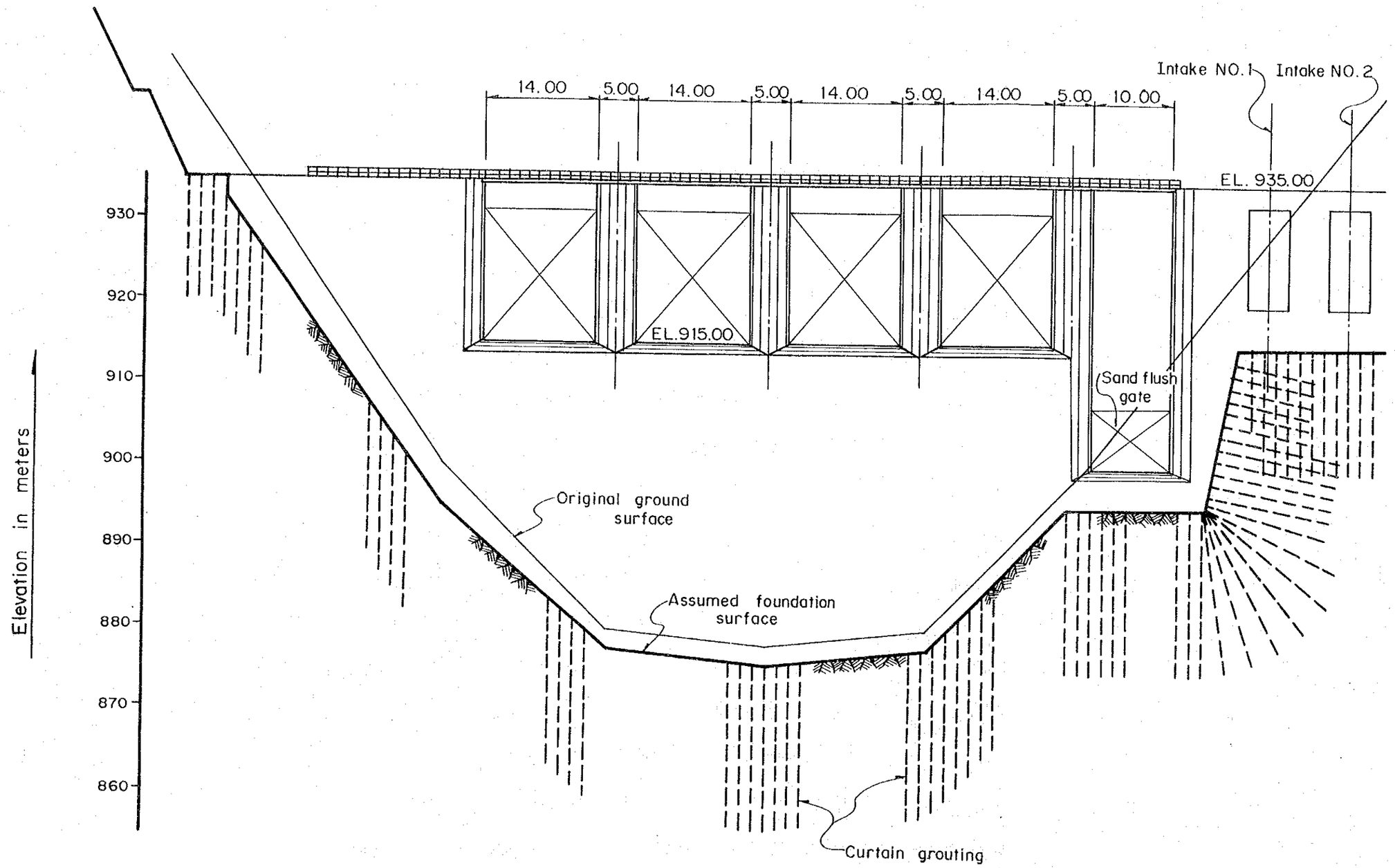

Profile

Figure 6.4.5 Profile and Typical Cross Section of CR-2 Intake Dam (1/2)

HIS MAJESTY'S GOVERNMENT OF NEPAL
WATER RESOURCES DEVELOPMENT OF
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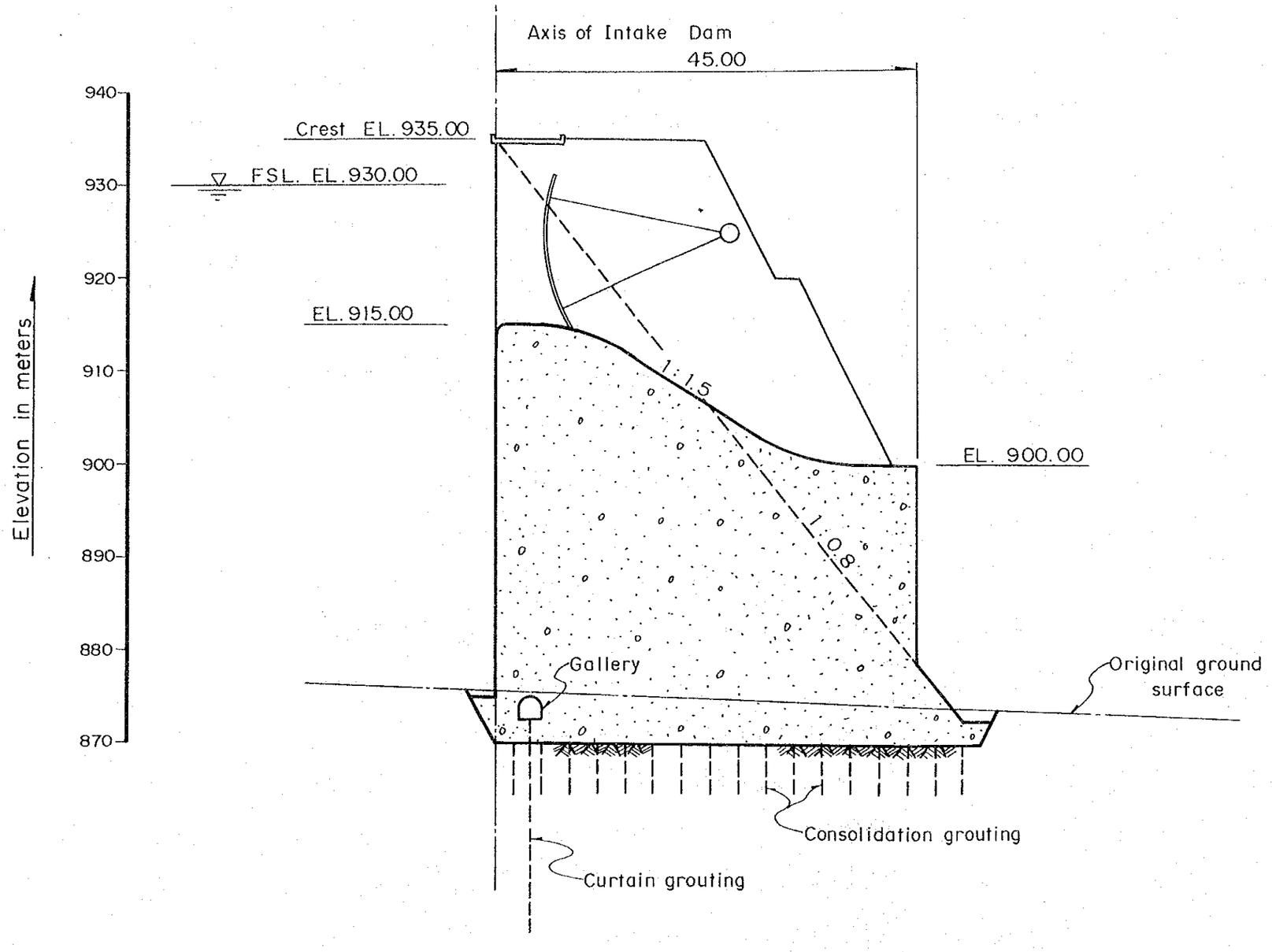

Typical Cross Section

Figure 6.4.5 Profile and Typical Cross Section of CR-2 Intake Dam (2/2)

HIS MAJESTY'S GOVERNMENT OF NEPAL
WATER RESOURCES DEVELOPMENT OF
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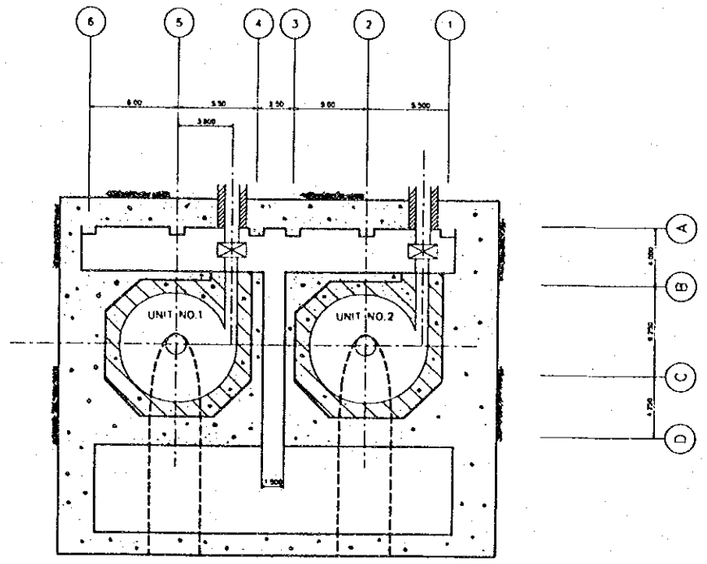
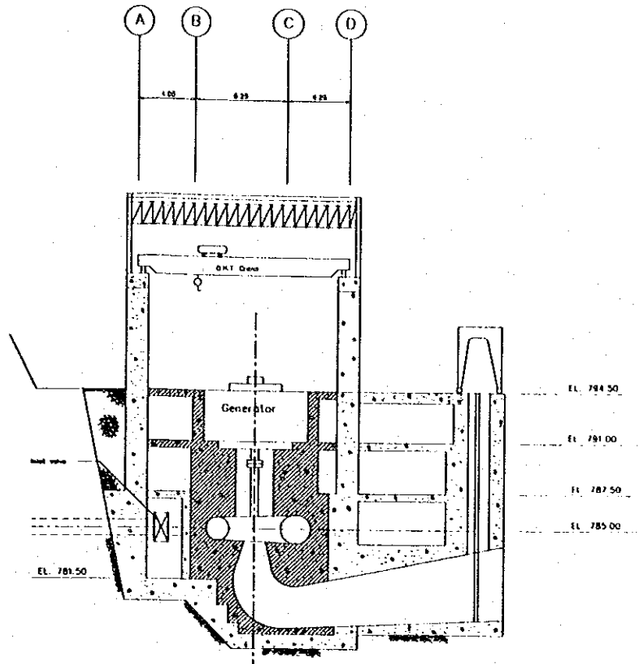
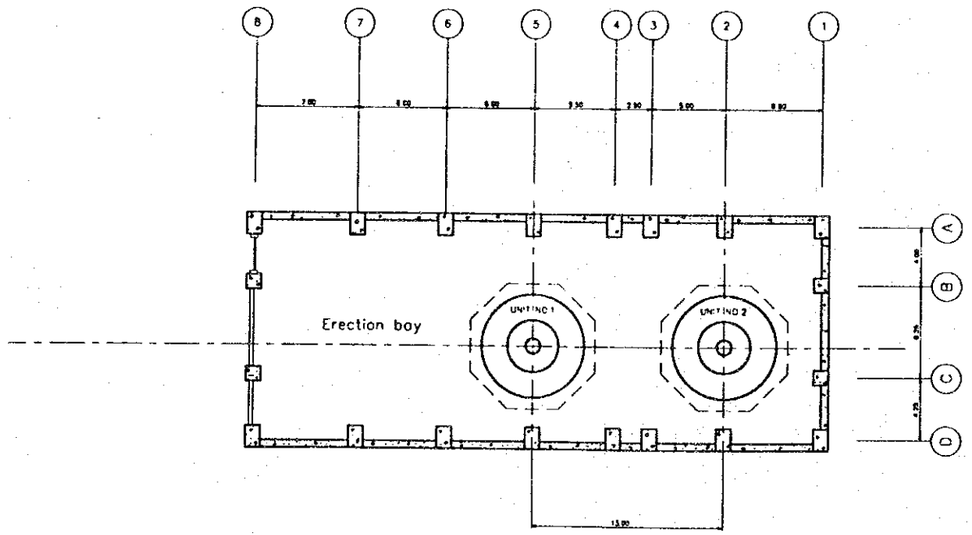


PLAN AT TURBINE CENTER



TRANSVERSE SECTION



PLAN AT GENERATOR ROOM

Figure 6.4.6 Structural Details of Powerhouse of CR-2 Scheme

HIS MAJESTY'S GOVERNMENT OF NEPAL
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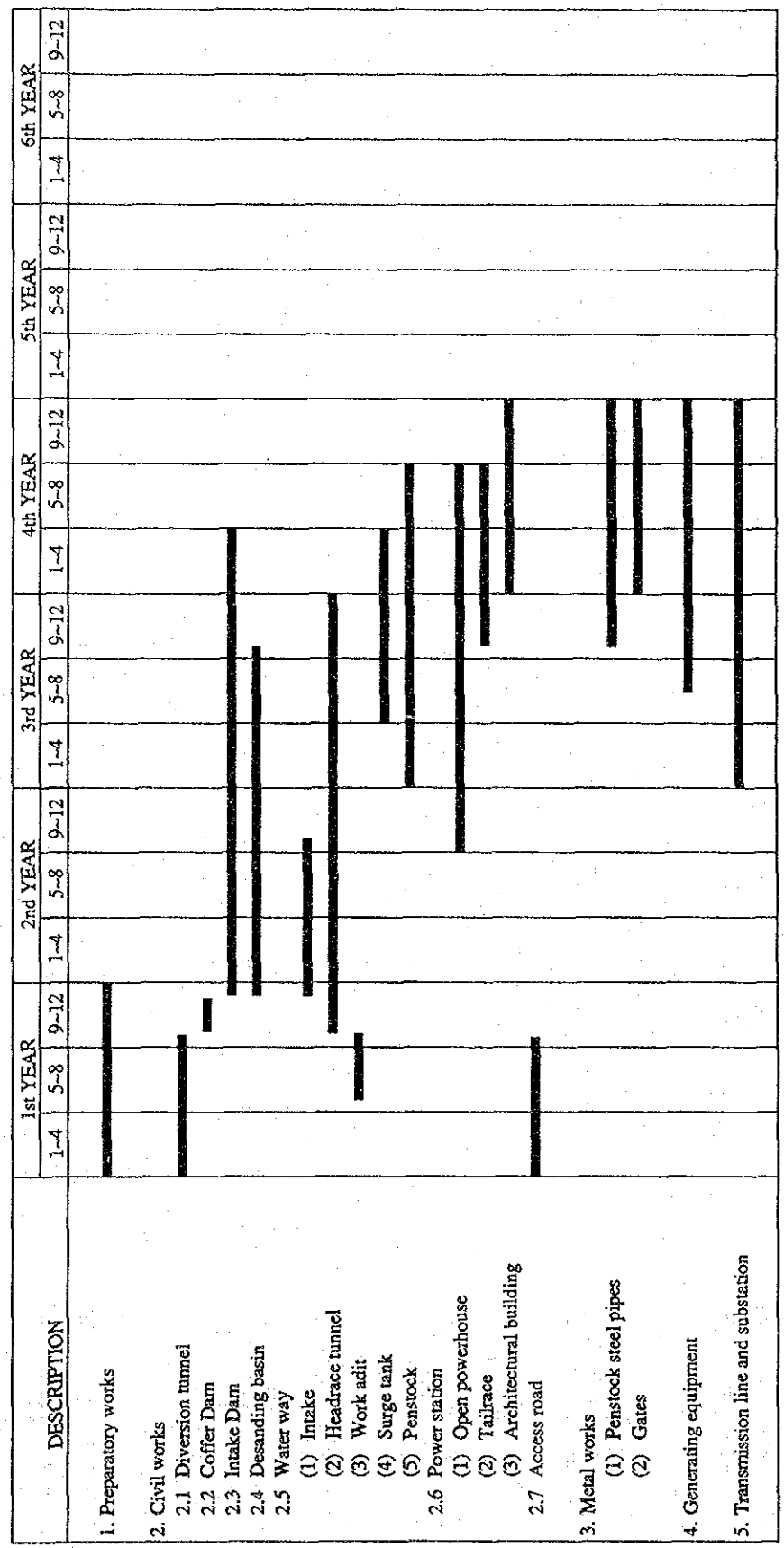

