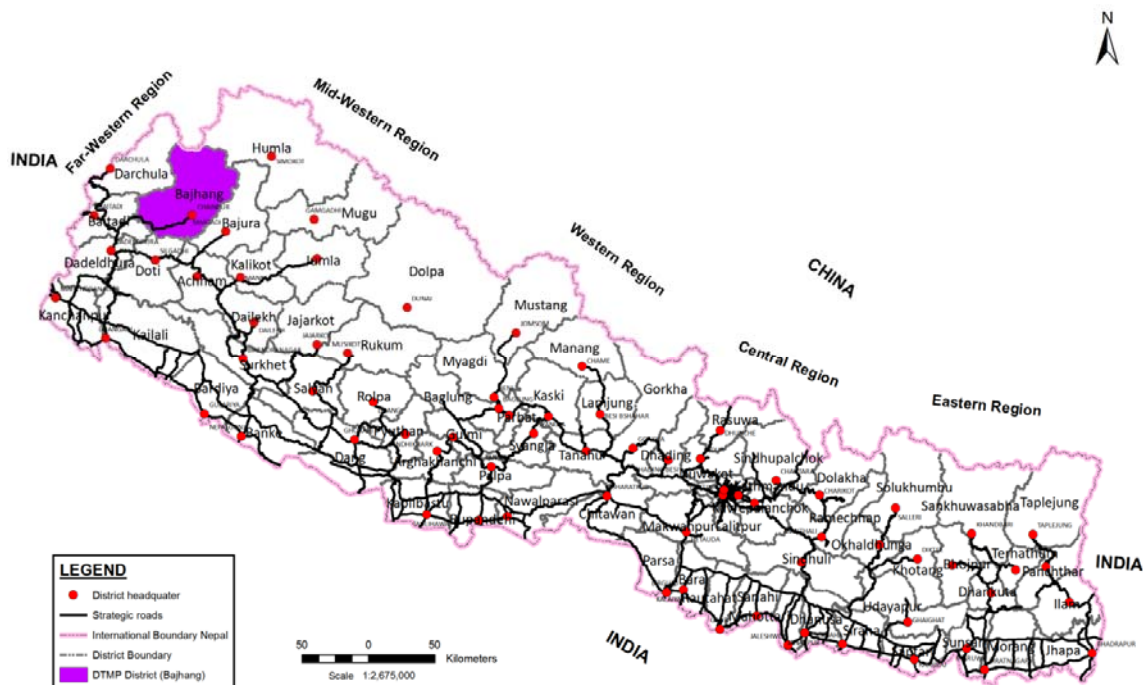
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1. INTRODUCTION

Bajhang District lies in located in northern part of Seti Zone . It is the most remote and least developed district Nepal. There is less development of the rural roads. Chainpur VDC is the district headquarter and is the key growth centre , centralized all facilities available in the district level . The district lies between 29° 29' to 30° 9' North latitude and 80° 46' to 81° 34' East longitude in range . The elevation of the district is 914.4 to 70104.4 meters at Saipal, Kanda VDC from the mean sea level . Most of the parts of the districts lies in the Himalayan and Mahabharata range and have steep slope . The total land area of the district is about 3422 Sq.Km. Out of the total area, 268.83 Sq.Km occupies Agricultural land, 1024.43 Sq.Km land area occupies Forest area and remaining 198.65 Sq.Km covers Grass Land. The average temperature of the district varies from minimum 2C to -7C to maximum 20 to 32C . The average annual precipitation is 50 to 150 ml The major river of the Bajhang District is Seti river. .

The total population of the Bajhang district is 194,701 (CBS 2011) comprising of males 92,794 (47.65%) and females 102,365 (52.45%) inhabit in 33,786 households within the 47 VDCs of the district.

Figure 1 Location of the district



The total population of the Bajhang district is 194,701 (CBS 2011) comprising of males 92,794 (47.65%) and females 102,365 (52.45%) inhabit in 33,786 households within the 47 VDCs of the district. Bajhang district has an average population density of around 57 people per sq. km. The average family size is 5.64. Life expectancy of the people is 62.2 years. The average literacy rate is about 46.48% (35.17% female and 57.79% male are literate). Bajhang district has a multi ethnic composition with Chettri(58.43%), Thakuri(11.58%), Bhramin(10.77%), Dalit (13.59%), Sanyasi (1.03), others(4.20%) . The common language is Nepali (99.83%) followed by Maithali (0.015%) Bhojpuri(0.0065), Tharu(0.0053%) Tamang(0.027%), Newari (0.065%), Magar(0.015%), Abhadi(0.001%), Gurung(0.004%), Urdu(0.002%) and Sherpa(0.025%).

Politically, Bajhang District is divided into 11 Illakas and 47 Village Development Committees .Most of the VDC Headquarter is not linked with the Roads. The district headquarter is linked with Khodpe-Chainpur Feeder Road. Bajhang district is located in the Seti zone in the Far Western Development Region of Nepal. It is surrounded by Bajura and Humla district in the East, Baitadi and Darchula District in the west, Humla District,China and Tibet in the north and Baitadai and Doti district in south.

2. DISTRICT ROAD CORE NETWORK (DRCN)

This chapter gives an overview of the existing roads in Bajhang District, distinguishing between strategic roads and rural roads. It goes on to identify those rural roads that make up the district road core network (DRCN) that will form the basis for this DTMP. The remaining rural roads are classified as village roads. The concept of DRCN is such that ,that particular road which will connect the VC headquarter by which all of the people from the VDC will be able to access the strategic road.

2.1 TOTAL ROAD NETWORK

Bajhang district has an estimated road network of 214.80 kilometers, including 79.98Km of strategic roads managed by DOR and 134.82 kilometers of rural roads managed by Bajhang DDC and the VDCs. Most of the district roads and all of the rural roads have an earthen surface. A map of the total road network in Bajhang district is shown in Figure at the end of this chapter.

Table 2.1.1 Total road length (km)

| Road Class | Total length | Black Top | Gravel | Earthen |
|-----------------|---------------|--------------|-------------|---------------|
| Strategic roads | 79.98 | 79.98 | - | - |
| Urban roads | - | - | - | - |
| Rural roads | 134.82 | | 1.19 | 133.62 |
| Total | 214.80 | 79.98 | 1.19 | 133.62 |

2.2 NATIONAL HIGHWAYS AND FEEDER ROADS

Bajhang district has 1 Feeder Road totaling 79.98 km. The Feeder Road is black topped of length 79.98 Kilometers.

Table 2.2.1 National Highways and Feeder Roads (km)

| Code | Description | Total length | Black Top | Gravel | Earthen |
|--------------|-------------------|--------------|-----------|--------|---------|
| F049 | Khodpe - Chainpur | 79.98 | 79.98 | | |
| Total | | 79.98 | | | |

2.3 DISTRICT ROAD CORE NETWORK

As part of the preparation of this DTMP, the District Road Core Network (DRCN) was identified together with the DTICC and DDC. This DRCN is the minimum network that allows all VDC headquarters to be connected with the strategic road network and the district headquarters, either directly or through other VDCs. In the selection of the DRCN roads, account was taken of the road conditions and the existing traffic levels. The identified DRCN roads were subsequently provided with road codes according to national standards.

The resulting District Road Core Network in Bajhang district is shown in Figure 3 at the end of this chapter. The DRCN covers 47 VDCs out of 47 VDCs. The DRCN consists of 47 district roads with a total length of 131.55 km. All DRCN roads are currently earthen roads some are gravel and are considered fair-weather only.

Table 2.3.1 Total road length (km)

| Road Class | Total length | Black Top | Gravel | Earthen |
|-----------------------------------|---------------------|------------------|---------------|----------------|
| Strategic road network | 79.98 | 79.98 | - | - |
| Highways | - | | | |
| Feeder roads | 79.98 | 79.98 | | |
| Urban roads | 0 | - | - | - |
| | 0 | 0 | 0 | 0 |
| District road core network | 131.55 | - | - | 131.55 |
| Village roads | 3.27 | - | 1.19 | 2.07 |
| Total | 214.80 | 79.98 | 1.19 | 133.62 |

Table 2.3.2 District road core network (km)

| Code | Description | Total length | New Construction | Black Top | Gravel | Earth en | All weather | Fair weather |
|--------------|---|---------------|------------------|-----------|--------|---------------|-------------|---------------|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 13.00 | | - | - | 13.00 | - | 13.00 |
| 68DR002 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel - Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-Darchula] | 5.10 | | - | - | 5.10 | - | 5.10 |
| 68DR003 | DHANSEI SADAK[Bijgada - Dahabagar - Kanda] | | 80.00 | | | | | |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada-Khiritadi - Pipalkot-Kafalseri-Darchula] | 15.25 | | - | - | 15.25 | - | 15.25 |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata - Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | 59.66 | | - | - | 59.66 | - | 59.66 |
| 68DR006 | PATHIVERA SADAK [Maurebagar-Chaudhari-Maulali-Sainpasela-Lekhgaun-Pathivera-Surma] | 8.72 | | - | - | 8.72 | - | 8.72 |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | 1.00 | | - | - | 1.00 | - | 1.00 |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela) - Jhuteda(Byashi) - Jay Prithivinagar] | 9.00 | | - | - | 9.00 | - | 9.00 |
| 68DR009 | KHAPTAD SADAK[Puwagadi - Netadhar - Toli - otuwa - Gadaraya] | | 20.00 | | | | | |
| 68DR010 | SURMA SADAK [Rithapatta(Shelakhet) -Daulichour-Surma-Pathivera] | 0.37 | | - | - | 0.37 | - | 0.37 |
| 68DR011 | CHANNA SADAK[Gadarya - Patadewal - Kalukheti - ajhigaun - Laatola - Puwagadi - Luyata-Chainpur] | | 20.00 | | | | | |
| 68DR012 | DHADAR MASTA SADAK [Luyanata -Hemantabada-Kailash-Kotdewal-Masta- Rilu-Datola-Melbisuna] | 0.49 | | - | - | 0.49 | - | 0.49 |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal -Taklakot] | 18.97 | | | | 18.97 | - | 18.97 |
| Total | | 131.55 | | - | - | 131.55 | - | 131.55 |

2.4 VILLAGE ROADS

The remaining roads that do not form part of the identified district road core network (DRCN) are classified as village roads and are under the responsibility of the 47 VDCs in Bajhang district. These are roads of a lower importance that do not form the main link between the VDC headquarters and the district headquarters or strategic road network. Instead they provide additional access to other parts of the VDCs.

Each 47 VDC will thus be responsible for village roads. It is recommended that the VDCs organise maintenance workers to carry out the emergency and routine/recurrent maintenance of these roads to ensure they remain accessible. Any upgrading or new construction of village roads falls outside the scope of this DTMP and is the responsibility of the VDCs.

Funding for these roads will mainly come from the VDC grants. Some district funding will also be allocated to the village roads. However, this district funding will be mainly for maintenance, especially emergency maintenance and routine/recurrent maintenances keep the village roads open.