Figure 6.4.7 Construction Schedule of CR-2

HIS MAJESTY'S GOVERNMENT OF NEPAL
WATER RESOURCES DEVELOPMENT OF
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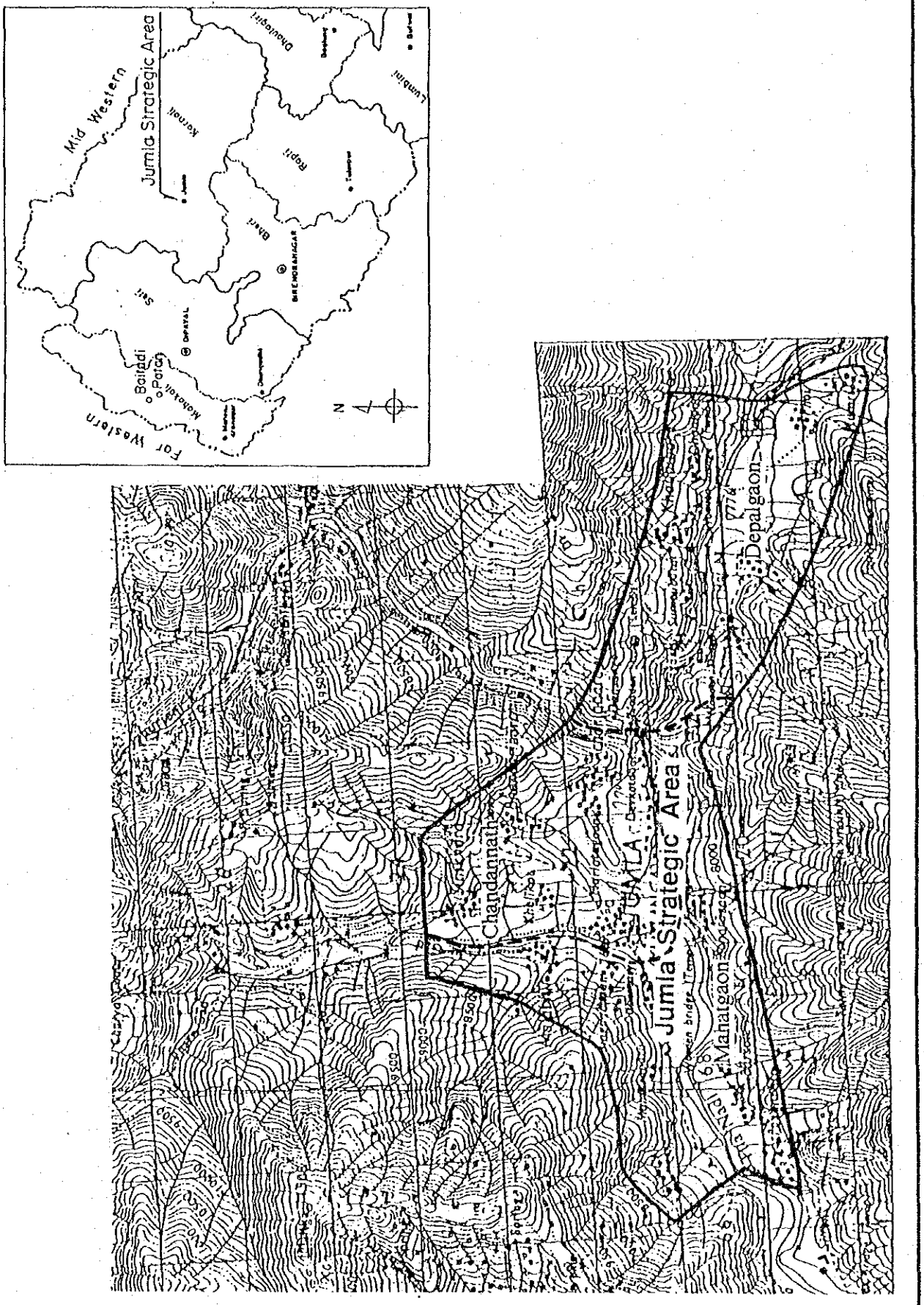

Figure 7.1.1 Jumla Strategic Area

HIS MAJESTY'S GOVERNMENT OF NEPAL
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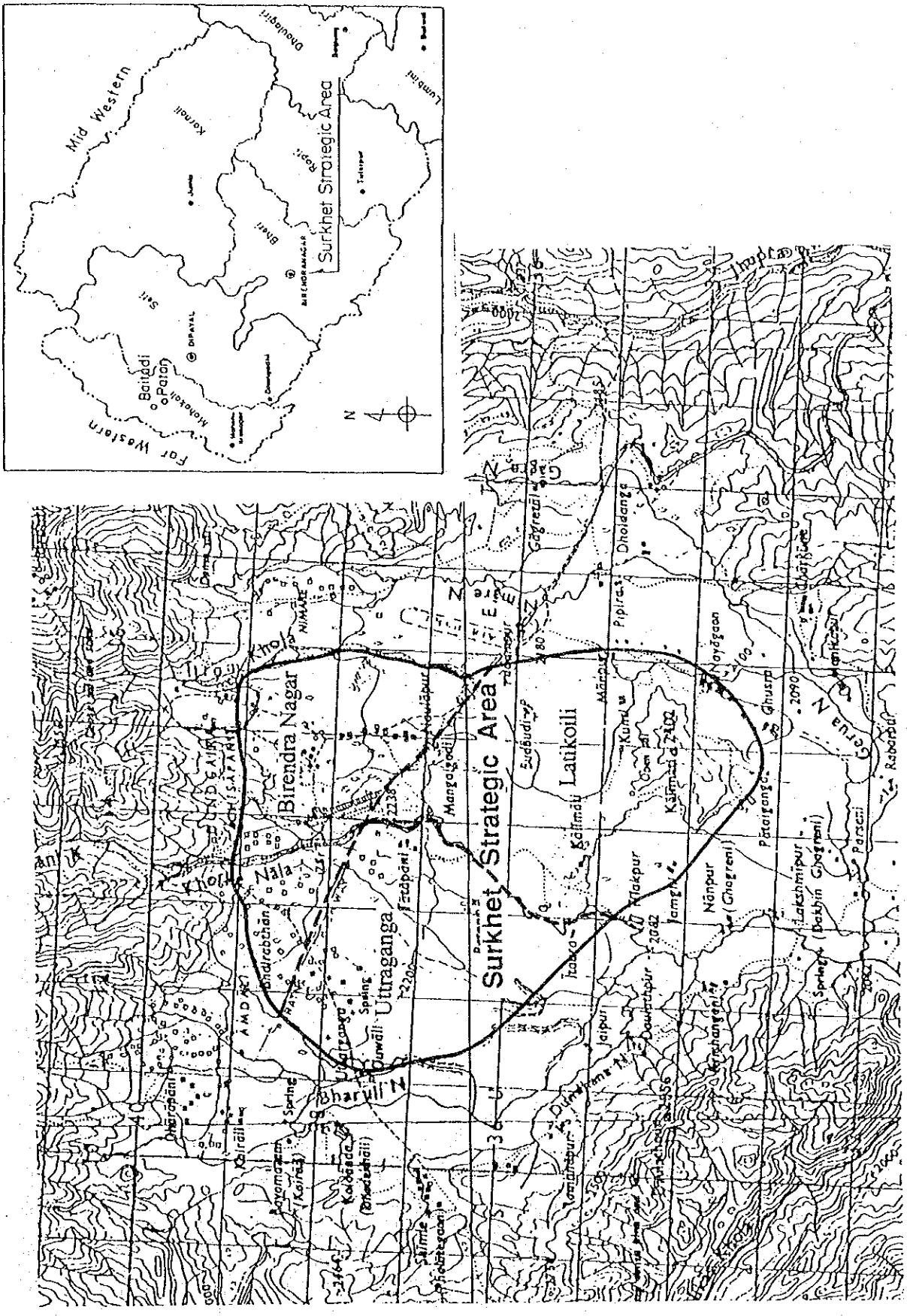

Figure 7.2.1 Surkhet Strategic Area

HIS MAJESTY'S GOVERNMENT OF NEPAL
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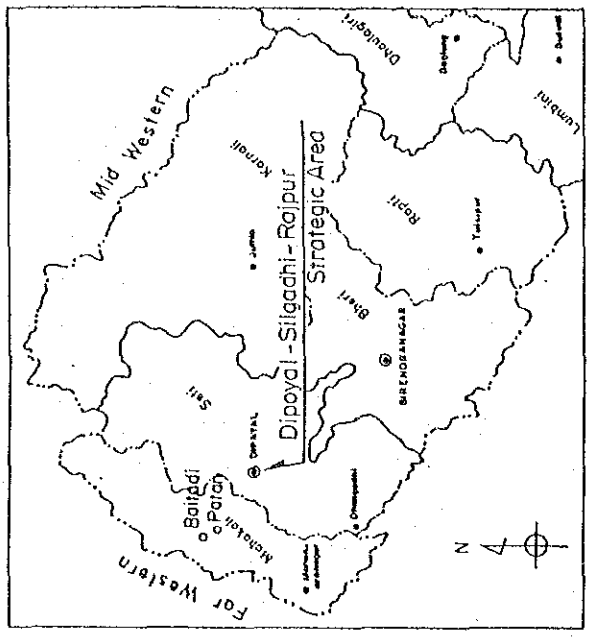

Figure 7.3.1 Dipayal-Silgadhi-Rajpur Strategic Area

HIS MAJESTY'S GOVERNMENT OF NEPAL
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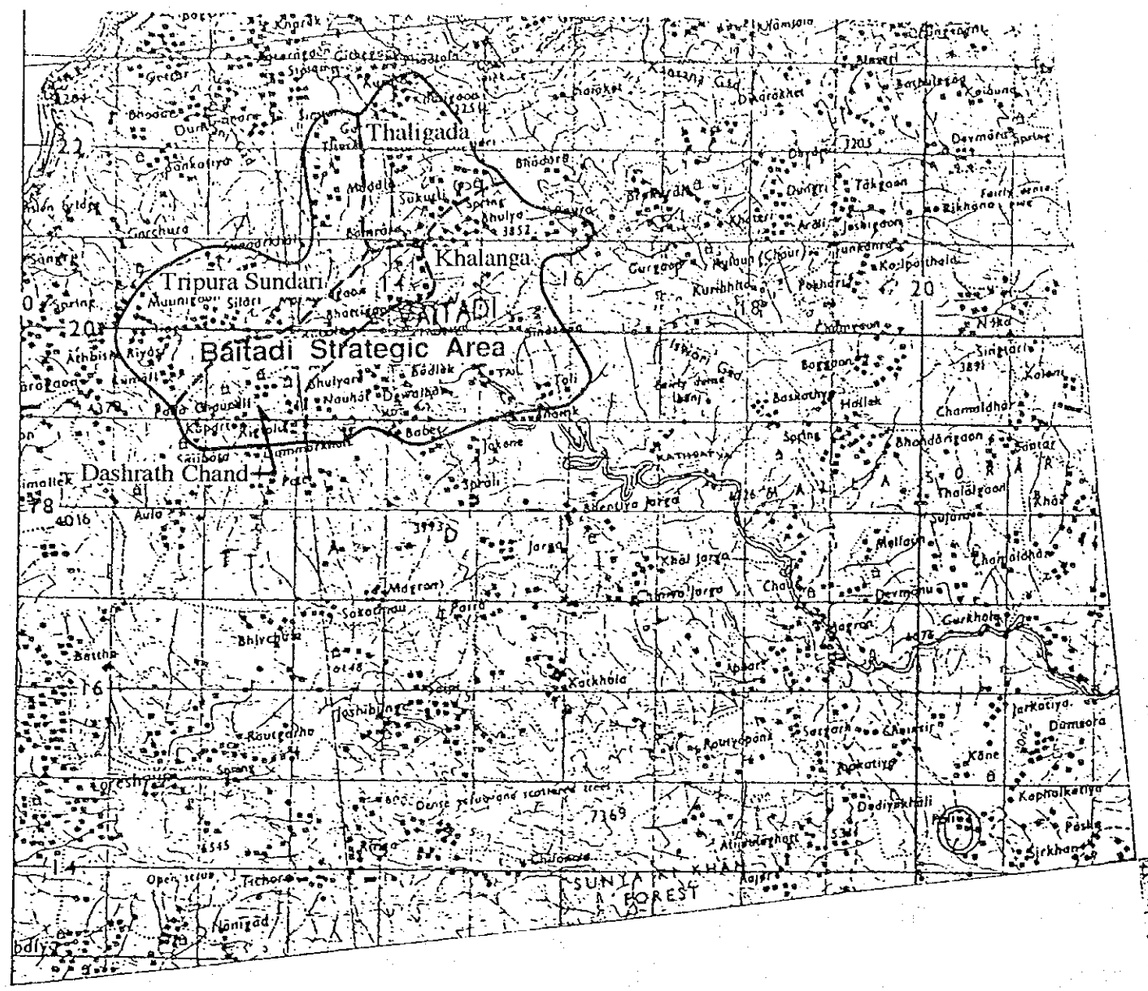