Figure 2 Total road inventory

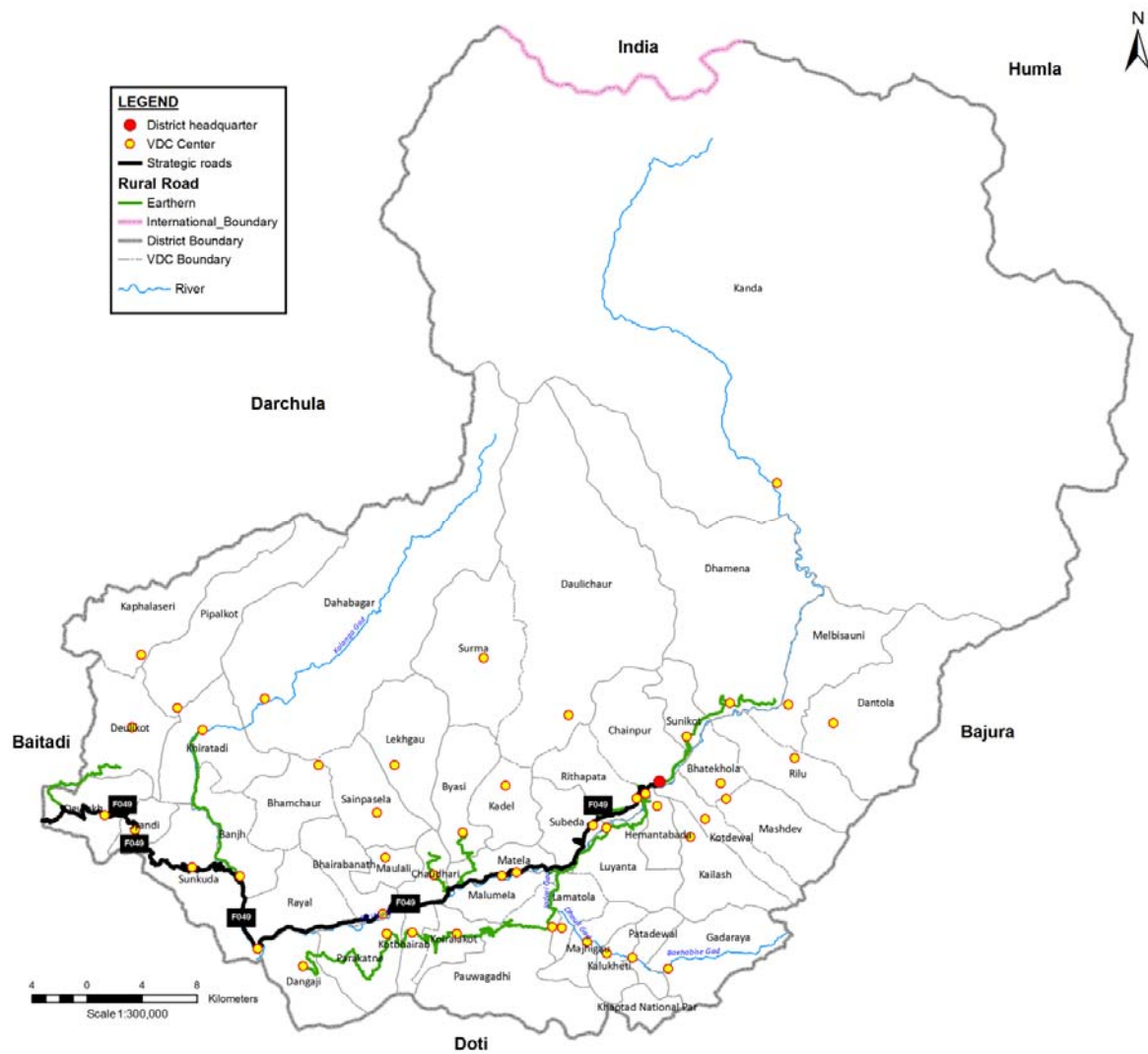
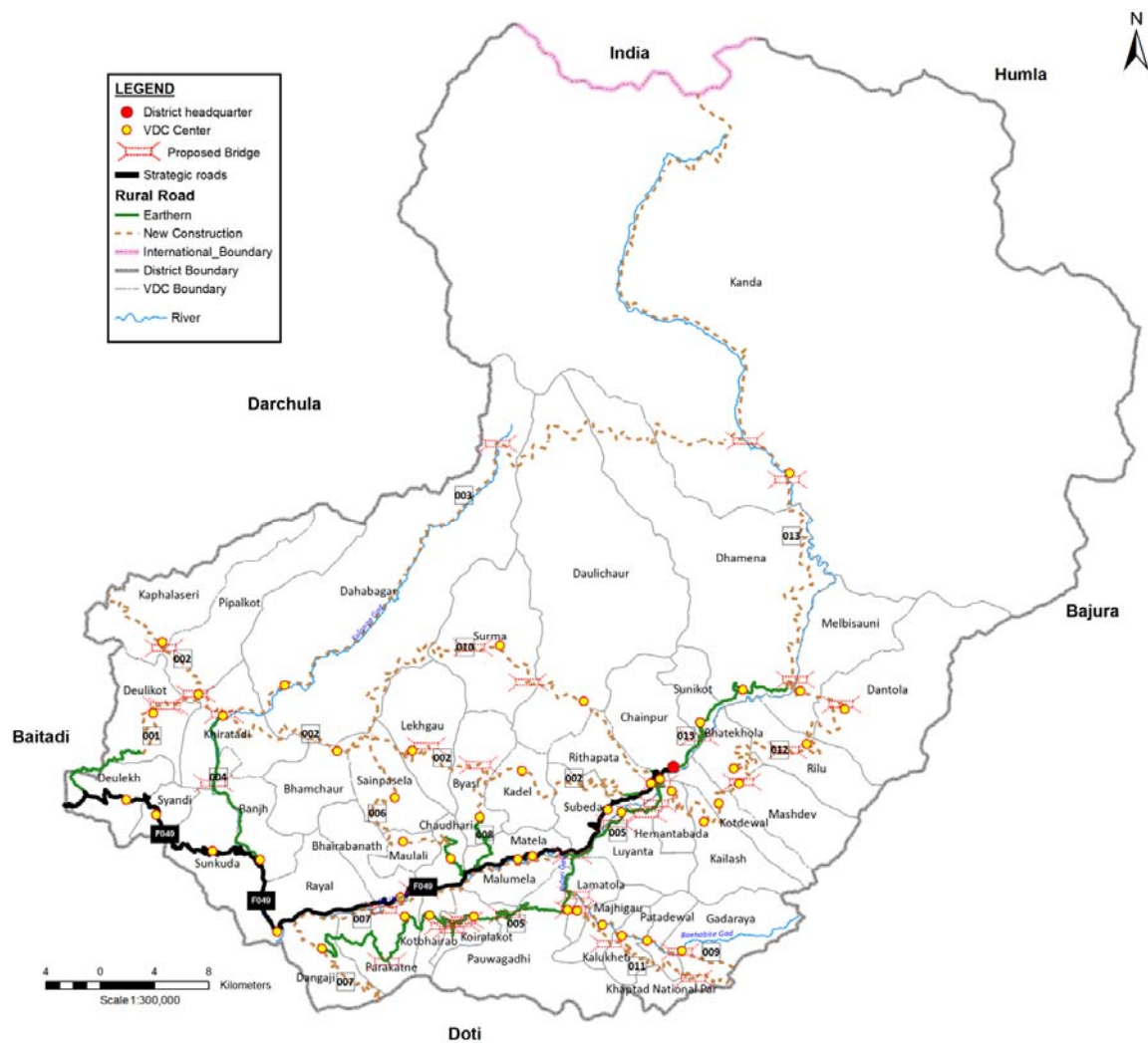


Figure 3 District Road Core Network (DRCN)



3. DISTRICT TRANSPORT PERSPECTIVE PLAN (DTPP)

The District Transport Perspective Plan is simply the list of all the identified interventions that are necessary to bring the roads to a maintainable all-weather standard and keep them there, as well as the construction of any new roads considered necessary to complete the DRCN. As such it is the summation of the interventions identified which are required to improve the road to the proper standard, as well as the conservation requirements to keep the roads at this standard.

3.1 CONSERVATION

Allocations to conservation has been done in order of priority: emergency maintenance – routine – recurrent (blacktop) – recurrent (gravel) – periodic (blacktop) – periodic maintenance (gravel). And reduction in allocation should be applied to the lowest priority type of conservation. The total requirements of the emergency maintenance is 27.85 Km, routine maintenance is 131.55 Km recurrent maintenance is 0 Km and periodic maintenance is 131.55 km in the Bajhang district.

Table 3.1.1 Conservation requirements

| Code | Emergency maintenance (km) | Routine maintenance (km) | Recurrent maintenance (km) | Periodic maintenance (km) |
|--------------|----------------------------|--------------------------|----------------------------|---------------------------|
| 68DR001 | 3.00 | 13.00 | | 13.00 |
| 68DR002 | 1.00 | 5.10 | | 5.10 |
| 68DR004 | 1.00 | 15.25 | | 15.25 |
| 68DR005 | 10.00 | 59.66 | | 59.66 |
| 68DR006 | 1.00 | 8.72 | | 8.72 |
| 68DR007 | | 1.00 | | 1.00 |
| 68DR008 | 9.00 | 9.00 | | 9.00 |
| 68DR010 | 0.37 | 0.37 | | 0.37 |
| 68DR012 | 0.49 | 0.49 | | 0.49 |
| 68DR013 | 2.00 | 18.97 | | 18.97 |
| Total | 27.85 | 131.55 | - | 131.55 |

3.2 IMPROVEMENT

Improvement of the DRCN road includes rehabilitation, gravelling, application of required cross drainage and protective structures, blacktopping and widening, which gives the DRCN roads in all weather standard.

Rehabilitation refers to existing road network where the roads are in poor condition, to require an improved road surface. Gravelling refer in existing earthen road to make them all weather standards. Similarly blacktopping refers in existing gravel road to improve its standard. Cross drainage structure (causeway, pipe culvert, slab culvert, bridge), protective structures (gabion wall, masonry wall, dry wall) are required to meet the all weather standard of the DRCN roads.

3.2.1 REHABILITATION

Rehabilitation and upgrading refer to the existing road network where the roads are found to be in poor condition, to require technical improvement (curves, gradients, etc) or to require an improved road surface. During field survey the rehabilitation works to be carried out is found to be 85.96 km out of the entire length of DRCN roads.

Table 3.2.1 Sections of the district road core network requiring rehabilitation

| Code | Description | Total length (km) | Rehabitation (km) |
|--------------|---|-------------------|-------------------|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 13.00 | 2.00 |
| 68DR002 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel - Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-Darchula] | 5.10 | 5.10 |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada-Khiritadi - Pipalkot-Kafalseri-Darchula] | 15.25 | 3.00 |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata - Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | 59.66 | 44.00 |
| 68DR006 | PATHIVERA SADAK [Maurebagar-Chaudhari-Maulali-Sainpasela-Lekhgaun-Pathivera-Surma] | 8.72 | 3.00 |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | 1.00 | 14.00 |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela) -Jhuteda(Byashi) - Jay Prithivinagar] | 9.00 | 9.00 |
| 68DR010 | SURMA SADAK [Rithapatta(Shelakhet) - Daulichour- Surma-Pathivera] | 0.37 | 0.37 |
| 68DR012 | DHADAR MASTA SADAK [Luyanata - Hemantabada-Kailash-Kotdewal-Masta- Rilu-Datola-Melbisuna] | 0.49 | 0.49 |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal -Taklakot] | 18.97 | 5.00 |
| Total | | 131.55 | 85.96 |

3.2.2 GRAVELLING

To improve the surface condition of the existing earthen roads considered in DRCN, 131.55 km will have to be converted into gravel standard to maintain as all weather condition.

Table 3.2.2 Sections of the district road core network requiring gravelling

| Code | Description | Total length (km) | Gravelling (km) |
|--------------|---|-------------------|-----------------|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 13.00 | 13.00 |
| 68DR002 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel - Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-Darchula] | 5.10 | 5.10 |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada-Khiritadi - Pipalkot-Kafalseri-Darchula] | 15.25 | 15.25 |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata - Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | 59.66 | 59.66 |
| 68DR006 | PATHIVERA SADAK [Maurebagar-Chaudhari-Maulali-Sainpasela-Lekhgaun-Pathivera-Surma] | 8.72 | 8.72 |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | 1.00 | 1.00 |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela) -Jhuteda(Byashi) - Jay Prithivinagar] | 9.00 | 9.00 |
| 68DR010 | SURMA SADAK [Rithapatta(Shelakhet) - Daulichour- Surma-Pathivera] | 0.37 | 0.37 |
| 68DR012 | DHADAR MASTA SADAK [Luyanata - Hemantabada-Kailash-Kotdewal-Masta- Rilu-Datola-Melbisuna] | 0.49 | 0.49 |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal -Taklakot] | 18.97 | 18.97 |
| Total | | 131.55 | 131.55 |

3.2.3 CROSS DRAINAGE

To maintain the road in all weather condition, the required cross drainage structures are listed during the DRCN survey. The required cross drainage structure are shown in table below.

Table 3.2.3 Required cross drainage structures

| Code | Description | Bridge (m) | Slab culvert (m) | CC Causeway (m) | Stone Causeway (m) | Pipe culvert (units) |
|--------------|---|------------|------------------|-----------------|--------------------|----------------------|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 13 | 9 | | 20 | 2 |
| 68DR002 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel - Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-Darchula] | | | | 5 | |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada-Khiritadi - Pipalkot-Kafalseri-Darchula] | 35 | | - | 29 | 5 |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata -Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | 301 | 10 | | 45 | 13 |
| 68DR006 | PATHIVERA SADAK [Maurebagar-Chaudhari-Maulali-Sainpasela-Lekhgaun-Pathivera-Surma] | | 10 | | | 1 |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | - | - | | - | - |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela) -Jhuteda(Byashi) - Jay Prithivinagar] | | | | 5 | 3 |
| 68DR010 | SURMA SADAK [Rithapatta(Shelakhet) - Daulichour- Surma-Pathivera] | | | | | |
| 68DR012 | DHADAR MASTA SADAK [Luyanata - Hemantabada-Kailash-Kotdewal-Masta-Rilu-Datola-Melbisuna] | | | | | |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal - Taklakot] | 45 | | | 5 | 3 |
| Total | | 394 | 29 | - | 109 | 27 |

3.2.4 PROTECTIVE STRUCTURES

To maintain the road in all weather condition, the required protective structures are listed during the DRCN survey. The required protective structure is shown in table below.

Table 3.2.4 Required protective structures

| Code | Description | Masonry walls (m ³) | Gabion walls (m ³) | Lined drain (m) |
|--------------|---|---------------------------------|--------------------------------|-----------------|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 380 | 2,200 | 7,000 |
| 68DR002 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel - Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-Darchula] | 80 | 770 | 4,000 |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada-Khiritadi - Pipalkot-Kafalseri-Darchula] | 80 | 1,150 | 13,250 |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata - Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | 1,290 | 7,240 | 50,000 |
| 68DR006 | PATHIVERA SADAK [Maurebagar-Chaudhari-Maulali-Sainpasela-Lekhgaun-Pathivera-Surma] | | 3,000 | 7,000 |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | - | 300 | - |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela) - Jhuteda(Byashi) - Jay Prithivinagar] | 460 | 880 | 7,500 |
| 68DR010 | SURMA SADAK [Rithapatta(Shelakhet) -Daulichour-Surma-Pathivera] | | | |
| 68DR012 | DHADAR MASTA SADAK [Luyanata -Hemantabada-Kailash-Kotdewal-Masta- Rilu-Datola-Melbisuna] | | 100 | |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal -Taklakot] | 510 | 880 | 17,000 |
| Total | | 2,800 | 16,520 | 105,750 |

3.2.5 WIDENING

The widening roads are done only to those roads which do not meet the prior district road standard also, the road must have VPD greater than 100. Although, the VPD of the roads are not greater than 100 most of the roads exists as track opening in Bajhang District so, the widening of the roads are necessary.

Table 3.2.5 Sections of the district road core network requiring widening

| Code | Description | Total length (km) | Widening (m) |
|--------------|---|-------------------|--------------|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 13.00 | 13 |
| 68DR002 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel - Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-Darchula] | 5.10 | 5 |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada-Khiritadi - Pipalkot-Kafalseri-Darchula] | 15.25 | 15 |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata - Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | 59.66 | 54 |
| 68DR006 | PATHIVERA SADAK [Maurebagar-Chaudhari-Maulali-Sainpasela-Lekhgaun-Pathivera-Surma] | 8.72 | 9 |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | 1.00 | 1 |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela) - Jhuteda(Byashi) - Jay Prithivinagar] | 9.00 | 9 |
| 68DR010 | SURMA SADAK [Rithapatta(Shelakhet) -Daulichour-Surma-Pathivera] | 0.37 | 0 |
| 68DR012 | DHADAR MASTA SADAK [Luyanata -Hemantabada-Kailash-Kotdewal-Masta- Rilu-Datola-Melbisuna] | 0.49 | 0 |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal -Taklakot] | 18.97 | 19 |
| Total | | 131.55 | 125 |

3.2.6 BLACKTOPPING

To improve the surface condition of the DRCN roads based on the PCU greater than 150, the required blacktopping of DRCN roads are listed during the DRCN survey. No such sections of the road with PCU 150 were identified.

Table 3.2.6 Sections of the district road core network requiring blacktopping

| Code | Description | Total length (km) | Blacktop (km) | Traffic (PCU) | Blacktopping (km) |
|--------------|---|-------------------|---------------|---------------|-------------------|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 13.00 | - | 2 | - |
| 68DR002 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel - Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-Darchula] | 5.10 | - | - | - |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada - Khiratadi - Pipalkot-Kafalseri-Darchula] | 15.25 | - | 9 | - |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata -Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | 59.66 | - | - | - |
| 68DR006 | PATHIVERA SADAK [Maurebagar- Chaudhari-Maulali-Sainpasela- Lekhgaun-Pathivera-Surma] | 8.72 | - | - | - |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | 1.00 | - | - | - |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela) -Jhuteda(Byashi) - Jay Prithivinagar] | 9.00 | - | - | - |
| 68DR010 | SURMA SADAK [Rithapatta(Shelakhet) -Daulichour- Surma-Pathivera] | 0.37 | - | - | - |
| 68DR012 | DHADAR MASTA SADAK [Luyanata - Hemantabada-Kailash-Kotdewal- Masta- Rilu-Datola-Melbisuna] | 0.49 | - | - | - |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal - Taklakot] | 18.97 | - | 11 | - |
| Total | | 131.55 | | | - |

3.3 NEW CONSTRUCTION

New construction road are proposed to such VDC which do not have access to the roads yet. In Bajhang District most of the VDC do have access to the roads.

Table 3.3.1 Sections of the district road core network requiring new construction

| Code | Description | New VDCs | Existing length | New length | Bridge (m) |
|--------------|---|--|-----------------|---------------|--------------|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | Pipalkot | 13.00 | 9.84 | 150 |
| 68DR002 | BANNI ASTA SADAK [Rithapata - Subeda - Kadel (Jayprithivinagar)- Byasi - Lekhgaun - Sainpasela - Bhachour - Khirtadi - Pipalkot-Kafalseri- (Ganai)Darchula] | Subeda , Kadel , Byasi , Lekhgaun , Sainpasela, Bhachour , Khirtadi , Pipalkot,Kafalseri | 5.10 | 80.00 | 300 |
| 68DR003 | DHANSEI SADAK[Bijgada - Dahabagar - Kanda] | Khirtadi,dahabagar ,Kanda | | 80.00 | 125 |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada-Khiritadi - Pipalkot-Kafalseri-Darchula(Ganai)] | Pipalkot, Kafalseri | 15.25 | - | |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata - Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | | 59.66 | 5.70 | 100 |
| 68DR006 | PATHIVERA SADAK [aurebagar-Chaudhari-aulali-Sainpasela-Lekhgaun(Pathivera)] | Lekhgaun | 8.72 | 40.00 | |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | aluela,Kotbhairav,Parakatne,Dangaji | 1.00 | 20.00 | 90 |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(atela) - Jhuteda(Byashi) - Jay Prithivinagar] | | 9.00 | 2.00 | |
| 68DR009 | KHAPTAD SADAK[Puwagadi - Netadhar - Toli - otuwa - Gadaraaya] | Gadarya, Patadewal ,Kalukheti ,ajhigaun, Laatola ,Puwagadi | - | 20.00 | 100 |
| 68DR010 | SURA SADAK [Rithapatta(Shelakhet) -Daulichour-Sura-Pathivera] | Daulichour, Sura,Lekhgaun | 0.37 | 20.00 | 110 |
| 68DR011 | CHANNA SADAK[Gadarya - Patadewal - Kalukheti - ajhigaun - Laatola - Puwagadi - Luyata-Chainpur] | Gadarya, Patadewal ,Kalukheti ,ajhigaun, Laatola ,Puwagadi ,Luyata,Chainpur | - | 20.00 | 130 |
| 68DR012 | DHADAR ASTA SADAK [Luyanata -Heantabada-Kailash-Kotdewal-asta- Bhatekhola -Rilu-Datola-elbisuna - Kanda(Dhuli)] | Heantabada,Kailash, Kotdewal,asta, Rilu,Datola,elbisuna, Kanda | 0.49 | 40.00 | 130 |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal -Urai-Taklakot] | Kanda | 18.97 | 84.00 | 80 |
| Total | | | 131.55 | 421.54 | 1,315 |

3.4 DISTRICT TRANSPORT PERSPECTIVE PLAN

The DTPP looks at the DTPP at the new construction, rehabilitation, and upgrading works deemed necessary, which are ranked according to the specific criteria. New construction is required where the existing network does not provide sufficient accessibility. Whereas the roads are found to be in poor condition upgrading is required. All of the DRCN roads of Bajhang district are fair. To make them all weather 131.55 Km roads should gravel, 1709m bridge, 29m slab culvert, 109m stone causeway, 27 no. of pipe culvert, 2800 cubic meter masonry wall, 16520 cubic meter gabion wall and 105,750m line drain is required.