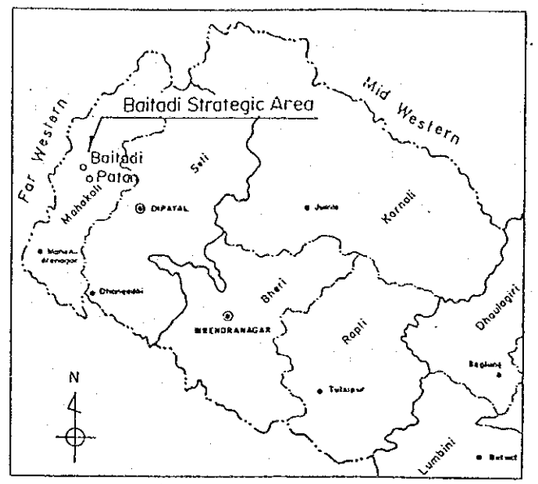

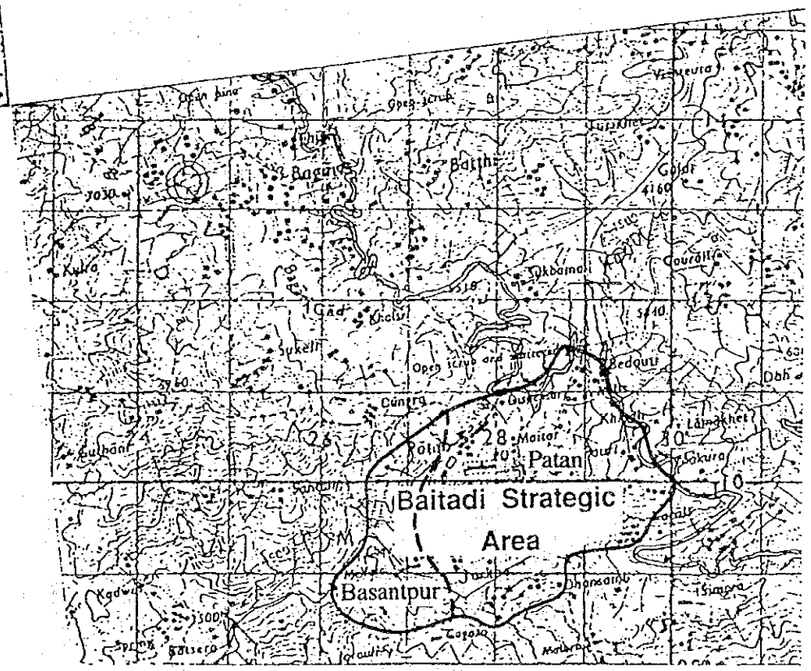

Figure 7.4.1 Baitadi Strategic Area

HIS MAJESTY'S GOVERNMENT OF NEPAL
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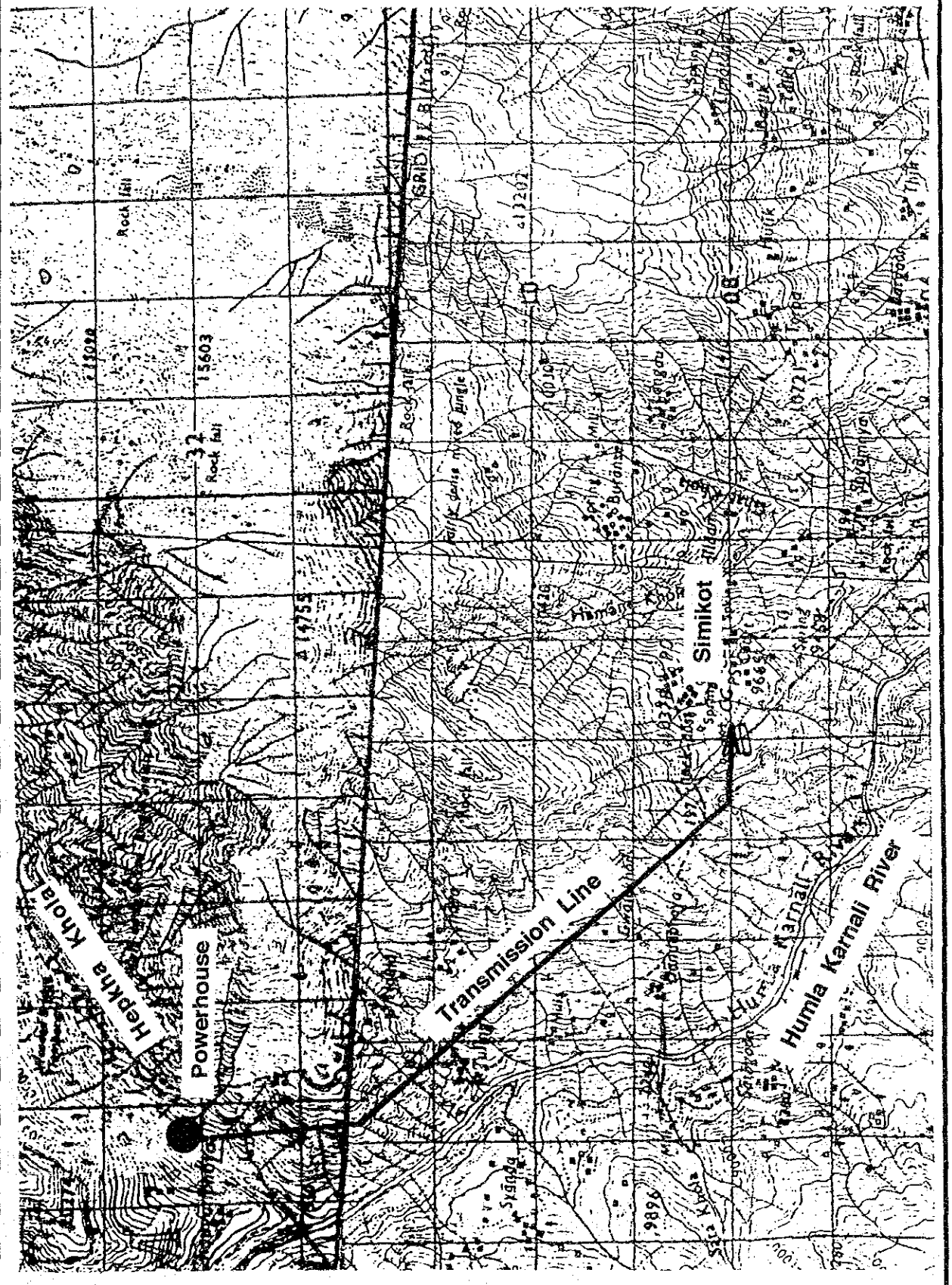

Figure 8.1.1 **Proposed Small Hydropower Scheme for Simikot**

HIS MAJESTY'S GOVERNMENT OF NEPAL
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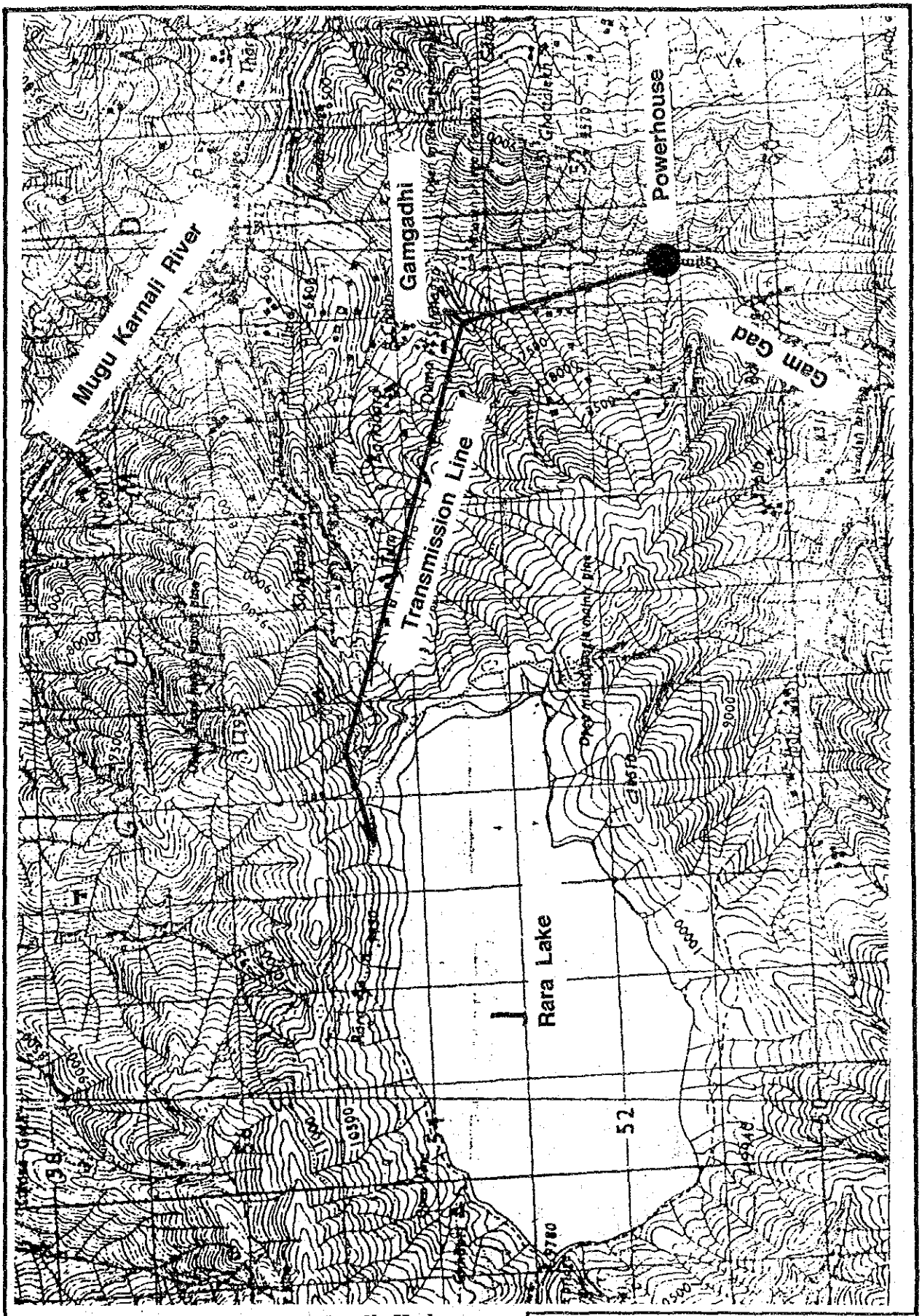

Figure 8.1.2 **Proposed Small Hydropower Scheme for Gamgadhi and Lake Rara**

HIS MAJESTY'S GOVERNMENT OF NEPAL
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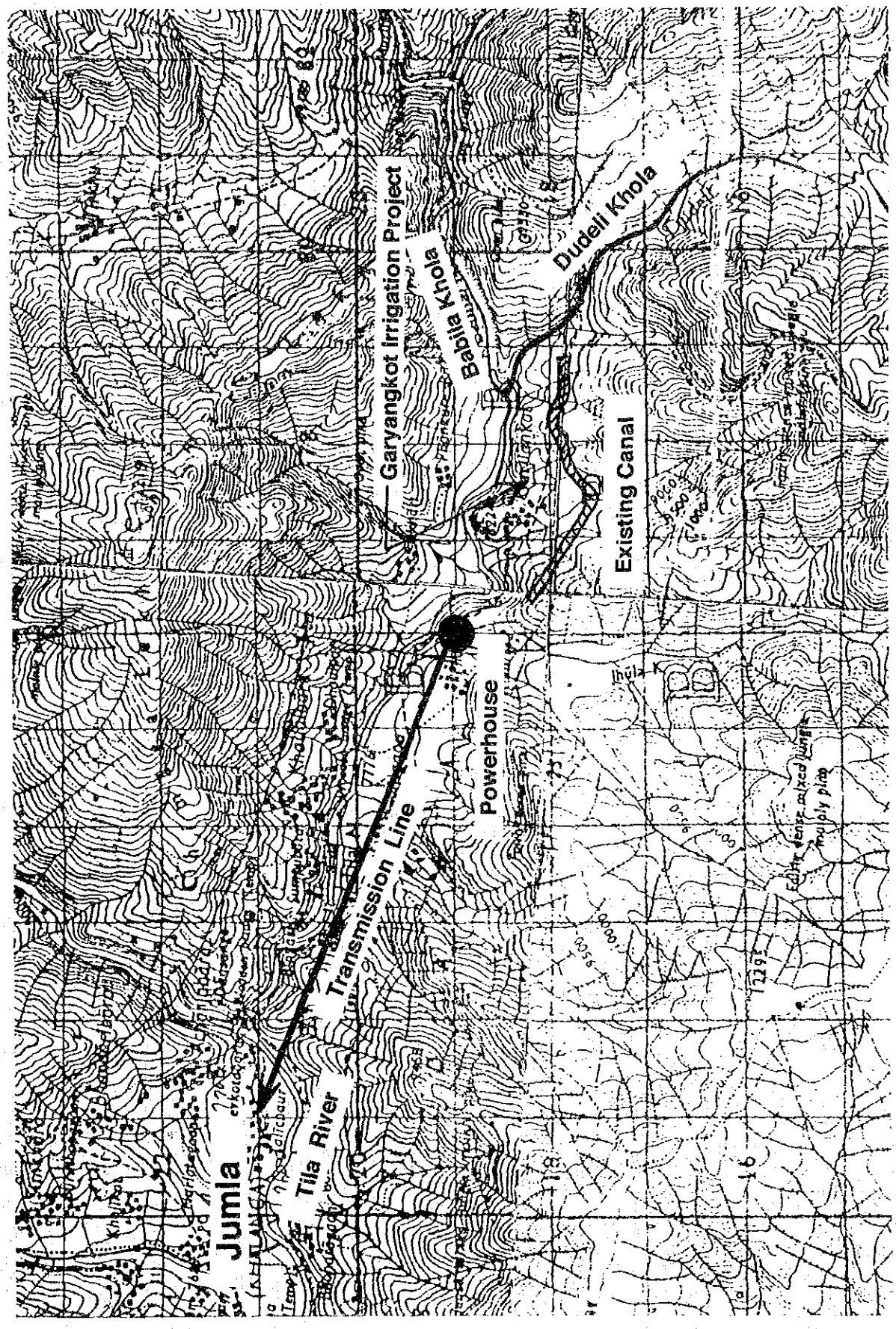

Figure 8.1.3 **Proposed Small Hydropower Scheme for Jumla**

HIS MAJESTY'S GOVERNMENT OF NEPAL
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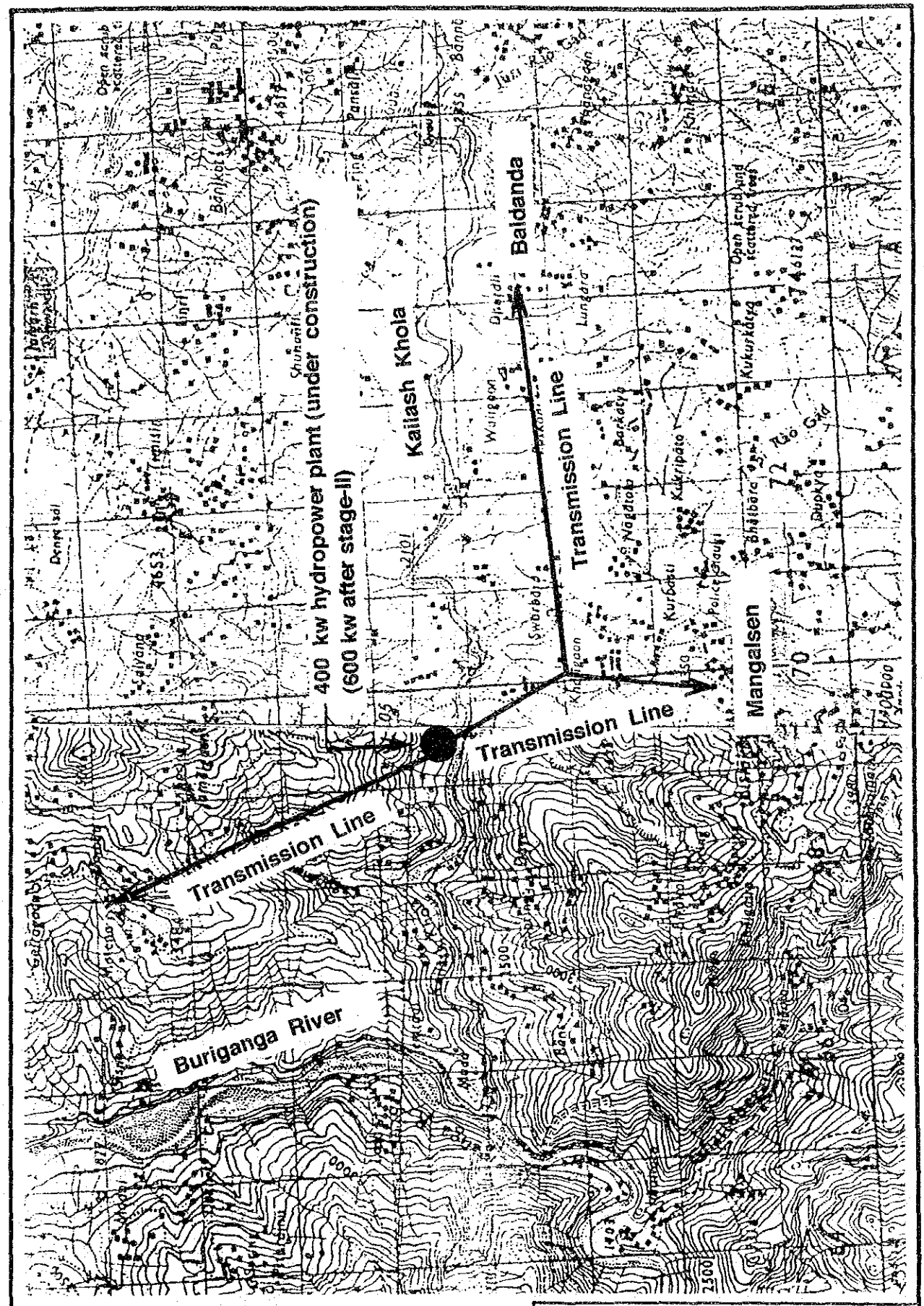