Table 3.4.1 District Transport Perspective Plan

| Code | Emergency maintenance (km) | Routine maintenance (km) | Recurrent maintenance (km) | Periodic maintenance (km) | Rehabilitation (km) | Gravelling (km) | Blacktopping (km) | Widening (m) | Bridge (m) | Slab culvert (m) | CC Causeway (m) | Stone Causeway (m) | Pipe culvert (units) | Masonry walls (m3) | Gabion walls (m3) | Lined drain (m) | New construction (km) |
|--------------|----------------------------|--------------------------|----------------------------|---------------------------|---------------------|-----------------|-------------------|--------------|--------------|------------------|-----------------|--------------------|----------------------|--------------------|-------------------|-----------------|-----------------------|
| 68DR001 | 3.00 | 13.00 | - | 13.00 | 2.00 | 13.00 | - | 12.50 | 163.00 | 9.00 | - | 20.00 | 2.00 | 380.00 | 2,200.00 | 7,000.00 | 9.84 |
| 68DR002 | 1.00 | 5.10 | - | 5.10 | 5.10 | 5.10 | - | 5.10 | 300.00 | - | - | 5.00 | - | 80.00 | 770.00 | 4,000.00 | 80.00 |
| 68DR003 | 1.00 | 15.25 | - | 15.25 | 3.00 | 15.25 | - | 15.25 | 160.00 | - | - | 29.00 | 5.00 | 80.00 | 1,150.00 | 13,250.00 | 80.00 |
| 68DR004 | 10.00 | 59.66 | - | 59.66 | 44.00 | 59.66 | - | 54.00 | 301.00 | 10.00 | - | 45.00 | 13.00 | 1,290.00 | 7,240.00 | 50,000.00 | - |
| 68DR005 | 1.00 | 8.72 | - | 8.72 | 3.00 | 8.72 | - | 8.72 | 100.00 | 10.00 | - | - | 1.00 | - | 3,000.00 | 7,000.00 | 5.70 |
| 68DR006 | - | 1.00 | - | 1.00 | 14.00 | 1.00 | - | 1.00 | - | - | - | - | - | - | 300.00 | - | 40.00 |
| 68DR007 | 9.00 | 9.00 | - | 9.00 | 9.00 | 9.00 | - | 9.00 | 90.00 | - | - | 5.00 | 3.00 | 460.00 | 880.00 | 7,500.00 | 20.00 |
| 68DR008 | 0.37 | 0.37 | - | 0.37 | 0.37 | 0.37 | - | 0.37 | - | - | - | - | - | - | - | - | 2.00 |
| 68DR009 | 0.49 | 0.49 | - | 0.49 | 0.49 | 0.49 | - | 0.49 | 100.00 | - | - | - | - | - | 100.00 | - | 20.00 |
| 68DR010 | 2.00 | 18.97 | - | 18.97 | 5.00 | 18.97 | - | 18.97 | 155.00 | - | - | 5.00 | 3.00 | 510.00 | 880.00 | 17,000.00 | 20.00 |
| 68DR011 | 27.85 | 131.55 | - | 131.55 | 85.96 | 131.55 | - | 125.39 | 524.00 | 29.00 | - | 109.00 | 27.00 | 2,800.00 | 16,520.00 | 105,750.00 | 20.00 |
| 68DR012 | - | - | - | - | - | - | - | - | 130.00 | - | - | - | - | - | - | - | 40.00 |
| 68DR013 | - | - | - | - | - | - | - | - | 80.00 | - | - | - | - | - | - | - | 84.00 |
| Total | 27.85 | 131.55 | - | 131.55 | 85.96 | 131.55 | - | 125 | 1,709 | 29 | - | 109 | 27 | 2,800 | 16,520 | 105,750 | 421.54 |

[illegible]

4. COST ESTIMATION

With the DTPP providing the full list of required interventions to bring the DRCN to a maintainable all-weather standard and keep it there, the costs of these interventions can be calculated using the standard costs determined.

The conservation, improvement, new construction costs are calculated for the first year as an indication of the amount of funding required. The costs are estimated by multiplying the length of roads requiring conservation, improvement, new construction by the relevant standard cost, taking into account the surface type for recurrent and periodic maintenance. These estimated costs reflect the costs for the first year of keeping the existing DRCN in good condition. A cost for later years is varying due to changes to the road network in terms of upgrading and new construction.

4.1 CONSERVATION

The conservation costs are calculated for the first year to arrive at the amount of funding required. The costs are calculated by multiplying the lengths of roads requiring conservation by the relevant standard costs for different types of surfaces and type of maintenance. The Standard unit costs for conservation are listed in table 4.1.

Table 4.1.1 Standard unit costs for conservation

| Activity | Unit | Unit cost (NPR/km) |
|----------------------------------|------|--------------------|
| Emergency maintenance | km | 30,000 |
| Routine maintenance | km | 20,000 |
| Recurrent maintenance (blacktop) | km | 500,000 |
| Recurrent maintenance (gravel) | km | 400,000 |
| Recurrent maintenance (earthen) | km | 250,000 |
| Periodic maintenance (blacktop) | km | 200,000 |
| Periodic maintenance (gravel) | km | 250,000 |

The total conservation costs for the first year is Rs 39,465,000 the total estimated conservation cost for the five year is Rs.197,327,000. Due to the road length and road surface the cost will change in later year.

Table 4.1.2 Estimated conservation costs for the first year (NPR '000)

| Code | Total length (km) | Blacktop (km) | Gravel (km) | Earthen (km) | Emergency | Routine | Recurrent (blacktop) | Recurrent (gravel) | Recurrent (earthen) | Periodic (blacktop) | Periodic (gravel) | Total annual cost | Total 5-year cost |
|--------------|-------------------|---------------|-------------|---------------|--------------|--------------|----------------------|--------------------|---------------------|---------------------|-------------------|-------------------|-------------------|
| 68DR001 | 13.00 | - | - | 13.00 | 390 | 260 | - | - | 3,250 | - | - | 3,900 | 19,500 |
| 68DR002 | 5.10 | - | - | 5.10 | 153 | 102 | - | - | 1,275 | - | - | 1,530 | 7,650 |
| 68DR004 | 15.25 | - | - | 15.25 | 458 | 305 | - | - | 3,813 | - | - | 4,575 | 22,875 |
| 68DR005 | 59.66 | - | - | 59.66 | 1,790 | 1,193 | - | - | 14,915 | - | - | 17,898 | 89,490 |
| 68DR006 | 8.72 | - | - | 8.72 | 262 | 174 | - | - | 2,180 | - | - | 2,616 | 13,080 |
| 68DR007 | 1.00 | - | - | 1.00 | 30 | 20 | - | - | 250 | - | - | 300 | 1,500 |
| 68DR008 | 9.00 | - | - | 9.00 | 270 | 180 | - | - | 2,250 | - | - | 2,700 | 13,500 |
| 68DR010 | 0.37 | - | - | 0.37 | 11 | 7 | - | - | 92 | - | - | 110 | 549 |
| 68DR012 | 0.49 | - | - | 0.49 | 15 | 10 | - | - | 121 | - | - | 146 | 728 |
| 68DR013 | 18.97 | - | - | 18.97 | 569 | 379 | - | - | 4,743 | - | - | 5,691 | 28,455 |
| Total | 131.55 | - | - | 131.55 | 3,947 | 2,631 | - | - | 32,888 | - | - | 39,465 | 197,327 |

4.2 IMPROVEMENT

The improvement costs are calculated by multiplying the length of roads requiring to the standard cost provide by the DDC Bajhang, taking into account the surface type for recurrent and periodic maintenance.

Table 4.2.1 Standard unit costs for improvement activities

| Activity | Unit | Unit cost (NPR) |
|-----------------------------|----------------|-----------------|
| Rehabilitation | km | 800,000 |
| Widening | m | 25,000 |
| Gravelling | km | 2,500,000 |
| Blacktopping | km | 10,000,000 |
| Bridge construction | m | 600,000 |
| Slab culvert construction | m | 150,000 |
| CC Causeway construction | m | 100,000 |
| Stone Causeway construction | m | 10,000 |
| Pipe culvert placement | unit | 10,000 |
| Masonry wall construction | m ³ | 10,000 |
| Gabion wall construction | m ³ | 5,000 |
| Lined drain construction | m | 1,000 |

The estimated cost for the improvement of the existing DRCN is the cost to maintain the DRCN to a maintainable all-weather standard. The total cost for improvement is NPR 859,240,000 as shown in table 4.2.2 as below.

Table 4.2.2 Cost estimate for improvement measures (NPR '000)

| Code | Total length (km) | Rehabilitation | Widening | Gravelling | Blacktopping | Bridges | Slab culverts | CC causeways | Stone causeways | Pipe culvert | Masonry walls | Gabion walls | Lined drains | Total cost |
|--------------|-------------------|----------------|--------------|----------------|--------------|----------------|---------------|--------------|-----------------|--------------|---------------|---------------|----------------|----------------|
| 68DR001 | 13.00 | 1,600 | 313 | 32,500 | - | 7,800 | 1,350 | - | 200 | 20 | 3,800 | 11,000 | 7,000 | 65,583 |
| 68DR002 | 5.10 | 4,080 | 128 | 12,750 | - | - | - | - | 50 | - | 800 | 3,850 | 4,000 | 25,658 |
| 68DR004 | 15.25 | 2,400 | 381 | 38,125 | - | 21,000 | - | - | 290 | 50 | 800 | 5,750 | 13,250 | 82,046 |
| 68DR005 | 59.66 | 35,200 | 1,350 | 149,150 | - | 180,600 | 1,500 | - | 450 | 130 | 12,900 | 36,200 | 50,000 | 467,480 |
| 68DR006 | 8.72 | 2,400 | 218 | 21,800 | - | - | 1,500 | - | - | 10 | - | 15,000 | 7,000 | 47,928 |
| 68DR007 | 1.00 | 11,200 | 25 | 2,500 | - | - | - | - | - | - | - | 1,500 | - | 15,225 |
| 68DR008 | 9.00 | 7,200 | 225 | 22,500 | - | - | - | - | 50 | 30 | 4,600 | 4,400 | 7,500 | 46,505 |
| 68DR010 | 0.37 | 296 | 9 | 915 | - | - | - | - | - | - | - | - | - | 1,220 |
| 68DR012 | 0.49 | 392 | 12 | 1,213 | - | - | - | - | - | - | - | 500 | - | 2,117 |
| 68DR013 | 18.97 | 4,000 | 474 | 47,425 | - | 27,000 | - | - | 50 | 30 | 5,100 | 4,400 | 17,000 | 105,479 |
| Total | 131.55 | 68,768 | 3,135 | 328,878 | - | 236,400 | 4,350 | - | 1,090 | 270 | 28,000 | 82,600 | 105,750 | 859,240 |

4.3 NEW CONSTRUCTION

New constructions are required those VDC's which are not connected by the road. In Bajhang District most of the VDC's are not connected by the roads.

Table 4.3.1 Standard unit costs for new construction

| Activity | Unit | Unit cost (NPR) |
|---------------------|------|-----------------|
| Opening up | km | 4,000,000 |
| Gravelling | km | 2,500,000 |
| Bridge construction | m | 10,000,000 |

The new construction required to complete the DRCN is identified. The new construction cost calculated is NPR. 15,890,010,000 which is shown in table 4.3.2 as below.

Table 4.3.2 Cost estimate for new construction (NPR '000)

| Code | Description | Length (km) | Opening up | Gravelling | Bridges | Total cost |
|--------------|---|---------------|------------------|------------------|-------------------|-------------------|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 9.84 | 39,360 | 24,600 | 1,500,000 | 1,563,960 |
| 68DR002 | BANNI ASTA SADAK [Rithapata - Subeda - Kadel (Jayprithivinagar)- Byasi - Lekhgaun - Sainpasela - Bhachour - Khirtadi - Pipalkot- Kafalseri-(Ganai)Darchula] | 80.00 | 320,000 | 200,000 | 3,000,000 | 3,520,000 |
| 68DR003 | DHANSERI SADAK[Bijgada - Dahabagar - Kanda] | 80.00 | 320,000 | 200,000 | 1,250,000 | 1,770,000 |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada- Khirtadi - Pipalkot-Kafalseri- Darchula(Ganai)] | - | - | - | - | - |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata -Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji- Dipayal] | 5.70 | 22,800 | 14,250 | 1,000,000 | 1,037,050 |
| 68DR006 | PATHIVERA SADAK [aurebagar- Chaudhari-aulali-Sainpasela- Lekhgaun(Pathivera)] | 40.00 | 160,000 | 100,000 | - | 260,000 |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | 20.00 | 80,000 | 50,000 | 900,000 | 1,030,000 |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(atela) -Jhuteda(Byashi) - Jay Prithivinagar] | 2.00 | 8,000 | 5,000 | - | 13,000 |
| 68DR009 | KHAPTAD SADAK[Puwagadi - Netadhar - Toli - otuwa - Gadaraya] | 20.00 | 80,000 | 50,000 | 1,000,000 | 1,130,000 |
| 68DR010 | SURA SADAK [Rithapatta(Shelakhet) - Daulichour- Sura-Pathivera] | 20.00 | 80,000 | 50,000 | 1,100,000 | 1,230,000 |
| 68DR011 | CHANNA SADAK[Gadarya - Patadewal - Kalukheti - ajhigaun - Laatola - Puwagadi - Luyata-Chainpur] | 20.00 | 80,000 | 50,000 | 1,300,000 | 1,430,000 |
| 68DR012 | DHADAR ASTA SADAK [Luyanata - Heantabada-Kailash-Kotdewal-asta- Bhatekhola -Rilu-Datola-elbisuna - Kanda(Dhuli)] | 40.00 | 160,000 | 100,000 | 1,300,000 | 1,560,000 |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal - Urai-Taklakot] | 84.00 | 336,000 | 210,000 | 800,000 | 1,346,000 |
| Total | | 421.54 | 1,686,160 | 1,053,850 | 13,150,000 | 15,890,010 |

4.4 DTPP COSTS

The DTPP cost is the required cost for long list of conservation, improvement and new construction for DRCN selected in the district. Projected 5-year Budget will not be sufficient to meet all the cost. The total DTPP cost calculated is NPR 18,003,144,000 which is shown in the table 4.4.1 as below.

Table 4.4.1 DTPP costs (NPR '000)

| Code | Conservation | Improvement | New construction | Total |
|--------------|---------------------|--------------------|-------------------------|-------------------|
| 68DR001 | 19,500 | 65,583 | 1,563,960 | 1,649,043 |
| 68DR002 | 7,650 | 25,658 | 3,520,000 | 3,553,308 |
| 68DR003 | 22,875 | 82,046 | 1,770,000 | 1,874,921 |
| 68DR004 | 89,490 | 467,480 | - | 556,970 |
| 68DR005 | 13,080 | 47,928 | 1,037,050 | 1,098,058 |
| 68DR006 | 1,500 | 15,225 | 260,000 | 276,725 |
| 68DR007 | 13,500 | 46,505 | 1,030,000 | 1,090,005 |
| 68DR008 | 549 | 1,220 | 13,000 | 14,769 |
| 68DR009 | 728 | 2,117 | 1,130,000 | 1,132,844 |
| 68DR010 | 28,455 | 105,479 | 1,230,000 | 1,363,934 |
| 68DR011 | 197,327 | 859,240 | 1,430,000 | 2,486,567 |
| 68DR012 | - | - | 1,560,000 | 1,560,000 |
| 68DR013 | - | - | 1,346,000 | 1,346,000 |
| Total | 394,653 | 1,718,481 | 15,890,010 | 18,003,144 |

5. RANKING

Once the costs of the different interventions are known, the roads can be ranked according to priority. Prioritization is according to the cost per capita, whereby a separate ranking is carried out for conservation, improvement and new construction. The cost of all the interventions under conservation, improvement or new construction is summed up for each road, and this total cost is divided by the population served by the road. The population served is defined as the total population of all VDCs linked by the road (excluding VDCs of which the headquarters are linked directly to the strategic road network). As, per the decision made by the political parties and on the consensus of all the DTO staffs the Priority of the Roads were made as follows.

| Rank | Rode Code | Road Name |
|------|-----------|--|
| 1 | 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata -Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] |
| 2 | 68DR012 | DHADAR MASTA SADAK [Luyanata - Hemantabada-Kailash-Kotdewal-Masta-Bhatekhola -Rilu-Datola-Melbisuna - Kanda(Dhuli)] |
| 3 | 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] |
| 4 | 68DR002 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel (Jayprithivinagar)- Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-(Ganai)Darchula] |
| 5 | 68DR010 | SURMA SADAK [Rithapatta(Shelakhet) - Daulichour- Surma-Pathivera] |
| 6 | 68DR004 | BUNGAL SADAK [Bagthala - Bijgada-Khiratadi - Pipalkot-Kafalseri-Darchula(Ganai)] |
| 7 | 68DR006 | PATHIVERA SADAK [Maurebagar-Chaudhari-Maulali-Sainpasela-Lekhgaun(Pathivera)] |
| 8 | 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] |
| 9 | 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela) -Jhuteda(Byashi) - Jay Prithivinagar] |
| 10 | 68DR009 | KHAPTAD SADAK[Puwagadi - Netadhar - Toli - Motuwa - Gadaraya] |
| 11 | 68DR011 | CHANNA SADAK[Gadarya - Patadewal - Kalukheti - Majhigaun - Lamatola - Puwagadi - Luyata-Chainpur] |
| 12 | 68DR013 | SAIPAL SADAK [Chainpur - Saipal -Urai-Taklakot] |
| 13 | 68DR003 | DHANSERI SADAK[Bijgada - Dahabagar - Kanda] |

5.1 CONSERVATION

For ranking of conservation, “Cost/person” and selecting “Sort smallest to largest”, the roads will be ranked in order of increasing cost per capita. The road with the highest priority (most benefit in relation to cost) will be at the top and the road with the lowest priority at the bottom. Then actual allocation to the different maintenance types will be determined in the ARMP.

Table 5.1.1 Ranking of conservation works (NPR '000)

| Code | Total length (km) | 1. Emergency | 2. Routine | 3. Recurrent (paved) | 4. Recurrent (gravel) | 5. Recurrent (earth) | 6. Periodic (blacktop) | 7. Periodic (gravel) | Total cost (NPR '000) | Population served | Cost/person (NPR) |
|---------|-------------------|--------------|------------|----------------------|-----------------------|----------------------|------------------------|----------------------|-----------------------|-------------------|-------------------|
| 68DR012 | 0.49 | 15 | 10 | - | - | 121 | - | - | 146 | 25,454 | 6 |
| 68DR010 | 0.37 | 11 | 7 | - | - | 92 | - | - | 110 | 13,059 | 8 |
| 68DR007 | 1.00 | 30 | 20 | - | - | 250 | - | - | 300 | 11,485 | 26 |
| 68DR002 | 5.10 | 153 | 102 | - | - | 1,275 | - | - | 1,530 | 51,818 | 30 |
| 68DR006 | 8.72 | 262 | 174 | - | - | 2,180 | - | - | 2,616 | 24,696 | 106 |
| 68DR004 | 15.25 | 458 | 305 | - | - | 3,813 | - | - | 4,575 | 24,552 | 186 |
| 68DR001 | 13.00 | 390 | 260 | - | - | 3,250 | - | - | 3,900 | 17,931 | 218 |
| 68DR008 | 9.00 | 270 | 180 | - | - | 2,250 | - | - | 2,700 | 11,513 | 235 |
| 68DR013 | 18.97 | 569 | 379 | - | - | 4,743 | - | - | 5,691 | 13,733 | 414 |
| 68DR005 | 59.66 | 1,790 | 1,193 | - | - | 14,915 | - | - | 17,898 | 15,673 | 1,142 |

5.2 IMPROVEMENT

For ranking of improvement, “Cost/person” and selecting “Sort smallest to largest”, the roads will be ranked in order of increasing cost per capita. The road with the highest priority will be at the top and the road with the lowest priority at the bottom. Then actual allocation to the different maintenance types will be determined in the ARMP.

Table 5.2.1 Ranking of improvement works (NPR '000)

| Code | Total length (km) | Total cost (NPR '000) | Population served | Cost/person (NPR) |
|---------|-------------------|-----------------------|-------------------|-------------------|
| 68DR012 | 0.49 | 2,117 | 25,454 | 83 |
| 68DR010 | 0.37 | 1,220 | 13,059 | 93 |
| 68DR002 | 5.10 | 25,658 | 51,818 | 495 |
| 68DR007 | 1.00 | 15,225 | 11,485 | 1,326 |
| 68DR006 | 8.72 | 47,928 | 24,696 | 1,941 |
| 68DR004 | 15.25 | 82,046 | 24,552 | 3,342 |
| 68DR001 | 13.00 | 65,583 | 17,931 | 3,657 |
| 68DR008 | 9.00 | 46,505 | 11,513 | 4,039 |
| 68DR013 | 18.97 | 105,479 | 13,733 | 7,681 |
| 68DR005 | 59.66 | 467,480 | 15,673 | 29,827 |

5.3 NEW CONSTRUCTION

For ranking of new construction, “Cost/person” and selecting “Sort smallest to largest”, the roads will be ranked in order of increasing cost per capita. The road with the highest priority will be at the top and the road with the lowest priority at the bottom.