Figure 8.1.4 **Achham Small Hydropower Scheme for Mangalsen**

HIS MAJESTY'S GOVERNMENT OF NEPAL
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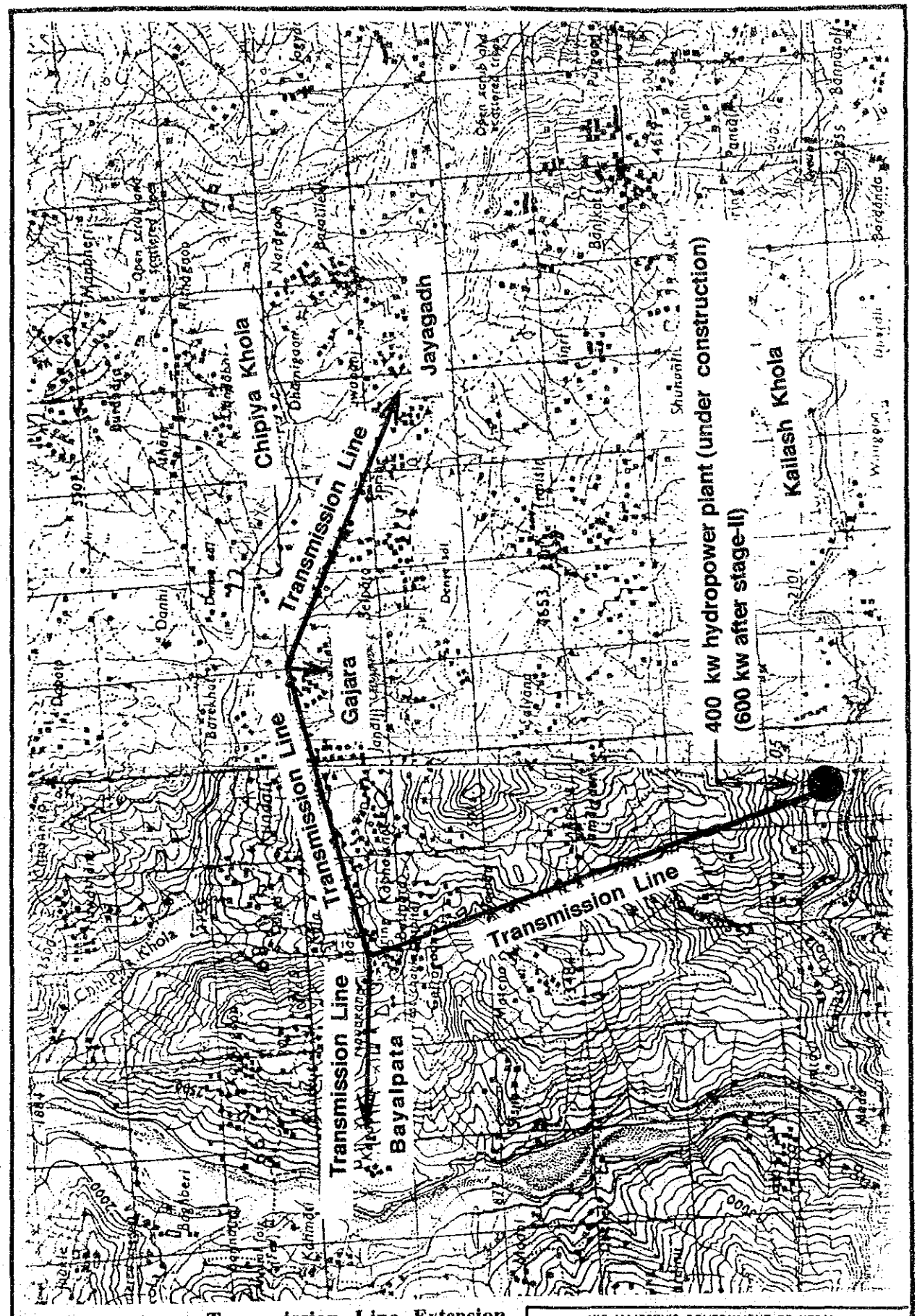

Figure 8.1.5 **Transmission Line Extension of Accham Small Hydropower Scheme to Gajara, Jayagadh and Bayalpata**

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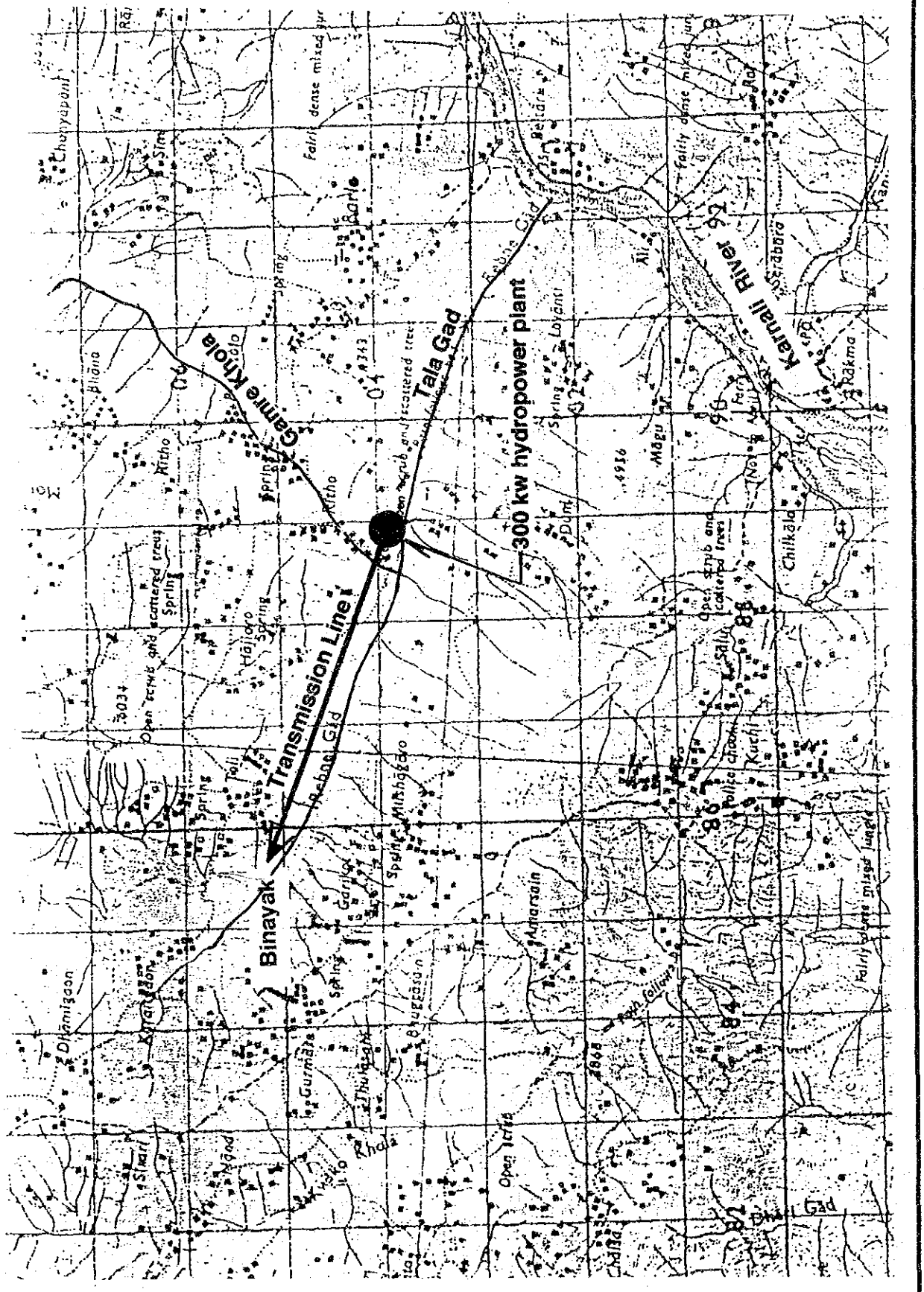

Figure 8.1.6 **Proposed Small Hydropower Scheme for Binayak**

HIS MAJESTY'S GOVERNMENT OF NEPAL
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APPENDIX V

DOMESTIC WATER SUPPLY

APPENDIX V
DOMESTIC WATER SUPPLY

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LIST OF ABBREVIATIONS

ADB	:	Asian Development Bank
ADBN	:	Agricultural Development Bank of Nepal
AIC	:	Agricultural Inputs Corporation
AMIS	:	Agency Managed Irrigation System
BOD	:	Biochemical Oxygen Demand
C.I.F.	:	Cost, insurance and freight
CBS	:	Central Bureau of Statistics
CDR	:	Central Development Region
CIDA	:	Canadian International Development Agency
COD	:	Chemical Oxygen Demand
DHM	:	Department of Hydrology and Meteorology
DIO	:	District Irrigation Office
DLG	:	Department of Local Government
DNPWC	:	Department of National Parks and Wildlife Conservation
DO	:	Dissolved Oxygen
DOA	:	Department of Agriculture
DOI	:	Department of Irrigation
DPTC	:	Water Induced Disaster Prevention Technical Centre
DSCWM	:	Department of Soil Conservation and Watershed Management
DWSS	:	Department of Water Supply and Sewerage
ED	:	Electricity Department
EDF	:	Electricity de France International
EDR	:	Eastern Development Region
EIA	:	Environmental Impact Assessment
EIRR	:	Economic Internal Rate of Return
EIS	:	Environmental Impact Study
FCN	:	Food Corporation of Nepal
FMIS	:	Farmer Managed Irrigation Systems
F.O.B.	:	Free on board
FWDR	:	Far Western Development Region
G.I.wire	:	Galvanized Iron wire
GLOF	:	Glacier Lake Outburst Flood
GDP	:	Gross Domestic Product
GOJ	:	Government of Japan
HMG/N	:	His Majesty's Government of Nepal
ICIMOD	:	International Centre for Integrated Mountain development
IDA	:	International Development Aids

IEE	:	Initial Environmental Examination
IRDP	:	Integrated Rural Development Project
IUCNNR	:	International Union for Conservation of Nature and Natural Resources
JICA	:	Japan International Cooperation Agency
KMTNC	:	King Mahendra Trust for Nature Conservation
LRMP	:	Land Resource Mapping Project
MFE	:	Ministry of Forests and Environment
MHDB	:	Marsyandi Hydropower Development Board
MPID2	:	Master Plan for Irrigation Development in Nepal Cycle 2
MWDR	:	Mid-Western Development Region
MWR	:	Ministry of Water Resources
NARSC	:	National Agricultural Research Service Centre
NCCNCR	:	National Council for the Conservation of National and Cultural Resources
NEA	:	Nepal Electricity Authority
NEC	:	Nepal Electricity Corporation
NPC	:	National Planning Commission
NPWC	:	National Parks and Wildlife Conservation
NWSC	:	Nepal Water Supply Corporation
RNA	:	Royal Nepal Army
Rs.	:	Nepalese Rupee
SHDB	:	Small Hydro Development Board
SHIP	:	Second Hill Irrigation Projects
S/W	:	Scope of Work
UMN	:	United Mission to Nepal
UN	:	United Nations
UNDP	:	United Nations Development Programme
U.S.A.	:	United States of America
US$	:	Dollars in United States of America
VDC	:	Village Development Committee
WDR	:	Western Development Region
WEC	:	Water and Energy Commission
WECS	:	Water and Energy Commission Secretariat
WSSB	:	Water Supply and Sewerage Board

LIST OF UNIT OF MEASUREMENT

°C	:	degree centigrade or Celsius
cusec	:	cubic foot per second = 0.02832 m^3/s
El.	:	Elevation
GWh	:	Giga Watt hour
ha	:	hectare
km	:	kilometer
km^2	:	square kilometer
kW	:	kilo Watt
kV	:	kilo Volt
m	:	meter
m^3/s	:	cubic meter per second
m^3/sec	:	cubic meter per second
m^3/day	:	cubic meter per day
MW	:	Mega Watt
%	:	percent

1. INTRODUCTION

The implementation of water supply schemes in the Study Area was commenced in 1970s and accelerated in 1980s following the proclamation of the International Drinking Water and Sanitation Decade by the United Nations, UN. A comprehensive inventory of existing water supply schemes including on-going and planned ones has not well compiled yet in the Study Area probably due to the fact that rural water supply schemes are implemented at the district level with self-help of local people.

This Study aims to prepare an inventory list of water supply schemes to grasp the current water supply situation in the Study Area. Furthermore, future balance between supply capacity and demand in the domestic water supply in year 2000 and 2013 is also dealt with by Village Development Committee, VDC, based on its population data in year 1981 and 1991. As a summary, discussed are the recommendations for future water supply in the Study Area.

Four areas are designated as the strategic areas in the Study Area, i.e. Jumla, Surkhet, Dipayal-Silgadhi-Rajpur and Baitadi. Further detailed discussions are given for the future water balance of these four strategic areas.

2. BACKGROUND INFORMATION

2.1 Past Performance

Systematic planning and implementation of public water supply and sewerage in Nepal date back to year 1972 when the Department of Water Supply and Sewerage, DWSS, was established to accelerate the development of public water supply and sewerage and to encourage in creating healthy manpower. Access to safe water furthermore has merits to reduce the infant mortality rate, to increase the literacy rate, in particular female literacy, and to relieve the work burden of women and children. By the end of year 1980, urban population of 83% could receive the public water supply, whilst only 7% for the rural population (Ref. VI-1).

The proclamation of the International Drinking Water and Sanitation Decade (1981 to 1990) by the UN contributed to the improvement of the public water supply sector in Nepal, giving the water supply coverage ratio of 66% for the urban population and 34% for the rural population at the end of 1990. Compared with public water supply, sanitation gained little improvement with a coverage ratio of about 6% at the end of the said Decade.

In the Study Area, the implementation of water supply was commenced in 1970s with a few schemes in one district, and was spurred in 1980s following the proclamation of the International Drinking Water and Sanitation Decade, but the accomplishment rate of water supply schemes is far behind from that of national average as discussed in the subsequent Section 3.1, Existing and On-going/Planned Water Supply Schemes.

Main fund sources to implement the water supply schemes were DWSS, K-BIRD (Karnali-Bheri Integrated Rural Development Project, MOLD), UNICEF (United Nations International Children's Emergency Fund) and ADB in the Study Area. The extensive activities of UNICEF for the water supply schemes in the Study Area are aimed to improve the children's literacy by relieving their daily work to collect drinking water from the nearby river.

2.2 Institution

During the Panchayat system, water supply schemes were managed by two departments and one board; Department of Water Supply and Sewerage (DWSS), Water Supply and Sewerage Board (WSSB) and Ministry of Panchayat and Local Development (MPLD). The DWSS and the WSSB administratively organized under the Ministry of Water Resources were responsible

for the development of rural and urban water supply schemes, respectively. The MPLD (Ministry of Local Development at present) was given responsibility for the development of rural water supply systems serving less than 1,500 people.

After a new democratically elected Government was formed, the development of water supply schemes is managed by the DWSS and the Nepal Water Supply Corporation (NWSC) administratively organized under the Ministry of Housing and Physical Planning. The NWSC is in charge of water supply schemes of twelve municipal areas (Kathmandu, Pokhara and ten municipalities in Terai). The DWSS is responsible not only for all the rural water supply programmes including the schemes taken over from the MPLD, but also for the water supply projects of municipalities except for those managed by NWSC. Thus, all the water supply schemes in the Study Area are under the control of the DWSS.

The DWSS has two regional offices in the Study Area to manage water supply schemes under the supervision of the regional director; one is the Surkhet regional office to undertake the schemes in the Mid Western Development Region and the other is the Dipayal regional office for the schemes in the Far Western Development Region. Furthermore, a district office is established in each district to manage each water supply scheme. Even allowed to have a few to several water supply engineers under the district officer, each district suffers from chronic shortage of manpower.

2.3 Water Supply Policy and Target

Rural water supply schemes are in principle implemented based on the request of local people as a policy guideline of the government; that is, a community which needs a water supply scheme is at first required to form a water users committee, through which the request to implement the water supply scheme is submitted to their district office of the DWSS.

Once the water supply scheme is decided to be implemented, the DWSS will supply materials not available around the project area and will manage construction works if the beneficiaries to be served by the scheme exceed 1,000 people. However, the beneficiaries are to provide at least the labour for the earthworks.

If the beneficiaries are less than 1,000, the DWSS will only supply materials not available around the project area, and the water users committee will manage all the construction works with technical assistance of the district officer of the DWSS. In a word, rural water supply schemes in Nepal are, in principle, implemented with the contribution of local people and with the assistance of the Government.

Based on the basic policy of the Government for the rural water supply schemes mentioned above, a national target to provide safe drinking water throughout the nation by year 2000 was launched.

3. WATER SUPPLY CONDITION IN THE STUDY AREA

3.1 Existing and On-going/Planned Water Supply Schemes

In the first field work carried out in November and December 1991, the information on the water supply schemes in the Study Area was collected from the Department of Water Supply and Sewerage, DWSS, (Ref. VI-2). Taking into consideration the fact that the water supply schemes in the Study Area are basically implemented on the district level, the information on the present status of water supply schemes was collected by distributing questionnaires on them to each district office through the second field investigation carried out in March and April 1992.

Information on water supply schemes in a district was tried to collect by Village Development Committee (VDC) taking into consideration the balance study of rural water supply which will be dealt with in the subsequent Section 3.3, Balance between Future Domestic Water Demand and Supply Capacity; that is, the VDC is the smallest administrative unit for the compilation of population census.

At first, the name of VDC and its population in 1981 and 1991 were confirmed through the questionnaire, although it was frequent that population in 1981 was not available due to merge and division of VDC. For each water supply scheme in a VDC, collected was the information on scheme name, scheme status (existing, on-going or planned), completion year (or expected completion year), type of water source, design population, design capacity and so on.

The questionnaires were distributed to 16 district offices in the Study Area; Humla, Mugu, Kalikot, Jumla, Dolpa, Rukum, Dailekh, Jajarkot and Surkhet in the Mid Western Development Region and Darchula, Baitadi, Dadeldhura, Bajhang, Bajura, Doti and Achham in the Far Western Development Region, and were collected from all of them by the task force team formed by the engineers of DWSS, MWR and JICA. Helicopters were fully utilized as a transportation means between Kathmandu and the district offices taking into consideration limited time for field investigation and remoteness of the Study Area.

According to the result obtained through the questionnaires, water supply schemes in service are at present 203 in the Mid Western Development Region where the Study Area lies; 46 in the Karnali Zone, 50 in the Rapti Zone and 107 in the Bheri Zone, whilst there are 330 existing schemes in the Far Western Development Region where the Study Area lies; 208 in the Mahakali Zone and 122 in the Seti Zone as summarized in Table 3.1.1. Total schemes

including on-going ones count 472 in the Mid Western Development Region (225 in the Karnali, 75 in the Rapti and 172 in the Bheri) and 928 in the Far Western Development Region (419 in the Mahakali and 509 in the Seti).

In terms of service ratio, which is defined as the rate of the design population of existing water supply schemes to 1991 population, the Mid Western Development Region gained the ratio of 28.5%; 17.2% for the Karnali Zone, 39.5% for the Rapti Zone and 30.8% for the Bheri Zone. On the other hand, the Far Western Development Region accomplished a slightly lower ratio of 22.7%, composed of 26.5% for the Mahakali Zone and 20.1% for the Seti Zone. Although water supply service in the Study Area less gained in comparison with the national average of 34% for the rural population as at end of 1990, the service ratio of water supply will be improved at 64.3% in the Mid Western Development Region and 68.1% in the Far Western Development Region when the on-going and planned schemes are included.

Water sources of highly undulated hilly and mountainous areas, where the Study Area lies, are normally stone spouts and natural springs, and sometimes surface water when the former water sources are not available in the vicinity of the scheme. Due to the quality of water, treatment is not applied for the former source, but rough filtration is done for the latter source. Water conveyance from the source to the service area relies upon gravity with little exceptions, taking into consideration available electric power and operation and maintenance of pumps.

Following are mentioned in the questionnaires as the problems that many existing water supply schemes face:

- Repair or renovation cannot be made due to lack of materials, i.e. pipes, pipe fittings and so on.
- Regular maintenance is not made.
- Production from water sources reduces due to the deterioration of vegetation.
- Implementation is delayed due to fund constraints.

Further detailed analysis by VDC including the balance study between future demand and supply capacity will be discussed in the subsequent Section 3.3, Balance between Future Domestic Water Demand and Supply Capacity.

3.2 Future Demand of Domestic Water Supply

The future demand of domestic water supply was projected to estimate the amount of water to be developed or to be augmented in the target years by multiplying the unit water consumption rate per head by the population predicted in the respective target years.

The target years to estimate domestic water demand were selected in year 2000 and 2013. The former is launched as the target year to provide safe drinking water throughout the nation, whilst the latter is proposed as the target year in this master plan study.

The service level of rural water supply schemes based on the standard set up by DWSS is as follows (Ref. VI-1):

Public standpost	:	1 per 100 people on an average within 150 metres
Hand pumps	:	1 per 100 people
Average supply	:	45 litres per head per day for standpost supplies, 115 litres per day for private connections in urban areas.

Taking into account the locality of the Study Area, i.e. rural area, the unit water consumption rate per head was assumed at 45 litres per head per day.

Future population was estimated by assuming that the annual population increase rate obtained by using the population census in year 1981 and 1991 can be applied for the projection of year 2000 and 2013. When 1981 population data of the VDC are not available, the projection was made by applying the average population increase rate in the district (refer to Table 3.2.1). In case that the population decrease is recorded in the VDC between 1981 and 1991, its population projection in year 2000 and 2013 was also relied on the average population increase rate in the district, since there is a high possibility that the boundary of the VDC is changed.

The population increase and the resulted future demand of domestic water supply projected by VDC are summarized by district as given in Table 3.2.1. In the Mid Western Development Region, the population will grow from the current level of 943,646 persons (year 1991) to 1,109,183 persons in year 2000 and 1,441,810 persons in year 2013, resulting in water demand of 49,913,235 litre per day or 0.58 m^3/sec in year 2000 and 64,881,450 litre per day or 0.75 m^3/sec in year 2013.

The Far Western Development Region has the almost same population growth as the Mid Western Development Region: 1,144,928 persons in year 2000 and 1,393,597 persons in

year 2013, resulting in domestic water requirements of 51,521,760 litre per day or 0.60 m^3/sec in year 2000 and 62,711,865 litre per day or 0.73 m^3/sec in year 2013. The balance between future domestic water demand and supply capacity will be dealt with by VDC in the subsequent Section 3.3, Balance between Future Domestic Water Demand and Supply Capacity.

3.3 Balance between Future Domestic Water Demand and Supply Capacity

The balance between the domestic water demand projected in year 2000 and 2013 and the present supply capacity was computed by VDC to estimate the amount to be developed. Water deficits, which are the amount to be developed so as to meet the demand, were summarized by district as given in Table 3.3.1.

The Mid Western Development Region in the Study Area requires to develop an amount of 24,134,906 litre per day or 0.28 m^3/sec by year 2000 and 35,209,591 litre per day or 0.41 m^3/sec by year 2013. Among nine districts, Surkhet shares the highest demand of 10,870,841 litre per day in year 2013 due to high population increase, followed by Dailekh of 7,611,091 litre per day. Total deficits of the Far Western Development Region in the Study Area are 24,327,645 litre per day or 0.28 m^3/sec by year 2000 and 33,011,858 litre per day or 0.38 m^3/sec by year 2013. Baitadi and Bajhang are two districts to require the highest and second highest development in water supply among seven districts. The amount to be developed by year 2013 is 7,403,856 litre per day for Baitadi and 6,660,796 litre per day for Bajhang. Water supply condition of each district is discussed in more details in the subsequent Sub-sections.

3.3.1 Karnali Zone

Humla District

The Humla district has 19 existing and 49 on-going/planned water supply schemes for 26 VDC as detailed in Table 3.3.2, an inventory list of water supply schemes in each VDC. There is no VDC which has no water supply schemes in the district, even if there are wards left as the area without water supply. Furthermore, current water supply capacity in 12 VDC meets the requirements of year 2000, whilst 10 VDC for year 2013.

Mugu District

There are six existing and 14 on-going/planned water supply schemes for 24 VDC in the Mugu district as detailed in Table 3.3.3. Of 24 VDCs, 14 VDCs have neither existing nor on-going/planned water supply schemes at present. On the other hand, 7 VDCs are counted as the ones with the supply capacity for the demands in year 2000, whilst 6 VDCs for the demands in year 2013.

Kalikot District

The Kalikot district has nine existing and 65 on-going/planned water supply schemes for 29 VDCs as detailed in Table 3.3.4. The VDCs with neither existing nor on-going/planned water supply schemes are six, whilst water demands of year 2000 are met by 19 VDCs with existing and on-going/planned water supply schemes, whilst 18 VDCs for the 2013 demands.

Jumla District

In Jumla, there are six existing and 22 on-going/planned water supply schemes for 29 VDCs as detailed in Table 3.3.5. The VDCs with neither existing nor on-going/planned schemes are twelve out of 29 VDCs. On the other hand, the VDC, which has the supply capacity to meet the demands of year 2000 and 2013 with the existing and on-going/planned schemes, is only Kartikswami.

Dolpa District

The Dolpa district has six existing and 29 on-going/planned water supply schemes for 23 VDCs as detailed in Table 3.3.6. There are eight VDCs which have neither existing nor on-going/planned water supply schemes, whilst the supply capacity of existing and on-going/planned schemes meets the year 2000 and 2013 demands in nine VDCs.

3.3.2 Rapti Zone

Rukum District

For the 43 VDCs of the Rukum district, there are 50 existing and 25 on-going/planned water supply schemes as detailed in Table 3.3.7. The VDCs with neither existing nor on-going/planned schemes are five. On the other hand, the supply capacity of the existing and on-going/planned schemes meets the year 2000 demand in nine VDCs, whilst six VDCs for the year 2013 demand.

3.3.3 Bheri Zone

Dailekh District

The Dailekh district has 28 existing and 37 on-going/planned water supply schemes for 59 VDCs as detailed in Table 3.3.8. Water supply schemes are not provided for 26 VDCs out of 59. On the other hand, the VDCs with the supply capacity to meet the demands of year 2000 and 2013 are eight.

Jajarkot District

The Jajarkot district has 30 VDCs, for which there are 31 existing and 12 on-going/planned water supply schemes as detailed is Table 3.3.9. Among 30 VDCs, the VDCs with neither existing nor on-going/planned water supply schemes are three, whilst the number of VDCs with the supply capacity to meet the demands of year 2000 and 2013 is six and two, respectively.

Surkhet District

The Surkhet district has one municipality, Birendranagar, and 49 VDCs, for which there are 48 existing and 16 on-going/planned water supply schemes as detailed in Table 3.3.10. The VDCs with neither existing nor on-going/planned water supply schemes are four. On the other hand, twelve VDCs have supply capacity to meet the demand of year 2000, whilst four VDCs for the demand of year 2013.

3.3.4 Mahakali Zone

Darchula District

The Darchula district has 38 VDCs, for which there exist 59 existing and 73 on-going/planned water supply schemes as detailed in Table 3.3.11. The VDCs with neither existing nor on-going/planned water supply schemes are two, whilst the number of VDCs with the supply capacity to meet the demands of year 2000 and 2013 is five.

Baitadi District

The Baitadi district has 117 existing and 98 on-going/planned water supply schemes for 68 VDCs as detailed in Table 3.3.12. The limited available capacity of water sources results in a large number of water supply schemes in the Baitadi district. There are two VDCs

with neither existing nor on-going/planned schemes in the district. On the other hand, eleven VDCs have the supply capacity enough to meet the demand of year 2000, whilst five for the demand of year 2013.

Dadeldhura District

The number of VDCs is 25 in the Dadeldhura district, for which there are 32 existing and 40 on-going/planned water supply schemes as detailed in Table 3.3.13. All the VDCs in the district have water supply scheme(s), and twelve VDCs among them have supply capacity to meet the demand of year 2000, whilst ten VDCs for the demand of year 2013.

3.3.5 Seti Zone

Bajhang District

There are 46 VDCs in the Bajhang district, which retain 21 existing and 44 on-going/planned water supply schemes as detailed in Table 3.3.14. Of 46, 15 VDCs have neither existing nor on-going/planned water supply schemes. On the other hand, five VDCs are capable of meeting the demands of year 2000 and 2013 with the existing and on-going/planned supply capacity.

Bajura District

The number of VDCs in the Bajura district is 27, for which there are 30 existing and 33 on-going/planned water supply schemes as detailed in Table 3.3.15. Of 27, two VDCs have neither existing nor on-going/planned water supply schemes. On the other hand, the supply capacity of seven VDCs meets the demand of year 2000, whilst three VDCs for the demand of year 2013.

Doti District

There are one municipality, Dipayal-Silgadhi, and 53 VDCs in the Doti district, which retain 21 existing and 126 on-going/planned water supply schemes as detailed in Table 3.3.16. The VDCs with neither existing nor on-going/planned water supply schemes are twelve out of one municipality and 53 VDCs. On the other hand, a total of 20 VDCs has supply capacity to meet the demand of year 2000, whilst 18 VDCs for the demand of year 2013.

Achham District

The Achham district has 75 VDCs, for which there are 50 existing and 184 on-going/planned water supply schemes as detailed in Table 3.3.17. Of 75, a total of 18 VDCs has neither existing nor on-going/planned water supply schemes. On the other hand, supply capacity of 29 VDCs meets their demand of year 2000, whilst 28 VDCs for the demand of year 2013.

3.4 Views for Water Supply Condition in the Study Area

As discussed in the preceding Section 3.1 (refer to Table 3.1.1), Existing and On-going/Planned Water Supply Schemes, water supply condition will be improved from the current level of 28.5% to a level of 64.3% in the Mid Western Development Region and from 22.7% to 68.1% in the Far Western Development Region in terms of service ratio by implementing on-going/planned schemes. This shows that much progress can be expected within a few to several years for the water supply in the Study Area, even if its achievement rate is behind from the national average.

There are 312 VDCs in the Mid Western Development Region, of which 78 VDCs have not received the services of water supply as dealt with by district in the preceding Section 3.3, Balance between Future Domestic Water Demand and Supply Capacity. On the other hand, 51 VDCs out of 332 are left as the ones without receiving the service of water supply in the Far Western Development Region. It can be considered urgent for the VDCs without receiving the service of water supply to make a plan of water supply schemes.

The beneficiaries of a water supply scheme are estimated to be 1,286 persons in the Mid Western Development Region from the design population of 607,020 for the scheme number of 472 consisting of existing and on-going/planned schemes (refer to Table 3.1.1). Relying on this beneficiary number of a scheme, the Mid Western Development Region is required to develop 417 schemes by year 2000 and 608 schemes by year 2013.

On the other hand, the Far Western Development Region has a capacity to supply for 683,089 persons with the schemes of 928, resulting in the beneficiaries of 736 persons for one scheme. Applying this figure, the number of schemes to be developed by year 2000 and 2013 becomes 735 and 997, respectively. Compared with the number of on-going/planned schemes, i.e. 472 in the Mid Western Development Region and 997 in the Far Western Development Region, the number of schemes to be developed by respective target years falls in the reality for implementation in both the Development Regions.

4. WATER SUPPLY IN THE STRATEGIC AREAS

4.1 Jumla Strategic Area

4.1.1 Present Condition

The Jumla strategic area includes three Village Development Committees (VDC), Chandannath, Mahatgaun and Depalgaun as shown in Figure 4.1.1. Chandannath is the only VDC which is at present receiving water supply. Two water supply schemes are now under construction for Mahatgaun and Chandannath, whilst one water supply scheme for Depalgaun is now being planned under the finance of the Asian Development Bank (ADB).

The population of the Jumla strategic area consisting of three VDCs is 10,075 persons in year 1991. On the other hand, the total supply capacity in the area with the existing and on-going/planned schemes is 306,720 litre per day with the design population of 4,789 persons as summarized below:

Present Water Supply Condition in Jumla Strategic Area

Name of VDC	Supply Capacity (l/day)			Design Population (persons)		
	existing	on-going/ planned	total	existing	on-going/ planned	total
Chandannath	60,480	51,840	112,320	1,750	850	2,600
Mahatgaun	0	25,920	25,920	0	625	625
Depalgaun	0	168,480	168,480	0	1,564	1,564
Total	60,480	194,400	306,720	1,750	3,039	4,789

The service ratio, which is defined as the rate of design population to total population, is 17%, and furthermore unit consumption per head is more or less 35 litre per day as of year 1991 in the area. After the completion of the on-going and planned schemes in the area, the service ratio will improve to a level of 48% with the unit consumption rate of 64 litre per day by applying the population of 10,075 persons in year 1991.