Table 5.3.1 Ranking of construction works (NPR '000)

| Code | Length (km) | Total cost (NPR '000) | Population served | Cost/person (NPR) |
|---------|-------------|-----------------------|-------------------|-------------------|
| 68DR004 | - | - | 24,552 | - |
| 68DR008 | 2.00 | 13,000 | 11,513 | 1,129 |
| 68DR006 | 40.00 | 260,000 | 24,696 | 10,528 |
| 68DR011 | 20.00 | 1,430,000 | 25,489 | 56,103 |
| 68DR012 | 40.00 | 1,560,000 | 25,454 | 61,287 |
| 68DR005 | 5.70 | 1,037,050 | 15,673 | 66,168 |
| 68DR002 | 80.00 | 3,520,000 | 51,818 | 67,930 |
| 68DR009 | 20.00 | 1,130,000 | 15,893 | 71,100 |
| 68DR001 | 9.84 | 1,563,960 | 17,931 | 87,221 |
| 68DR007 | 20.00 | 1,030,000 | 11,485 | 89,682 |
| 68DR010 | 20.00 | 1,230,000 | 13,059 | 94,188 |
| 68DR013 | 84.00 | 1,346,000 | 13,733 | 98,012 |
| 68DR003 | 80.00 | 1,770,000 | 16,356 | 108,217 |

6. DISTRICT TRANSPORT MASTER PLAN (DTMP)

The balancing of the available budget and the estimated costs of the required interventions, to determine which interventions can be carried out in the 5-year is the district transport master plan (DTMP). The 80% budget is allocated for the DRCN roads of Bajhang District and left 20% budget is allocated for village roads.

In the allocation of the DTMP budget, priority is given to conservation works, followed by improvement works and finally new construction. That is to say, any DTMP funding is first allocated to conservation, and remaining funds is allocated for improvement of the existing DRCN roads for maintainable all weather standards, and remaining allocated for new construction of DRCN roads, if there is still funding left over at the end of this process, this may be allocated to village roads. If the funding source is constant and if the funds are available as per the forecast, at the end of DTMP 100% of roads become maintainable all weather standards.

6.1 FIVE YEAR PROJECTED FINANCIAL RESOURCES

The financial resource is projected by taking the growth rate in particular funding source from the last three- year's budget. The total estimated amount of funding is NRs.901, 116,000 for the 5-years DTMP period.

Table 6.1.1 Estimated funding levels (roads) for next five years (in NPR '000)

| Funding source | 2070/71 | 2071/72 | 2072/73 | 2073/74 | 2074/75 |
|--|----------------|----------------|----------------|----------------|----------------|
| Internal Revenue | 1,080 | 1,296 | 1,555 | 1,866 | 2,146 |
| Agricultural Road | 8,160 | 9,792 | 11,750 | 14,100 | 16,216 |
| RCIW | 17,220 | 20,664 | 24,797 | 29,756 | 34,220 |
| DLRIP | 35,000 | 42,000 | 50,400 | 60,480 | 69,552 |
| DLRIP MEINTAINANCE | 2,000 | 2,400 | 2,880 | 3,456 | 3,974 |
| Road Board Nepal | 1,700 | 2,040 | 2,448 | 2,938 | 3,378 |
| Min Of Phy. Inf. And Trans Dept Of Roads | 11,520 | 13,824 | 16,589 | 19,907 | 22,893 |
| GIZ | 50,000 | 57,500 | 66,125 | 76,044 | 87,450 |
| Total | 126,680 | 149,516 | 176,544 | 208,547 | 239,828 |
| Grand total | 901,116 | | | | |

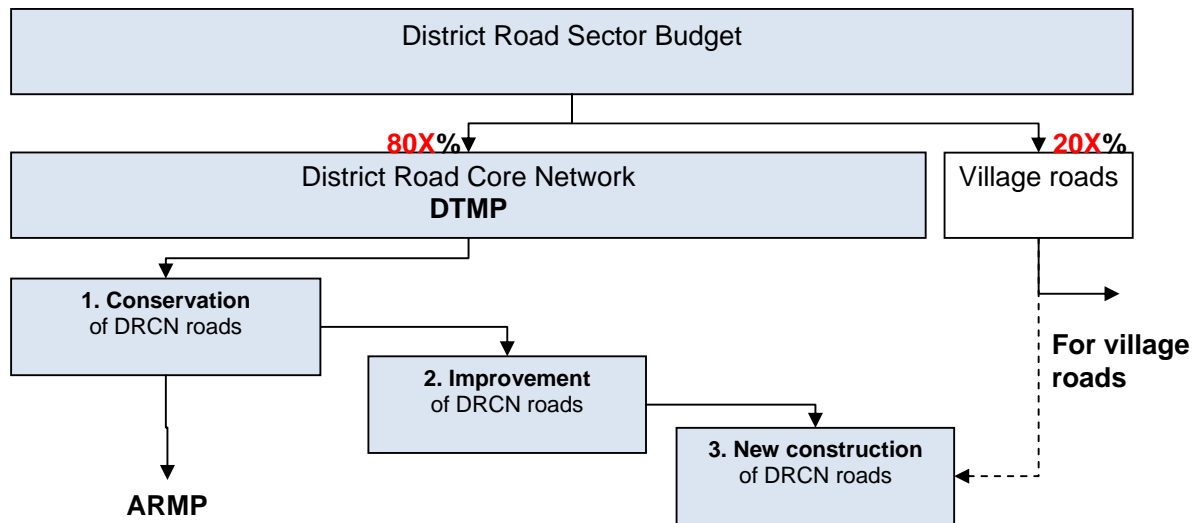
6.2 BUDGET ALLOCATION

In the Bajhang district, 80% of the total estimated budget is allocated for the DRCN roads for the DTMP and rest 20% of the total budget is allocated for the village roads.

| Item | | | | Year | | | | | | | | | | | | | | | |
|---------------------------------|---------|----|-------|---------|----|------|---------|----|------|---------|----|-------|---------|----|------|---------|----|----|--|
| Fiscal year | | | | 2069/70 | | | 2070/71 | | | 2071/72 | | | 2072/73 | | | 2073/74 | | | |
| Total budget | | | | 126,680 | | | 149,516 | | | 176,544 | | | 208,547 | | | 239,828 | | | |
| Village roads | | | | 25,336 | | | 29,903 | | | 35,309 | | | 41,709 | | | 47,966 | | | |
| Core road network budget (DTMP) | | | | 101,344 | | | 119,613 | | | 141,235 | | | 166,838 | | | 191,863 | | | |
| Core network length (km) | | | | 131.55 | | | 131.55 | | | 131.55 | | | 131.55 | | | 131.55 | | | |
| Blacktop (km) | | | | - | | | - | | | - | | | - | | | - | | | |
| Gravel (km) | | | | - | | | 9.61 | | | 26.16 | | | 48.29 | | | 70.77 | | | |
| Earthen (km) | | | | 131.55 | | | 121.94 | | | 105.39 | | | 83.26 | | | 60.78 | | | |
| Conservation (NRs) | | | | 21,578 | | | 32,393 | | | 26,000 | | | 38,578 | | | 41,578 | | | |
| Emergency | | | | 3,947 | | | 3,947 | | | 3,000 | | | 3,947 | | | 3,947 | | | |
| Routine | | | | 2,631 | | | 2,631 | | | 2,000 | | | 2,631 | | | 2,631 | | | |
| Recurrent (blacktop) | | | | - | | | - | | | - | | | - | | | - | | | |
| Recurrent (gravel) | | | | - | | | 6,656 | | | 5,000 | | | 15,000 | | | 15,000 | | | |
| Recurrent (earthen) | | | | 15,000 | | | 15,000 | | | 14,000 | | | 10,000 | | | 10,000 | | | |
| Periodic (blacktop) | | | | - | | | - | | | - | | | - | | | - | | | |
| Periodic (gravel) | | | | - | | | 4,160 | | | 2,000 | | | 7,000 | | | 10,000 | | | |
| Improvement | Cost | BT | GR | 79,766 | BT | GR | 87,220 | BT | GR | 115,235 | BT | GR | 128,260 | BT | GR | 150,285 | BT | GR | |
| 68DR012 | 2,117 | - | 0.49 | 2,117 | - | 0.49 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 68DR010 | 1,220 | - | 0.37 | 1,220 | - | 0.37 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 68DR002 | 25,658 | - | 5.10 | 18,858 | - | 3.75 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 68DR007 | 15,225 | - | 1.00 | 46,978 | - | 3.09 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 68DR006 | 47,928 | - | 8.72 | 10,594 | - | 1.93 | 16,641 | - | 3.03 | 3,000 | - | 0.55 | 51,861 | - | 9.44 | - | - | - | |
| 68DR004 | 82,046 | - | 15.25 | - | - | - | 30,000 | - | 5.58 | 30,000 | - | 5.58 | 6,135 | - | 1.14 | - | - | - | |
| 68DR001 | 65,583 | - | 13.00 | - | - | - | 20,000 | - | 3.96 | 20,000 | - | 3.96 | 6,525 | - | 1.29 | - | - | - | |
| 68DR008 | 46,505 | - | 9.00 | - | - | - | 20,579 | - | 3.98 | 62,235 | - | 12.04 | 24,165 | - | 4.68 | - | - | - | |
| 68DR013 | 105,479 | - | 18.97 | - | - | - | - | - | - | - | - | - | 16,884 | - | 3.04 | - | - | - | |
| 68DR005 | 467,480 | - | 59.66 | - | - | - | - | - | - | - | - | - | 22,690 | - | 2.90 | - | - | - | |

| | | | | | | | | | | | | | | | | | |
|------------------------|-----------|--------|---|----|------|--------|---|-------|---------|----|-------|---------|---|-------|---------|-------|---|
| Total improvement | | 79,767 | | - | 9.61 | 87,220 | - | 16.55 | 115,235 | - | 22.13 | 128,260 | - | 22.48 | - | - | - |
| Construction | Cost | GR | - | GR | - | GR | - | GR | - | GR | - | GR | - | GR | - | GR | - |
| 68DR004 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 68DR008 | 13,000 | 2.00 | - | - | - | - | - | - | - | - | - | - | - | - | 26,000 | 4.00 | - |
| 68DR006 | 260,000 | 40.00 | - | - | - | - | - | - | - | - | - | - | - | - | 65,000 | 10.00 | - |
| 68DR011 | 1,430,000 | 20.00 | - | - | - | - | - | - | - | - | - | - | - | - | 59,285 | 0.83 | - |
| 68DR012 | 1,560,000 | 40.00 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 68DR005 | 1,037,050 | 5.70 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 68DR002 | 3,520,000 | 80.00 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 68DR009 | 1,130,000 | 20.00 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 68DR001 | 1,563,960 | 9.84 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 68DR007 | 1,030,000 | 20.00 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 68DR010 | 1,230,000 | 20.00 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 68DR013 | 1,346,000 | 84.00 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 68DR003 | 1,770,000 | 80.00 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total new construction | | - | - | - | - | - | - | - | - | - | - | - | - | - | 150,285 | 14.83 | - |
| Remaining budget | | - | 0 | - | - | 0 | - | 0 | - | - | 0 | - | 0 | - | 0 | - | - |

Figure 5 District road sector budget allocation



The budget allocation for next five year is done based on the ranking of the road and the priority given by DDC authority. Due to budget constraint, full budget for conservation of DRCN roads could not be allocated. Few roads are subjected to improve into gravel surface condition and budget is allocated to complete new construction which will complete the DRCN. Thus this will make all the VDCs accessible by road network in next five years. The detail of allocation of budget for next five year is shown in the table 6.2.1 as below.

Table 6.2.1 DTMP investment plan

6.3 DTMP OUTPUTS

At the end of the DTMP all of the roads are improved to gravel.

Table 6.3.1 DTMP output

| Conservation | Improvement gravel | Improvement blacktop | New construction |
|--------------|--------------------|----------------------|------------------|
| 131.55 | 70.77 | - | 14.83 |

6.4 DTMP OUTCOME

At the end of the DTMP all the fair weather roads are upgraded to all weather status roads. 73.54Km of the road is graveled at the end of the DTMP.

Table 6.4.1 Standard of DRCN roads

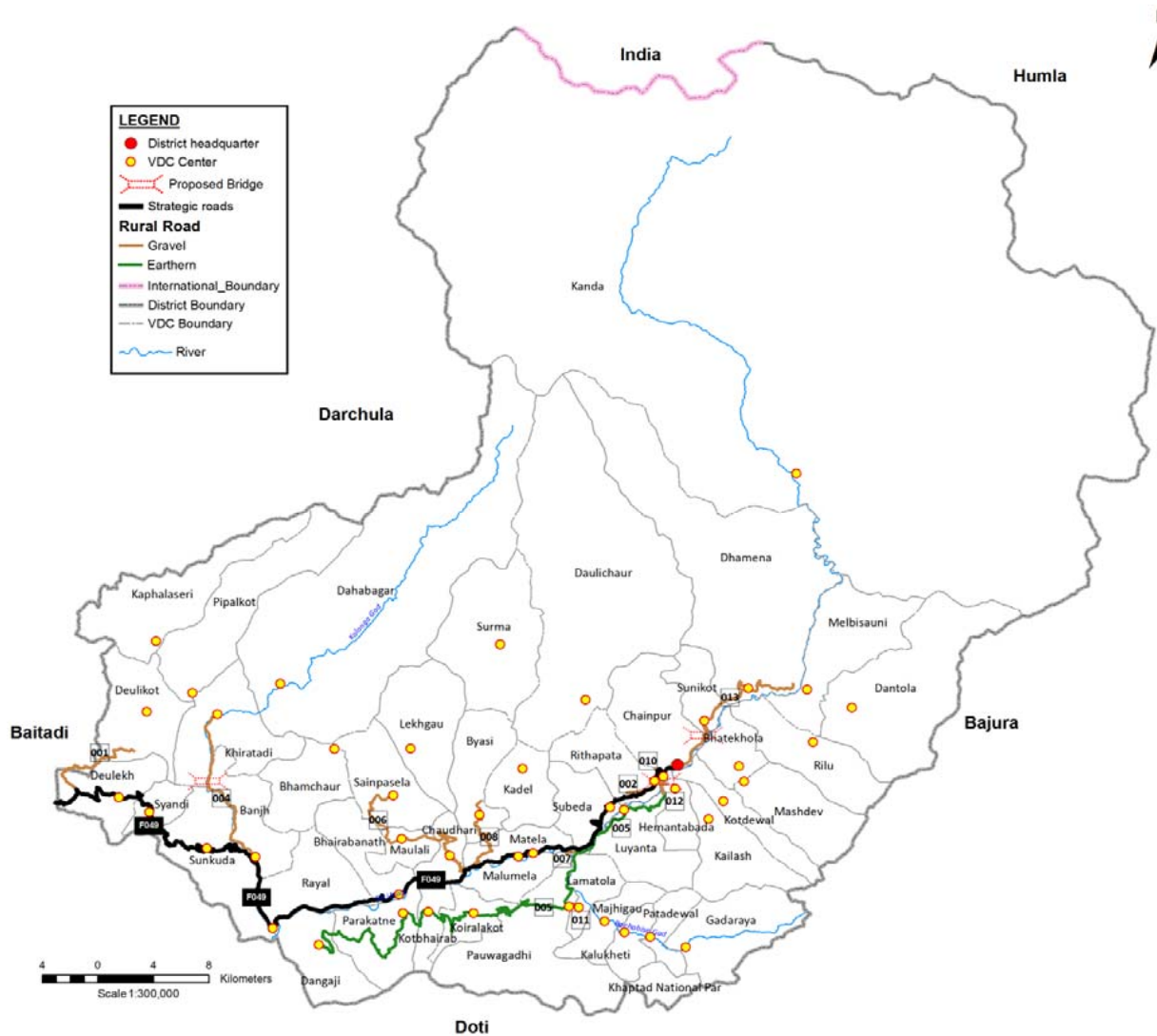
| | Total length | Fair-weather | | All-weather gravel | | All-weather blacktop | |
|---------------|--------------|--------------|------|--------------------|-----|----------------------|----|
| | km | km | % | km | % | km | % |
| Start of DTMP | 131.55 | 131.55 | 100% | - | 0% | - | 0% |
| End of DTMP | 131.55 | 60.78 | 46% | 70.77 | 54% | - | 0% |
| Difference | - | - 70.77 | -54% | 70.77 | 54% | - | 0% |

At the end of the DTMP no such VDC were found to have access to the SRN road network.

Table 6.4.2 Population with access to road network

| | Direct access to SRN | | | No access to road | | | Fair-weather core roads | | | All-weather core roads | | |
|---------------|----------------------|------------|-----|-------------------|------------|-----|-------------------------|------------|-----|------------------------|------------|-----|
| | VDCs | Population | % | VDCs | Population | % | VDCs | Population | % | VDCs | Population | % |
| Start of DTMP | 11 | 53,666 | 28% | 27 | 107,502 | 55% | 23 | 103,533 | 53% | 0 | - | 0% |
| End of DTMP | 11 | 53,666 | 28% | 24 | 91,168 | 47% | 8 | 27,905 | 14% | 17 | 81,402 | 42% |
| Difference | - | - | 0% | 3 | 16,334 | -8% | 15 | 75,628 | 39% | 17 | 81,402 | 42% |

Figure 6 District Transport Master Plan (DTMP)



ANNEX 1 TRAFFIC DATA

| Code | Description | Total length (km) | Mot or-cycle | Car-Jeep - Mini bus | Trac tor | Truck-Bus | PCU |
|--------------|---|-------------------|--------------|---------------------|----------|-----------|-----|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 13.00 | 0 | 0 | 1 | 0 | 2 |
| 68DR002 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel - Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-Darchula] | 5.10 | 0 | 0 | 0 | 0 | - |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada-Khiritadi - Pipalkot-Kafalseri-Darchula] | 15.25 | 0 | 5 | 0 | 1 | 9 |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata -Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | 59.66 | 0 | 0 | 0 | 0 | - |
| 68DR006 | PATHIVERA SADAK [Maurebagar-Chaudhari-Maulali-Sainpasela-Lekhgaun-Pathivera-Surma] | 8.72 | 0 | 0 | 0 | 0 | - |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | 1.00 | 0 | 0 | 0 | 0 | - |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela) -Jhuteda(Byashi) - Jay Prithivinagar] | 9.00 | 0 | 0 | 0 | 0 | - |
| 68DR010 | SURMA SADAK [Rithapatta(Shelakhet) - Daulichour- Surma-Pathivera] | 0.37 | 0 | 0 | 0 | 0 | - |
| 68DR012 | DHADAR MASTA SADAK [Luyanata - Hemantabada-Kailash-Kotdewal-Masta-Rilu-Datola-Melbisuna] | 0.49 | 0 | 0 | 0 | 0 | - |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal - Taklakot] | 18.97 | 3 | 3 | 1 | 1 | 11 |
| Total | | 131.55 | | | | | |

ANNEX 2 POPULATION SERVED

| # | VDC/municipality | Population | Road | | | | | | | | | | | | | SRN |
|----|------------------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----|
| | | | 68DR001 | 68DR002 | 68DR003 | 68DR004 | 68DR005 | 68DR006 | 68DR007 | 68DR008 | 68DR009 | 68DR010 | 68DR011 | 68DR012 | 68DR013 | |
| 1 | Banjh | 4,944 | | | | X | | | | | | | | | | X |
| 2 | Bhairabanath | 5,037 | | | | | | | | | | | | | | X |
| 3 | Bhamchaur | 4,931 | | X | | | | | | | | | | | | |
| 4 | Bhatekhola | 3,577 | | | | | | | | | | | | | | |
| 5 | Byasi | 4,236 | | X | | | | | | X | | | | | | |
| 6 | Chainpur | 6,642 | | | | | | X | | | | | X | | X | X |
| 7 | Chaundhari | 3,406 | | | | | | | | | | | | | | X |
| 8 | Dahabagar | 6,117 | | | X | | | | | | | | | | | |
| 9 | Dangaji | 4,290 | | | | | X | | X | | | | | | | |
| 10 | Datola | 3,156 | | | | | | | | | | | | X | | |
| 11 | Daulichaur | 5,317 | | | | | | | | | | X | | | | |
| 12 | Deulekh | 4,387 | | | | | | | | | | | | | | X |
| 13 | Deulikut | 7,499 | X | | | | | | | | | | | | | |
| 14 | Dhamena | 2,835 | | | | | | | | | | | | | X | |
| 15 | Gadaraya | 3,022 | | | | | | | | | X | | X | | | |
| 16 | Hemantabada | 3,339 | | | | | | | | | | | | X | | |
| 17 | Kadel | 4,762 | | X | | | | | | X | | | | | | |
| 18 | Kailash | 1,911 | | | | | | | | | | | | X | | |
| 19 | Kalukheti | 2,557 | | | | | | | | | X | | X | | | |
| 20 | Kanda | 2,182 | | | X | | | | | | | | | X | X | |
| 21 | Kaphalaseri | 6,692 | | X | | X | | | | | | | | | | |
| 22 | Khiratadi | 8,057 | | X | X | X | | | | | | | | | | |
| 23 | Koiralakot | 3,631 | | | | | X | | | | | | | | | |
| 24 | Kot Bhairab | 3,495 | | | | | X | | | | | | | | | |
| 25 | Kotdewal | 3,291 | | | | | | | | | | | | X | | |
| 26 | Lamatola | 1,854 | | | | | | | | | X | | X | | | |
| 27 | Lekgau | 4,783 | | X | | | | X | | | | X | | | | |
| 28 | Luyanata | 2,954 | | | | | | | X | | | | X | | | |
| 29 | Majhigau | 4,032 | | | | | | | | | X | | X | | | |
| 30 | Malumela | 2,279 | | | | | | | X | | | | | | | |
| 31 | Masta | 2,743 | | | | | | | | | | | | X | | X |
| 32 | Matela | 2,515 | | | | | | | | X | | | | | | |
| 33 | Maulali | 3,413 | | | | | | X | | | | | | | | |
| 34 | Melbisauni | 3,492 | | | | | | | | | | | | X | | |
| 35 | Parakante | 4,257 | | | | | X | | | | | | | | | |
| 36 | Patadewal | 2,466 | | | | | | | | | X | | X | | | |
| 37 | Pauwaghadi | 1,962 | | | | | | | X | | X | | X | | | |
| 38 | Pipalkot | 4,859 | X | X | | X | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|----|----------------------------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 39 | Rayal | 6,395 | | | | | | | | | | | | | | X |
| 40 | Rilu | 5,340 | | | | | | | | | | | X | | | |
| 41 | Rithapata | 2,959 | | X | | | | | | | | X | | | | X |
| 42 | Sainpasela | 6,153 | | X | | | | X | | | | | | | | |
| 43 | Subeda | 4,386 | | X | | | | | | | | | | | | X |
| 44 | Sunikot | 2,074 | | | | | | | | | | | | | X | |
| 45 | Sunkunda | 7,194 | | | | | | | | | | | | | | X |
| 46 | Surma | 3,705 | | | | | | X | | | | | | | | |
| 47 | Syandi | 5,573 | X | | | | | | | | | | | | | X |
| | Total population | 194,701 | 17,931 | 51,818 | 16,356 | 24,552 | 15,673 | 24,696 | 11,485 | 11,513 | 15,893 | 13,059 | 25,489 | 25,454 | 13,733 | 53,666 |
| | Total VDCs/municipalities | 47 | 3 | 10 | 3 | 4 | 4 | 5 | 4 | 3 | 6 | 3 | 8 | 8 | 4 | 11 |