4.1.2 Future Water Demand

The population of the Jumla strategic area is expected to reach 10,795 persons in year 2000 and 11,935 persons in year 2013. Water demands to be developed for the respective target years of each VDC were estimated by computing the balance between the water demand, which is expressed as the multiplication of population by unit consumption rate of 45 litre per head, and the water supply capacity by existing and on-going/planned schemes, totalling 263,700 litre per day in year 2000 and 302,940 litre per day in year 2013 as summarized below:

Water Demands in Target Years

Name of VDC	Projected Population		Supply Capacity (l/day)	Water Deficit (l/day)		
	2000	2013		2000	2013	2000 to 2013
Chandannath	6,183	6,659	112,320	165,915	187,335	21,420
Mahatgaun	2,749	3,145	25,920	97,785	115,605	17,820
Depalagaun	1,863	2,131	168,480	0	0	0
Total	10,795	11,935	306,720	263,700	302,940	39,240

4.1.3 Water Source and Preliminary Cost Estimate

A potential source for the water supply scheme of Chandannath and Mahatgaun VDCs was identified in the Rini Khola relying on the available 1 to 50,000 scale topographic maps and the reconnaissance to the site as shown in Figure 4.1.1. Water collected at the intake lying in the Rini Khola is planned to be conveyed to the water receiving tanks of Chandannath and Mahatgaun through the transmission pipe by gravity. Water supply to Depalgaun is excluded due to the expectation of no water deficits by year 2013.

The profile of water transmission route as illustrated in Figure 4.1.2 was prepared on the basis of the route plan studied on the above topographic map. The intake structure is located about 6 km upstream of the receiving tank sited at Chandannath. The pipeline crosses the Tila River and then is extended up to the receiving tank lying in Mahatgaun after it reaches Chandannath. A total head is about 260 m consisting of 60 m between the intake site and the receiving tank of Chandannath and 200 m between the two receiving tanks of Chandannath and Mahatgaun.

The construction cost required to implement the scheme, which includes the components of an intake, water conveyance pipes, a pressure breaking chamber and two water receiving tanks, was preliminarily estimated at US$ 58 thousand, of which US$ 20.5 thousand is needed for the extension to Mahatgaun, by applying the assumptions and conditions mentioned below:

a) The scheme meets the water demand of Chandannath and Mahatgaun by year 2013.

b) The estimate of material costs relies on the data and information available in the Mid and Far Western Development Regions.

c) Unit costs for construction works are estimated taking into consideration the remoteness with difficulty in access to the site.

d) Unit costs furthermore include labour costs.

e) Sanitation components are not included in the cost estimate.

Main components of the scheme are given in Table 4.1.1.

4.2 Surkhet Strategic Area

4.2.1 Present Condition

The municipality and the VDCs which belong to the Surkhet strategic area are Birendranagar (municipality), Uttraganga and Latikoili as shown in Figure 4.2.1. There are three existing schemes for supplying domestic water to Birendranagar and Uttraganga, whilst two water supply schemes are under construction for Birendranagar and Latikoili.

The population of the Surkhet strategic area consisting of one municipality and two VDCs is 38,627 persons in year 1991. The total supply capacity of existing and on-going/planned schemes is 4,755,891 litre per day with the design population of 60,151 persons as summarized below:

Present Water Supply Condition in Surkhet Strategic Area

Name of Muni./ VDC	Supply Capacity (l/day) existing	on-going/ planned	total	Design Population (persons) existing	on-going/ planned	total
Birendranagar	3,715,200	300,000	4,015,200	39,000	6,000	45,000
Uttraganga	440,691	0	440,691	6,151	0	6,151
Latikoili	0	300,000	300,000	0	9,000	9,000
Total	4,155,891	600,000	4,755,891	45,151	15,000	60,151

The service ratio in the Surkhet strategic area records a high value of 86% at present including Latikoili without existing water supply schemes, improving 100% with the completion of on-going and planned schemes. With a high service ratio of water supply, unit consumption per head becomes a rate of 108 litre per day. The completion of on-going and planned schemes will raise the unit consumption per head to a level of 123 litre per day.

4.2.2 Future Water Demand

The population of the Surkhet strategic area is expected to reach 58,424 persons in year 2000 and 106,855 persons in year 2013. The comparison between the population in year 2000 and 2013 and the supply capacity of five existing and on-going schemes mentioned above results in requiring the development of 270,639 litre per day by year 2000 and 962,154 litre per day by year 2013 as summarized below:

Water Demands in Target Years

Name of Muni./ VDC	Projected Population (persons) 2000	2013	Supply Capacity (l/day)	Water Deficit (l/day) 2000	2013	2000 to 2013
Birendranagar	35,950	69,014	4,015,200	0	0	0
Uttraganga	10,169	18,785	440,691	16,914	404,634	387,720
Latikoili	12,305	19,056	300,000	253,725	557,520	303,795
Total	58,424	106,855	4,755,891	270,639	962,154	691,515

Water deficits were computed as done in the Jumla Strategic area. The municipality of Birendranagar will be free from water shortage.

4.2.3 Water Sources and Preliminary Cost Estimate

Potential sources for the water supply schemes of Uttraganga and Latikoili were identified in the field investigation of Phase III as depicted in Figure 4.2.1. Surface water of the Khorke Khola is conveyed to the receiving tank of Uttraganga through the transmission pipe, whilst water sources for Latikoili are sought to wells.

The profile of water transmission route as illustrated in Figure 4.2.2 was prepared on the basis of the route plan. Most of the route passes along the contour line and the total distance and the total head between the intake site and the receiving tank are about 3.8 km and about 100 m respectively.

The construction cost required for the Uttraganga scheme was estimated at US$ 26 thousand for meeting the demand of year 2013 by applying the same assumptions and conditions used for the Jumla scheme. On the other hand, Latikoili will need an amount of US$ 17 thousand for drilling wells and installing pumps and generators. Main components of the schemes are given in Table 4.1.1.

4.3 Dipayal-Silgadhi-Rajpur Strategic Area

4.3.1 Present Condition

Dipayal-Silgadhi and Tikha are the municipality and the VDC included in the Dipayal-Silgadhi-Rajpur strategic area as shown in Figure 4.3.1. There is only one scheme to supply domestic water to the area, whilst four water supply schemes are under construction for Silgadhi and Tikha. Furthermore, one water supply scheme is under plan for Rajpur under the finance of ADB.

The population of Dipayal-Silgadhi and Tikha is 19,861 persons in year 1991. The total capacity of existing and on-going/planned schemes is 1,221,216 litre per day with the design population of 14,852 persons as summarized below:

Present Water Supply Condition in the Dipayal-Silgadhi-Rajpur Strategic Area

Name of Muni./ VDC	Supply Capacity (l/day) existing	on-going/ planned	total	Design Population (persons) existing	on-going/ planned	total
Dipayal	311,660	0	311,660	4,166	0	4,166
Silgadhi	0	756,943	756,943	0	7,349	7,349
Tikha	0	152,613	152,613	0	3,337	3,337
Total	311,660	909,556	1,221,216	4,166	10,686	14,852

The service ratio in the area is at present 21%, and will be improved at a level of 75% with the completion of on-going and planned schemes. On the other hand, the unit consumption rate per head will become 82 litre per day with the completion of on-going and planned schemes from the current level of 75 litre per day.

4.3.2 Future Water Demand

The population of Dipayal-Silgadhi and Tikha is expected to increase to 21,461 persons in year 2000 and 24,004 persons in year 2013. Even with the supply capacity of 1,221,216 litre per day by five water supply schemes mentioned above, the Dipayal-Silgadhi-Rajpur strategic area requires to develop an amount of 286,300 litre per day by year 2000 and 378,398 litre per day by year 2013 as summarized below:

Water Demands in Target Years

Name of Muni./ VDC	Projected Population (persons) 2000	2013	Supply Capacity (l/day)	Water Deficit (l/day) 2000	2013	2000 to 2013
Dipayal	13,288	14,930	311,660	286,300	360,191	73,891
Silgadhi	4,794	5,278	756,943	0	0	0
Tikha	3,379	3,796	152,613	0	18,207	18,207
Total	21,461	24,004	1,221,216	286,300	378,398	92,098

Water demands in the area were computed as done in the Jumla strategic area.

4.3.3 Water Sources and Preliminary Cost Estimate

Potential sources for the water supply schemes of Tikha and Dipayal except Silgadhi, where no water deficits are expected by year 2013, were identified in the Ritha Khola and Godre Khola, respectively as given in Figure 4.3.1.

The pipeline route for Dipayal municipality, as its profile is given in Figure 4.3.2, is planned to mostly pass along the contour line from the intake site to the point around 0.5 km upstream of the receiving tank. The last 0.5 km of the route is planned to creep on the steep mountain slope. The total distance and the total head between the intake site and the receiving tank are about 3 km and 100 m respectively. On the other hand, the pipeline for Tikha, as its profile is given in Figure 4.3.3, is planned to run along the contour line throughout the route. The total distance and the total head are about 3.8 km and about 75 m, respectively.

The construction cost required for the implementation of both schemes was estimated at US$ 34 thousand; US$ 10 thousand for Tikha and US$ 24 thousand for Dipayal. Main components of the schemes are given in Table 4.1.1.

4.4 Baitadi Strategic Area

4.4.1 Present Condition

The Baitadi strategic area covers the VDCs of Khalanga, Thaligada, Tripurasundari and Dashrath Chand in the Baitadi zone and Patan and Basantpur in the Patan zone as shown in Figure 4.4.1. The area receives domestic water supply from 26 existing schemes. Nine schemes are under construction to meet the growing demands.

The population of the Baitadi strategic area consisting of six VDCs is 20,481 persons in year 1991. The total supply capacity of existing and on-going/planned schemes is 727,490 litre per day with the design population of 15,954 persons as summarized below:

Present Water Supply Condition in the Baitadi Strategic Area

Name of VDC	Supply Capacity (l/day) existing	on-going/ planned	total	Design Population (persons) existing	on-going/ planned	total
Khalanga	112,520	185,500	298,020	2,920	3,750	6,670
Thaligada	38,825	100,980	139,805	885	1,900	2,785
Tripurasundari	35,730	0	35,730	810	0	810
Dashrath Chand	12,150	15,750	27,900	270	350	620
Patan	217,035	0	217,035	4,869	0	4,869
Basantpur	6,750	2,250	9,000	150	50	200
Total	423,010	304,480	727,490	9,904	6,050	15,954

The service ratio in the area records a relatively high value of 48%. When the on-going/planned schemes are completed, the ratio will reach a level of 78%. On the other hand, the unit consumption rate per head is 43 litre per day with the existing schemes, and will slightly improve to a level of 46 litre per day with the completion of on-going and planned schemes.

4.4.2 Future Water Supply Plan

The population of the Baitadi strategic area is expected to increase to 23,114 persons in year 2000 and 27,667 persons in year 2013. The area will require to develop 344,125 litres per day by year 2000 and 517,525 litres per day by year 2013 to meet the growing demands even with the total capacity of 727,490 litres per day by existing and on-going/planned schemes as summarized below:

Water Deficit in Target Years

Name of VDC	Projected Population (persons)		Supply Capa-	Water Deficit (l/day)		
	in 2000	in 2013	city (l/day)	in 2000	in 2013	2000 to 2013
Khalanga	5,923	6,846	298,020	0	10,050	10,050
Thaligada	3,335	3,855	139,805	10,270	33,670	23,400
Tripurasundari	2,748	3,176	35,730	87,930	107,190	19,260
Dashrath Chand	2,995	3,461	27,900	106,875	127,845	20,970
Patan	5,386	6,309	217,035	25,335	66,870	41,535
Basantpur	2,727	4,020	9,000	113,715	171,900	58,185
Total	23,114	27,667	727,490	344,125	517,525	173,400

4.4.3 Water Sources and Preliminary Cost Estimate

A potential water source was identified in the Gwalek Khola to distribute water to Khalanga, Thaligada, Tripurasundari and Dashrath Chand VDCs as shown in Figure 4.4.1. On the other hand, water sources for Patan and Basantpur were sought to the Surnaya Khola and Dhadaun Khola, respectively.

In the Baitadi zone, the pipeline route between the intake site and the receiving tank at Khalanga mostly runs along the contour line as its profile is given in Figure 4.2.2 and has a distance of about 3.5 km and a head of about 30 m. The pipeline bifurcates its route towards three destinations, Thaligada, Dashrath Chand and Tripurasundari, at Khalanga. The distance and the head between the planned structures are given below:

	distance (Km)	head (m)
Intake site - Khalanga receiving tank	3.5	30
Khalanga receiving tank - Dashrath Chand receiving tank	1.0	30
Khalang receiving tank - Tripurasundari receiving tank	1.5	60
Khalang receiving tank - Thaligada receiving tank	1.5	120

In the Patan zone, the pipeline route for Patan VDC is planned to mostly bury along the contour line (refer to Figure 4.4.3), having the almost constant slope. The total distance and the head between the intake site and the receiving tank site are 2 km and 30 m, respectively. On the other hand, the pipeline route for Basantpur VDC will have a conveyance distance of

2.5 km, running along the contour line (refer to Figure 4.4.4). Head between the intake structure and the receiving tank is around 160 m.

The cost required for the implementation of those three schemes was estimated at US$ 61.8 thousand; US$ 19.2 thousand for Khalanga, US$ 6.0 thousand for Thaligada, US$ 6.8 thousand for Tripurasundari, US$ 5.2 thousand for Dashrath Chand, US$ 8.9 thousand for Patan and US$ 15.7 thousand for Basantpur. Main components of the schemes are given in Table 4.1.1.

List of References

Ref. V-1 Binnie & Partners / ADB. (1991). ADB Third Water Supply and Sanitation Sector Project

Ref. V-2 Department of Water Supply and Sewerage (DWSS). (1991). Project Inventory ; Mid Western Development Region and Far Western Development Region

TABLES

Table 3.1.1 WATER SUPPLY SCHEMES IN THE STUDY AREA

Mid-Western Development Region

District	Existing Water Supply Sheme		On-going/Planning Water Supply Scheme		Total Water Supply Scheme		Population in 1991	Service Ratio(Design Population/Population in1991), %	
	Number	Design Population	Number	Design Population	Number	Design Population		Existing Scheme	Total Scheme
Karnali Zone									
1 Humla	19	9,627	49	24,167	68	33,794	34,640	27.8	97.6
2 Mugu	6	4,009	14	10,112	20	14,121	36,445	11.0	38.7
3 Kalikot	9	22,010	65	80,650	74	102,660	88,781	24.8	115.6
4 Jumla	6	3,959	22	15,127	28	19,086	76,305	5.2	25.0
5 Dolpa	6	5,345	29	10,139	35	15,484	25,076	21.3	61.7
Sub-total	46	44,950	179	140,195	225	185,145	261,247	17.2	70.9
Rapti Zone									
1 Rukum	50	61,230	25	52,212	75	113,442	155,017	39.5	73.2
Sub-total	50	61,230	25	52,212	75	113,442	155,017	39.5	73.2
Bheri Zone									
1 Dailekh	28	16,669	37	39,601	65	56,270	187,820	8.9	30.0
2 Jajarkot	31	31,917	12	36,757	43	68,674	114,267	27.9	60.1
3 Surkhet	48	113,848	16	69,641	64	183,489	225,296	50.5	81.4
Sub-total	107	162,434	65	145,999	172	308,433	527,383	30.8	58.5
Total	203	268,614	269	338,406	472	607,020	943,647	28.5	64.3

Far-Western Development Region

District	Existing Water Supply Sheme		On-going/Planning Water Supply Scheme		Total Water Supply Scheme		Population in 1991	Service Ratio(Design Population/Population in1991), %	
	Number	Design Population	Number	Design Population	Number	Design Population		Existing Scheme	Total Scheme
Mahakali Zone									
1 Darchula	59	23,661	73	32,536	132	56,197	101,614	23.3	55.3
2 Baitadi	117	44,588	98	60,455	215	105,043	200,229	22.3	52.5
3 Dadeldhura	32	39,505	40	63,581	72	103,086	104,449	37.8	98.7
Sub-total	208	107,754	211	156,572	419	264,326	406,292	26.5	65.1
Seti Zone									
1 Bajhang	21	19,860	44	40,589	65	60,449	139,178	14.3	43.4
2 Bajura	30	17,405	33	38,853	63	56,258	92,083	18.9	61.1
3 Doti	21	35,488	126	109,733	147	145,221	167,469	21.2	86.7
4 Achham	50	47,372	184	109,463	234	156,835	197,888	23.9	79.3
Sub-total	122	120,125	387	298,638	509	418,763	596,618	20.1	70.2
Total	330	227,879	598	455,210	928	683,089	1,002,910	22.7	68.1

Table 3.2.1 FUTURE DEMAND OF DOMESTIC WATER

Zone	District	Population in1991	Annual Increase Rate, %	Population in 2000	Water Demand in 2000, lpd	Population in2013	Water Demand in 2013, lpd
Mid Western Development Region							
Karnali	Humla	34,640	1.05(5.49)	41,655	1,874,475	56,012	2,520,540
	Mugu	36,445	1.05(-1.80)	39,704	1,786,680	45,280	2,037,600
	Kalikot	88,781	0.13	100,083	4,503,735	119,399	5,372,955
	Jumla	76,305	1.04	83,557	3,760,065	96,787	4,355,415
	Dolpa	25,075	1.30	26,903	1,210,635	31,463	1,415,835
Rapti	Rukum	155,017	1.59	177,246	7,976,070	216,023	9,721,035
Bheri	Dailekh	187,820	1.21	209,557	9,430,065	253,279	11,397,555
	Jajarkot	114,267	1.41	134,070	6,033,150	162,429	7,309,305
	Surkhet	225,296	3.09	296,408	13,338,360	461,138	20,751,210
	Sub-total	943,646		1,109,183	49,913,235	1,441,810	64,881,450
Far Western Development Region							
Mahakali	Darchula	101,614	1.20	108,007	4,860,315	126,702	5,701,590
	Baitadi	200,229	1.12	224,714	10,112,130	267,909	12,055,905
	Dadeldhura	104,449	1.87	134,027	6,031,215	192,519	8,663,355
Seti	Bajhang	139,178	1.16	161,067	7,248,015	207,319	9,329,355
	Bajura	92,083	2.12	107,875	4,854,375	136,762	6,154,290
	Doti	167,469	0.90	198,040	8,911,800	227,104	10,219,680
	Achham	197,888	0.66	211,198	9,503,910	235,282	10,587,690
	Sub-total	1,002,910		1,144,928	51,521,760	1,393,597	62,711,865
	Total	1,946,556		2,254,111	101,434,995	2,835,407	127,593,315

Note: The annual population increase rate of the Humla and Mugu Districts is estimated as one district due to the change of boundary between them.

Table 3.3.1 WAER SUPPLY CONDITION IN THE STUDY AREA

Zone	District	Number of Municipality	Number of VDC	Population in 2000	Population in 2013	Number of Exisiting Schemes	Supply Capacity of Existing Schemes, lpd	Number of On-going/ Planned Schemes,lpd	Supply Capacity of On-going/ Planned Schemes,lpd	Deficits in 2000,lpd	Dificits in 2013,lpd
Mid Western Development Region											
Karnali	Humla		26	41,655	56,012	19	433,215	49	1,080,255	565,312	1,126,962
	Mugu		24	39,704	45,280	6	311,310	14	1,213,920	1,079,712	1,262,610
	Kalikot		29	100,083	119,399	9	1,065,881	65	4,805,186	926,750	1,444,005
	Jumla		29	83,557	96,787	6	194,648	22	812,817	2,808,168	3,399,399
	Dolpa		23	26,903	31,463	6	284,080	29	625,314	532,396	655,484
Rapti	Rukum		43	177,246	216,023	50	3,013,364	25	3,191,453	3,121,161	4,532,080
Bheri	Dailekh		59	209,557	253,279	28	1,717,370	37	2,910,398	6,336,496	7,611,091
	Jajarkot		30	134,070	162,429	31	1,238,982	12	1,827,058	3,140,088	4,307,119
	Surkhet	1	49	296,408	461,138	48	7,627,301	16	3,410,437	5,624,823	10,870,841
	Sub-total	1	312	1,109,183	1,441,810	203	15,886,151	269	19,876,838	24,134,906	35,209,591
Far Western Development Region											
Mahakali	Darchula		38	108,007	126,702	59	1,142,580	73	1,582,836	1,896,361	2,666,480
	Baitadi		68	224,714	267,909	117	1,897,616	98	3,413,768	5,674,193	7,403,856
	Dadeldhura		25	134,027	192,519	32	2,275,837	40	4,345,643	1,994,863	3,837,918
Seti	Bajhang		46	161,067	207,319	21	853,787	44	2,034,819	4,858,391	6,660,796
	Bajura		27	107,875	136,762	30	798,732	33	1,940,707	2,474,535	3,605,452
	Doti	1	53	198,040	227,104	21	2,473,359	126	6,550,638	3,200,690	3,882,665
	Achham		75	211,198	235,282	50	1,930,567	184	6,674,150	4,228,612	4,954,691
	Sub-total	1	332	1,144,928	1,393,597	330	11,372,478	598	26,542,561	24,327,645	33,011,858
	Total	2	644	2,254,111	2,835,407	533	27,258,629	867	46,419,399	48,462,551	68,221,449

Table 3.3.2 Water Supply Condition in the Humla District

No. of Village Development Committee : 26
No. of Municipality : 0

Zone / District	Area No.	Village Development Committee in the Area	Population in 1981	Population in 1991	Annual Increse Rate, %	Population in 2000	Population in 2013	Existing Water Supply Project: Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	On-going/Planning Water Supply Project: Name	Area Coverge (wards/total wards)	Design Population	Type
Karnali / Humla	1	1. Simikot	1,382	2,351	5.457	3,792	7,566	Hildum w/s Project	8	100	Ghata Khola Stream	1989	4,500	Simikot w/s Project	1to6	1,850	Humana Khola Stream
								Buruncha w/s Project	7,8	300	Bhaita Khola Stream	1989	13,500	Langudak w/s	8	100	Langudak Khola
		2. Hepka	780	977	2.277	1,197	1,603	Dhaiga w/s Prpject	Hepka-2,3 Dadafaya-6,7,8,9	700	Chhabichicha Spring	1975	31,500	Sagma w/s	9	85	Hildum chara Stream
														Tangin w/s	8,9	300	Takra Gumba Stream
														Hepka w/s	4,5,6,7	500	Kayachhua Spring
														Gada Pari w/s	1	100	Chhambu Spring
		3. Bargaun	855	1,022	1.800	1,200	1,513	Bargaun w/s Project	1to9	2,000	Chhoutra Khola Stream	1988/1989	90,000	Gada Pari w/s	1	100	Kapathing Spring
	2	1. Sayda	1,108	1,314	1.720	1,532	1,912										
														Sayda w/s	4to7	800	Kaudipanora Spring
														Satyaniga w/s	1,2,3	300	Sapudhara Spring
														Kolchi w/s	8,9	350	Garugaru Stream
		2. Dandafaya	1,070	1,317	2.099	1,588	2,080	Golakhod w/s Project	3	274	Adhari khola Stream	1988/1989	12,330	Dadafaya w/s		900	Pani mul Spring
		3. Khagalgaun	845	630	1.050	692	793							Khagalgaun w/s Project	3to9	1,200	Chhutal Spring
														Jhair Kholchi w/s	1,2	250	Parakchi Spring
	3	1. Kermi		540	1.050	593	680	Kermi w/s Project	5to9	361	Gonbalungbamul Spring	1991	16,245	Chhaduk w/s Project	1to4	223	Hamtunga Khola Stream
		2. Limi	574	989	5.591	1,614	3,274							Hailgi w/s	1to4	500	Nalbu Khola Stream
														Jaiga w/s	5,6,7	400	Takchi Khola Stream
		3. Muchu	1,008	937	1.050	1,029	1,179							Tila w/s	8,9	300	Muhar Khola Stream
	4	1. Thechaya		1,664	1.050	1,828	2,094							Chala w/s		350	Kulya Ko Pani Spring
														Theay w/s	1to6	1,800	Hotick Khola Stream
		2. Kharpunath		696	1.050	765	876							Dojam w/s	8,9	250	Chharikadu Stream
														Baijibada w/s	7	100	Punachara Stream
														Kharpu w/s	4to9	700	Jauga Spring
		3. Chhipra	693	792	1.050	870	997	Lakhnala w/s Project	8,9	300	Jhula Khola Stream	1988	13,500	Takla w/s	1to4	500	Chaisa Spring
	5	1. Lali	927	1,062	1.369	1,200	1,432	Piusa w/s Project		312	Ligya Khola Spring	1989	14,040	Chhipra w/s Project	1to7	650	Bhaisa Kharak Spring
		2. Yangchu		405	1.050	445	510	Yanchu w/s Project	4to9	470	Ghata Ratavid Stream	1989/1990	21,150				
	6	1. Rodikot	1,353	1,743	2.565	2,189	3,043							Durpa w/s	1,2,3	200	Noumula Spring
		2. Melchham	1,363	1,369	0.044	1,374	1,382							Radikot w/s Project		1,400	Ghata Khola Stream
								Melcham w/s Project	1,3,4	600	Nachawa mul Spring	1980	27,000	Nekpa w/s	8,9	350	Kari gad Khola Stream
								Pali w/s Project	6,7	350	Lagna mul Spring	1990	15,750				
								Paplang w/s Project	5	200	Jargua mul Spring	1989	9,000				
								Korka w/s Project	2	60	Tatapani mul Spring	1990	2,700				
		3. Gothi	894	966	0.778	1,036	1,145	Bhawakati w/s Project	2,4,5	392	Ghata Khola Stream	1988/1989	17,640	Puma w/s Project	3	240	Maipsa pinara Spring
								Gothi w/s Project	6to9	650	Balu Khola Stream	1982	29,250				
	7	1. Mimi	674	803	1.767	940	1,180							Mimi w/s Project	Mimi-3,4	,9,8 &Danna-1,2,4	891	Saju Chour Stream
														Mercha w/s	1,2	200	Kumba Khola Stream
		2. Dami	971	1,300	2.961	1,690	2,470							Baifu w/s	5,6,7	400	Lady Khola Spring
														Mimi w/s Project	1,2,4	205	Saju Chour Stream
														Dami w/s Project	7,8,9	320	Marmi Spring
	8	1. Saya	1,172	1,404	1.823	1,652	2,089							Bhedla bada w/s	6,7	300	Satila mul Spring
														Laku Chhyagi w/s	9	203	Karala Spring
														Aul Chhyagi w/s	8,9	384	Dograi Khola Stream
		2. Ripa	1,183	1,526	2.579	1,919	2,672							Barahi w/s Project	5,6,7	748	Rabday Paui Spring
														Munde w/s Project	9	250	Bhitta Khola
														Wonopani	4to8	1,200	Bhunara SakaraStream
		3. Raya	1,092	1,281	1.609	1,479	1,820							Rip w/s	1,2,3	500	Hata Khark Spring
	9	1. Maila	2,802	3,087	0.973	3,368	3,820	Sarupata w/s Project	9	413	Bajhi Khola Stream	1988/1989	18,585	Thali w/s	5to9	628	Tara Khola Stream
		2. Leuthi	2,020	2,525	2.257	3,087	4,125	Lauthi w/s Project	2,3,5	745	Ghaita Khola Stream	1985/1986	33,525				
								Baragun w/s	6,8	200	Ghata Stream	1990	9,000	Dada w/s	8,9	300	Pani mul Saryn Stream
		3. Shree Nagar	2,064	2,609	2.371	3,222	4,369	Shree nagar w/s Project	1to5	1,200	Dhaula Pani Spring	1974	54,000	Palsa w/s	4	75	Kula mul Stream
														Kakha w/s, Kaiki w/s	1,7	300	Spring
														Kalkhi Garu Pani w/s	6,7,8	700	Sangra , maicha Spring
														Bagothi w/s Project	8	115	Gaurighara Spring
		4. Jaur	1,306	1,331	0.190	1,354	1,388							Jaira w/s Project	1to7	1,300	Spring
														Tumcha w/s Project	8	200	Ghata Khola Stream
														Tumcha w/s Project	9	150	Ghata Khola Stream
						41,655	56,012			9,627			433,215			24,167	

Table 3.3.2 Water Supply Condition in the Humla District

Zone : Kamali
District : Humla

lation 2000	Population in 2013	Existing Water Supply Project						On-going/Planning Water Supply Project							Deficit in 2000, lpd	Deficit in 2013, lpd
		Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd			
3,792	7,566	Hildum w/s Project	8	100	Ghata Khola Stream	1989	4,500	Simikot w/s Project	1to6	1,850	Humana Khola Stream	1990	89,210		55,126	224,954
		Buruncha w/s Project	7,8	300	Bhaita Khola Stream	1989	13,500	Langudak w/s	8	100	Langudak Khola		4,500			
								Sagma w/s	9	85	Hildum chara Stream		3,825			
1,197	1,603	Dhaiga w/s Project	Hepka-2,3	700	Chhabichicha Spring	1975	31,500	Tangin w/s	8,9	300	Takra Gumba Stream		13,500		0	0
			Dadafaya-6,7,8,9					Hepka w/s	4,5,6,7	500	Kayachhua Spring		22,500			
								Gada Pari w/s	1	100	Chhambu Spring		4,500			
1,200	1,513	Bargaun w/s Project	1to9	2,000	Chhoutra Khola Stream	1988/1989	90,000	Gada Pari w/s	1	100	Kapathing Spring		4,500			
1,532	1,912														0	0
								Sayda w/s	4to7	800	Kaudipanora Spring		36,000		3,688	20,796
								Satayauga w/s	1,2,3	300	Sapudhara Spring		13,500			
								Kolchi w/s	8,9	350	Garugaru Stream		15,750			
1,588	2,080	Golakhod w/s Project	3	274	Adhari khola Stream	1988/1989	12,330	Dadafaya w/s		900	Pani mul Spring		22,500		36,616	58,763
692	793							Khagalgaun w/s Project	3to9	1,200	Chhutal Spring	1990	54,000		0	0
								Jhair Kholchi w/s	1,2	250	Parakchi Spring		11,250			
593	680	Kermi w/s Project	5to9	361	Gonbalungbamul Spring	1991	16,245	Chhaduk w/s Project	1to4	223	Hamtunga Khola Stream		10,035		415	4,298
1,614	3,274							Hailgi w/s	1to4	500	Nalbu Khola Stream		22,560		18,561	93,251
								Jaiga w/s	5,6,7	400	Takchi Khola Stream		18,000			
								Tila w/s	8,9	300	Muhar Khola Stream		13,500			
1,029	1,179							Chala w/s		350	Kulya Ko Pani Spring		15,750		30,571	37,308
1,828	2,094							Theay w/s	1to6	1,800	Hotick Khola Stream		81,000		0	0
								Dojam w/s	8,9	250	Chharikadu Stream		11,050			
								Baijibada w/s	7	100	Punachara Stream		4,500			
765	876							Kharpu w/s	4to9	700	Jauga Spring		31,500		0	0
								Takla w/s	1to4	500	Chaisa Spring		22,500			
870	997	Lakhnala w/s Project	8,9	300	Jhula Khola Stream	1988	13,500	Chhipra w/s Project	1to7	650	Bhaisa Kharak Spring	1990/1991	29,250		0	2,097
1,200	1,432	Piusa w/s Project		312	Ligya Khola Spring	1989	14,040								39,970	50,412
445	510	Yanchu w/s Project	4to9	470	Ghata Ratavid Stream	1989/1990	21,150	Dunpa w/s	1,2,3	200	Noumula Spring		9,000		0	0
2,189	3,043							Radikot w/s Project		1,400	Ghata Khola Stream	1990/1991	63,000		35,517	73,933
1,374	1,382	Melcham w/s Project	1,3,4	600	Nachawa mul Spring	1980	27,000	Nekpa w/s	8,9	350	Kari gad Khola Stream		15,750		0	0
		Pali w/s Project	6,7	350	Lagna mul Spring	1990	15,750									
		Paplang w/s Project	5	200	Jargua mul Spring	1989	9,000									
		Korka w/s Project	2	60	Tatapani mul Spring	1990	2,700									
1,036	1,145	Bhawakati w/s Project	2,4,5	392	Ghata Khola Stream	1988/1989	17,640	Puma w/s Project		3	240	Maipsa pinara Spring		10,800	0	0
		Gothi w/s Project	6to9	650	Baiu Khola Stream	1982	29,250									
940	1,180							Mimi w/s Project	Mimi-3,4	,9,8 &Darma-1,2,4	891	Saju Chour Stream	1990/1991	40,095	0	0
								Mercha w/s		1,2	200	Kumba Khola Stream		9,000		
								Baifu w/s		5,6,7	400	Lady Khola Spring		18,000		
1,690	2,470							Mimi w/s Project		1,2,4	205	Saju Chour Stream	1990/1991	9,225	38,944	74,035
								Dami w/s Project		7,8,9	320	Mamni Spring		14,400		
2,652	2,089							Bhadla bada w/s		6,7	300	Satila mul Spring		13,500		
								Laku Chhyagi w/s		9	203	Karala Spring		9,135	14,337	34,009
								Aul Chhyagi w/s		8,9	384	Dograi Khola Stream		17,200		
1,919	2,672							Barahi w/s Project		5,6,7	748	Rabday Paui Spring	1990/1991	33,660		
								Munde w/s Project		9	250	Bhitta Khola		11,250	0	27,482
,479	1,820							Wonopani		4to8	1,200	Bhunara SakaraStream		59,000		
								Rip w/s		1,2,3	500	Hata Khark Spring		22,500		
,368	3,820	Sarupata w/s Project	9	413	Bajhi Khola Stream	1988/1989	18,585	Thali w/s		5to9	628	Tara Khola Stream		28,260	38,291	53,639
,087	4,125	Lauthi w/s Project	2,3,5	745	Ghaita Khola Stream	1985/1986	33,525								132,984	153,324
		Baragun w/s	6,8	200	Ghata Stream	1990	9,000	Dada w/s		8,9	300	Pani mul Saryn Stream		13,500	65,997	112,742
								Palsa w/s		4	75	Kula mul Stream		3,375		
,222	4,369	Shree nagar w/s Project	1to5	1,200	Dhaula Pani Spring	1974	54,000	Kakha w/s, Karki w/s		1,7	300	Spring	1990	13,500		
								Kalkhi Garu Pani w/s		6,7,8	700	Sangra , maicha Spring		31,500	54,294	105,918
,354	1,388							Bagothi w/s Project		8	115	Gaurighara Spring	1990	5,175		
								Jaira w/s Project		1to7	1,300	Spring		58,500	0	0
								Tumcha w/s Project		8	200	Ghata Khola Stream		9,000		
								Tumcha w/s Project		9	150	Ghata Khola Stream		6,750		
,655	56,012			9,627			433,215				24,167			1,080,255	565,312	1,126,962