Source: Nepal population census 2011

ANNEX 3 LOCATION OF PROPOSED INTERVENTIONS

| Road code | Road Name | Length (km) | Start chainage (km) or X-coordinate | End chainage (km) or Y-coordinate | Rehabilitation (km) | Gravelling (km) | Blacktopping (km) | Widening (m) | Bridge (m) | Slab culvert (m) | CC Causeway (m) | Stone Causeway (m) | Pipe culvert (units) | Masonry walls (m3) |
|-----------|--|-------------|-------------------------------------|-----------------------------------|---------------------|-----------------|-------------------|--------------|------------|------------------|-----------------|--------------------|----------------------|--------------------|
| 68DR001 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 13 | 0+000 | 13+000 | 2 | 13 | 0 | 13 | 13 | 9 | | 20 | 2 | 38 |
| 68DR002 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel - Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-Darchula] | 5.1 | 0+000 | 5+100 | 5.1 | 5.1 | 0 | 5.1 | | | | 5 | | 8 |
| 68DR004 | BUNGAL SADAK [Bagthala - Bijgada-Khiratadi - Pipalkot-Kafalseri-Darchula] | 15.25 | 0+000 | 15+250 | 3 | 15.25 | 0 | 15.25 | 35 | | 0 | 29 | 5 | 8 |
| 68DR005 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata -Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | 59.66 | 0+000 | 59+660 | 59.66 | 59.66 | 0 | 59.66 | 301 | 10 | | 45 | 13 | 1290 |
| 68DR006 | PATHIVERA SADAK [Maurebagar-Chaudhari-Maulali-Sainpasela-Lekhgaun-Pathivera-Surma] | 8.72 | 0+000 | 8+720 | 3 | 8.72 | 0 | 8.72 | | 10 | | | 1 | |
| 68DR007 | SETI SADAK[Jadar-Kuch-Dangaji] | 1 | 0+000 | 1+000 | 14 | 1 | 0 | 1 | 0 | 0 | | 0 | 0 | 0 |
| 68DR008 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela)-Jhuteda(Byashi) - Jay Prithivinagar] | 9 | 0+000 | 9+000 | 9 | 9 | 0 | 9 | | | | 5 | 3 | 46 |
| 68DR010 | SURMA SADAK [Rithapatta(Shelakhet)-Daulichour- Surma-Pathivera] | 0.366 | 0+000 | 0+3660 | 0.37 | 0.366 | 0 | 0.366 | | | | | | |
| 68DR012 | DHADAR MASTA SADAK [Luyanata - Hemantabada-Kailash-Kotdewal- | 0.485 | 0+000 | 0+485 | 0.49 | 0.485 | 0 | 0.485 | | | | | | |

| Road code | Road Name | Length (km) | Start chainage (km) or X-coordinate | End chainage (km) or Y-coordinate | Rehabilitation (km) | Gravelling (km) | Blacktopping (km) | Widening (m) | Bridge (m) | Slab culvert (m) | CC Causeway (m) | Stone Causeway (m) | Pipe culvert (units) | Masonry walls (m3) |
|--------------|--|-------------|-------------------------------------|-----------------------------------|---------------------|-----------------|-------------------|--------------|------------|------------------|-----------------|--------------------|----------------------|--------------------|
| | Masta- Rilu-Datola-Melbisuna] | | | | | | | | | | | | | |
| 68DR013 | SAIPAL SADAK [Chainpur - Saipal - Taklakot] | 18.97 | 0+000 | 18+970 | 5 | 18.97 | 0 | 18.97 | 45 | | | 5 | 3 | 51 |
| Total | | 131.551 | | | 101.62 | 131.551 | 0 | 131.551 | 394 | 29 | 0 | 109 | 27 | 280 |

Annex 4 Overall Road Inventory List

| Road code | Road Name | Length (km) | Start chainage (km) or XY-coordinate | End chainage (km) or XY-coordinate | Surface Type: Black Top | Surface Type : Gravel | Surface Type : Earth | All Weather | Fair Weather | Condition - Good/ Fair | Condition - Poor | Condition -Temporarily Impassable | Condition - Permanentaly Impassable |
|-----------|---|-------------|--------------------------------------|------------------------------------|-------------------------|-----------------------|----------------------|-------------|--------------|------------------------|------------------|-----------------------------------|-------------------------------------|
| 1 | BHITTAD SADAK [Bitthad - Deulokot - Pipalkot] | 13 | 0+000 | 13+000 | 0 | 0 | 13 | 0 | 13 | 12 | 1 | 5 | 0 |
| 2 | BANNI MASTA SADAK [Rithapata - Subeda - Kadel - Byasi - Lekhgaun - Sainpasela - Bhamchour - Khirtadi - Pipalkot-Kafalseri-Darchula] | 5.1 | 0+000 | 5+100 | 0 | 0 | 5.1 | 0 | 5.1 | | 5.1 | | 5.1 |
| 3 | BUNGAL SADAK [Bagthala - Bijgada-Khiratadi - Pipalkot-Kafalseri-Darchula] | 15.25 | 0+000 | 15+250 | 0 | 0 | 15.25 | 0 | 15.25 | 15.25 | 0 | 0 | 0 |
| 4 | CHAINPUR -DIPAYAL SADAK [Chainpur - Luyata -Puwagadi-Korilakot - Kotbvhairab-Paraktne-Dangaji-Dipayal] | 59.66 | 0+000 | 59+660 | 0 | 0 | 59.66 | 0 | 59.66 | | 59.66 | 0 | 59.66 |
| 5 | PATHIVERA SADAK [Maurebagar-Chaudhari-Maulali-Sainpasela-Lekhgaun-Pathivera-Surma] | 8.72 | 0+000 | 8+720 | 0 | 0 | 8.72 | 0 | 8.72 | 5 | 3.72 | | 8.72 |
| 6 | SETI SADAK [Jadar - Kuch -Dangaji] | 1 | 0+000 | 1+000 | 0 | 0 | 1 | | 1 | | 1 | | 1 |
| 7 | JAYPRITHIVINAGAR SADAK [Bhadebagar(Matela) -Jhuteda(Byashi) - Jay Prithivinagar] | 9 | 0+000 | 9+000 | 0 | 0 | 9 | 0 | 9 | | 9 | | 9 |
| 8 | SURMA SADAK [Rithapatta(Shelakhet) -Daulichour- Surma-Pathivera] | 0.366 | 0+000 | 0+366 | 0 | 0 | 0.366 | 0 | 0.366 | | 0.366 | | 0.366 |
| 9 | DHADAR MASTA SADAK [Luyanata -Hemantabada-Kailash-Kotdewal-Masta-Rilu-Datola-Melbisuna] | 0.458 | 0+000 | 0+485 | 0 | 0 | 0.458 | 0 | 0.458 | | 0.458 | | 0.458 |
| 10 | SAIPAL SADAK [Chainpur - Saipal -Taklakot] | 18.97 | 0+000 | 18+000 | 0 | 0 | 18.97 | 0 | 18.97 | 18.97 | 0 | 18.97 | 0 |

| | | | | | | | | | | | | | |
|-------------------|----------------------|---------------------|-----------|------------|-------------------|-------------------|-------------------------------|-------------------|---------------------|-------------------|-------------------------|--------------|--------------------|
| | | | 00 | 970 | | | .9 | | 7 | 97 | | 7 | |
| | | | | | | | 7 | | | | | | |
| 11 | Puiyatola-Timurathi | 2.1 | 0+0 00 | 2+1 00 | 0 | 0 | 2. 1 | 0 | 2.1 | | 2. 1 | | 2.1 |
| 12 | Chainpur Bazzar Road | 1.192 | 0+0 00 | 1+1 92 | 0 | 1.19 2 | 0 | 1.1 92 | 0 | | | | |
| FRN 049 | Khodpe- Chainpur | 79.98 | 0+0 00 | 79+ 980 | 79. 98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tota I | | 214.7 96 | | | 79. 98 | 1.19 2 | 13 3. 62 4 | 1.1 92 | 133. 624 | 51. 22 | 82 .4 04 | 23.97 | 86.40 4 |

Annex 5 GIS File Projections and Coordinate System

GPS Setting

Grid: **Lat/Long hdd.ddd** and Datum **Indian Bangladesh** and Unit in **metric** system has been considered in GPS during field survey. Garmin Etrex 30 GPS receiver was used in GPS field survey.

Defining the coordinate systems and reprojecting data in ArcGIS

We can define a coordinate system for data using the following options in ArcGIS using the [Define Projection tool](#) in the Data Management toolbox. If the data has a coordinate system definition, but it does not match the typical coordinate system used by an organization, we can reproject the data using the [Project tool](#) in the Data Management toolbox. We need to use the corresponding projection parameters while defining the coordinate system or reprojecting the data.

Projection and coordinate System used in GIS Shape file

- Projection type: Conformal (preserving shape)
- Projected coordinate system: Transverse Mercator
- Parameters of the coordinate system:
 - *False_Easting: 500000*
 - *False_Northing: 0*
 - *Central_Meridian: 81 for Western of Nepal*
 - *Scale_Factor: 0.9999*
 - *Latitude_Of_Origin: 0*
 - *Spheroid: Everest 1830*
- Associated Geographic Coordinate System: *Everest-India and Nepal.prj* under Asi