Table 3.3.3 Water Supply Condition in the Mugu District

No. of Village Development Committee :24
No. of Municipality : 0

Zone / District	Area No.	Village Development Committee in the Area	Population in 1981	Population in 1991	Annual Increse Rate, %	Population in 2000	Population in 2013	Existing Water Supply Project						On-going/Planning Water Supply Project				
								Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	Name	Area Coverge (wards/total wards)	Design Population	Type	Compl
Karnali Mugu	1	1. Shree Nagar	2,290	2,267	1.050	2,490	2,853							Gamgadhi	5,8	748	Spring	1992/
														Gamgadhi	9	200	Stream	1992/
		2. Karkibada	2,410	2,355	1.050	2,587	2,963											
		3. Pina	2,532	2,486	1.050	2,731	3,128	Pina	1,2,3	1,096	Spring	1989/1990	86,400					
								Pina	6,7	934	Spring	1989/1990	58,320					
								Pina	8	328	Spring	1989/1990	38,880					
	2	1. Rowa	2,569	2,767	0.745	2,958	3,258											
		2. Mangri	1,592	1,664	0.443	1,732	1,834											
		3. Ruga	2,243	2,392	0.645	2,535	2,756											
	3	1. Mugu	1,120	777	1.050	854	978											
		2. Pulu	934	915	1.050	1,005	1,151											
	4	1. Kimari		744	1.050	817	936											
		2. Dolphu	1,433	550	1.050	604	692											
	5	1. Natharpu	1,739	1,103	1.050	1,212	1,388							Jawaldhara	1to4	892	Spring	1991/1
		2. Vee		901	1.050	990	1,134							Bhaure Pani Spring (Vee)	1to9	1,481	Spring	1992/1
		3. Jima	1,523	1,664	0.889	1,802	2,022	Jima	3,4	887	Spring	1989/1990	43,200	Sorukot	7,8,9	1,932	Spring (Naumulo)	1991/1
		4. Photu		812	1.050	892	1,022											
		5. Ghainakot	1,652	1,664	0.072	1,675	1,691											
	6	1. Kale	1,204	882	1.050	969	1,110											
		2. Rara	610	937	4.386	1,379	2,409	Thadra Khola (Ansidhara)	7	150	Stream	1990/1991	6,750					
	7	1. Sukhadhik	1,679	1,947	1.492	2,225	2,697	Hyari Churi Seim	1,2	704	Spring	1989/1990	77,760					
		2. Kot Danda		1,465	1.050	1,609	1,843											
		3. Hyanglung		1,315	1.050	1,445	1,655											
	8	1. Seri	1,444	1,466	0.151	1,486	1,516											
		2. Shree Kot	2,373	2,422	0.205	2,467	2,533							Shree Kot	1	433	Spring	1990/19
														Shree Kot	5,6	303	Spring	1990/19
														Shree Kot	7,8,9	353	Spring	1990/19
	9	1. Khamale		1,159	1.050	1,273	1,458							Chakpane	9	270	Spring	1992/19
		2. Gumtha	2,769	1,791	1.050	1,968	2,254							Thara	7,8,9	1,035	Spring	1992/19
														Gumtha	5,6,7	1,020	Spring	1992/19
														Panseri	4	365	Spring	1992/19
														Lamru	3	540	Spring	1992/19
														Rajkot Bada	3	540	Spring	1992/19
						39,704	45,280			4,099			311,310			10,112		

Table 3.3.3 Water Supply Condition in the Mugu District

Zone : Karnal
District : Mugu

Existing Water Supply Project						On-going/Planning Water Supply Project						Deficit in	Deficit in
Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	2000, lpd	2013, lpd
						Gamgadhi	5,8	748	Spring	1992/1993	124,416	0	0
						Gamgadhi	9	200	Stream	1992/1993	345,600		
												116,421	133,353
Pina	1,2,3	1,096	Spring	1989/1990	86,400							0	0
Pina	6,7	934	Spring	1989/1990	58,320								
Pina	8	328	Spring	1989/1990	38,880								
												133,120	146,609
												77,921	82,533
												114,054	124,001
												38,411	43,998
												45,234	51,812
												36,780	42,129
												27,190	31,144
						Jawaldhara	1to4	892	Spring	1991/1992	56,160	0	6,298
						Bhaure Pani Spring (Vee)	1to9	1,481	Spring	1992/1993	82,080	0	0
Jima	3,4	887	Spring	1989/1990	43,200	Sonakot	7,8,9	1,932	Spring (Naumulo)	1991/1992	172,800	0	0
												40,142	45,980
												75,369	76,082
												43,602	49,944
Thadra Khola (Ansidhara)	7	150	Stream	1990/1991	6,750							55,297	101,656
Hyari Churi Seim	1,2	704	Spring	1989/1990	77,760							22,346	43,599
												72,423	82,956
												65,008	74,462
												66,874	68,201
						Shree Kot	1	433	Spring	1990/1991	116,640	0	0
						Shree Kot	5,6	303	Spring	1990/1991	26,784		
						Shree Kot	7,8,9	353	Spring	1990/1991	110,592		
						Chakpane	9	270	Spring	1992/1993	7,776	49,520	57,853
						Thara	7,8,9	1,035	Spring	1992/1993	54,432	0	0
						Gumtha	5,6,7	1,020	Spring	1992/1993	67,392		
						Panseri	4	365	Spring	1992/1993	31,968		
						Lamru	3	540	Spring	1992/1993	8,640		
						Rajkot Bada	3	540	Spring	1992/1993	8,640		
4,099		311,310						10,112			1,213,920	1,079,712	1,262,610

Table 3.3.4 Water Supply Condition in the Kalikot District

No. of Village Development Committee : 29
No. of Municipality : 0

Zone : Ki
District : Ki

Zone / District	Area No.	Village Development Committee in the Area	Population in 1981	Population in 1991	Annual Increase Rate, %	Population in 2000	Population in 2013	Existing Water Supply Project: Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	On-going/Planning Water Supply Project: Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	Deficit in 2000, lpd
Karnali	1	1. Manma	3,394	4,434	2.709	5,640	7,983	Manma		5,500	Spring & Stream		247,500							6,295
Kalikot		2. Daha	3,206	3,407	0.610	3,599	3,895							Daha	1to7	3,057	Spring	1992	185,460	0
														Pili	8,9	829	Spring	1992	38,655	
		3. Pakha	3,862	2,970	0.130	3,959	4,026							Dahala	1 to 4	1,935	Spring	1992	114,048	0
														Pakha	5 to 7	2,169	Spring	1992	144,288	
														Chaukl	8,9	1,741	Spring	1992	132,192	
														Mela Bada	1	56	Spring	1992	38,880	
	2	1. Badalkot	1,663	2,020	1.964	2,406	3,099	Badalkot	2to7	959	Stream		31,840	Badalkot	8,9	714	Spring		44,928	0
								Badalkot	3	187	Stream		33,591							
								Badalkot	4,2	315	Stream		21,090							
		2. Nanikot	3,406	3,972	1.549	4,561	5,570							Scheme No. I	3	74	Spring	1995	3,330	0
														Scheme No. II	2,3	1,679	Stream	1995	79,255	
														Scheme No. III	4,6,7	1,870	Spring	1995	112,340	
														Scheme No. IV	9	1,021	Spring	1995	46,345	
														Scheme No. V	4	451	Spring	1995	20,295	
		3. Ramnakot	2,158	2,544	1.659	2,950	3,654							Scheme no. I	1 to 4	1,412	Spring	1993	97,290	0
														Scheme no. II	5,6	754	Spring	1993	46,130	
														Scheme no. III	7,8,9	1,017	Spring	1993	54,083	
	3	1. Fukot	2,838	3,778	2.902	4,887	7,089	Fukot	1 to 4	2,113	Spring		100,685							119,252
		2. Syuna	4,239	3,658	0.130	3,701	3,764	Syuna	1to9	6,435	Stream Fugad		314,030							0
		3. Shipkhana	3,896	3,351	0.130	3,390	3,448							Sipkhana	1to9	4,788	Spring	1992	234,262	0
	4	1. Murnra		1,989	0.130	2,012	2,047							Mumra and curie	1 to 9	2,600	Spring	1992	148,920	0
														Dhandukuke gaun	6	405	Spring	1992	18,225	
		2. Mehalmudi	4,173	3,181	0.130	3,218	3,273	Scheme No. I	1 to 5,7	2,173	Stream		99,785							0
								Scheme No. II	6 to 9	2,010	Stream		93,050							
		3. Ranku	1,929	2,837	3.933	4,015	6,629							Lusa	1,2	785	Stream	1993	36,075	0
														Serljyula	3,4	1,772	Spring	1993	79,740	
														Luyanta, Bhatgaun	7,8,9	1,525	Spring	1993	75,525	
														Raku	5,6	723	Spring	1993	33,885	
														Dutro Naina	7	1,525	Spring	1993	75,525	
	5	1. Rupsa		2,664	0.130	2,695	2,741							Herakuna	1,2	1,319	Spring	1993	60,305	0
														Lamasangh	3,4,7	1,386	Spring	1993	80,520	
														Paltako mela	7,8,9	691	Spring	1993	31,095	
														Uttigainada	8,9	394	Spring	1993	18,260	
														Chaite pani	9	379	Spring	1993	17,405	
		2. Kotwada	4,372	4,955	1.260	5,546	6,526							Scheme No. I	1 to 5	1,954	Spring	1995	87,930	49,140
														Scheme No. II	2,4	545	Spring	1995	29,075	
														Scheme No. III	5	672	Spring	1995	30,240	
														Scheme No. IV	9	471	Spring	1995	21,195	
														Scheme No. V	9	693	Spring	1995	31,985	
		3. Kumalgaun	4,430	2,452	0.130	2,481	2,523							Kumal gaun	1to9	4,901	Spring (Baigera)	1993	306,340	0
		4. Lalu	3,916	4,057	0.354	4,188	4,385							Scheme No. I	1to8	5,869	Stream	1995	248,520	0
														Scheme No. II	9	543	Spring	1995	22,680	
	6	1. Bharta		3,963	0.130	4,010	4,078													180,432
		2. Sukatiya	2,770	3,259	1.639	3,772	4,660							Scheme No. I	1	674	Spring	1992	138,240	0
														Scheme No. II	2	272	Spring	1992	129,600	
														Scheme No. III	3 to 6	2,412	Spring	1992	114,048	
														Scheme No. IV	8,9	1,917	Spring	1992	172,800	
														Scheme No. V	9	394	Spring	1992	144,288	
		3. Mugraha		1,853	0.130	1,875	1,907													84,366
		4. Gela	2,570	2,645	0.288	2,714	2,818							Scheme No. I	1,2	1,159	Stream	1995	63,636	0
														Scheme No. II	3,4	618	Spring	1995	17,280	
														Scheme No. III	Part of 5	258	Spring	1995	13,932	
														Scheme No. IV	Part of 5	245	Spring	1995	13,560	
														Scheme No. V	6,7	541	S.F Stream	1995	29,874	
														Scheme No. VI	8,9	1,030	Stream	1995	56,470	
	7	1. Odanku	3,456	2,905	0.130	2,939	2,989													132,262
		2. Chilkhaya	2,686	2,981	1.048	3,274	3,749							Lubada	2	160	Stream	1995	7,200	0
														Chikhaya	1, half of 2 ot 9	3,827	Spring	1995	172,215	
														Kamkhat	Half of 3	275	Spring	1995	12,375	
		3. Chhabre		2,506	0.130	2,535	2,579													114,096
	8	1. Jubitha	4,073	1,735	0.130	1,755	1,785							Khalna	1,2,3	879	Stream	1992	155,520	0
														Jubitha	4to9	2,253	Spring	1992	172,800	
														Khalna bazar	3 part of 3 no ward	300	Spring	1992	51,840	
		2. Ranchuli	2,053	1,904	0.130	1,926	1,959													86,688
		3. Mahadev	3,108		0.130	3,186	3,240							Rakalibada	9	445	Spring	1995	25,087	0
														Badam bada	8,7	582	Spring	1995	32,880	
														Dharali and Bhat pani bada	6, part of 8	613	Spring	1995	29,925	
														Dhand vigma	5	225	Spring	1995	12,531	
														Vigma bajar (Main way)	part of 4 & 5	175	Spring	1995	7,875	
														Bajedibada	part of 2 & 3	327	Spring	1995	18,429	
														Nagma, upallo and Tallo	Part of 2 and 1	585	Spring	1995	30,285	
	9	1. Thirpu	2,665	2,836	0.624	2,999	3,252	Parauthi		2,318	Spring		104,310							30,657
		2. Dhaulagoha	3,079	4,780	4.497	7,101	12,580							Bherula khola	1	839	Spring	1995	35,055	0
														Ghatte gad	2,3	1,536	Stream	1995	74,225	
														Ratapani mul	4 to 7	3,927	Spring	1995	166,080	
														Dune mul	8,9	1,234		1995	52,325	
														Chhirik helne mull	Part of 9	229	Spring	1995	9,585	
		3. Khin	2,245	2,496	1.065	2,746	3,151													123,561
						100,083	119,399			22,010			1,065,881			80,650			4,805,186	926,750

Table 3.3.4 Water Supply Condition in the Kalikot District

Zone : Karnali
District : Kalikot

ulation n 2013	Existing Water Supply Project						On-going/Planning Water Supply Project						Deficit in 2000, lpd	Deficit in 2013, lpd
	Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd		
7,983	Manma		5,500	Spring & Stream		247,500							6,295	111,747
3,895							Daha	1to7	3,057	Spring	1992	185,460	0	0
							Pill	8,9	829	Spring	1992	38,655		
4,026							Dahala	1 to 4	1,935	Spring	1992	114,048	0	0
							Pakha	5 to 7	2,169	Spring	1992	144,288		
							Chaukl	8,9	1,741	Spring	1992	132,192		
							Mela Bada	1	56	Spring	1992	38,880		
3,099	Badalkot	2to7	959	Stream		51,840	Badalkot	8,9	714	Spring		44,928	0	0
	Badalkot	3	187	Stream		33,591								
	Badalkot	4,2	315	Stream		21,090								
5,570							Scheme No. I	3	74	Spring	1995	3,330	0	0
							Scheme No. II	2,3	1,679	Stream	1995	79,255		
							Scheme No. III	4,6,7	1,870	Spring	1995	112,340		
							Scheme No. IV	9	1,021	Spring	1995	46,345		
							Scheme No. V	4	451	Spring	1995	20,295		
3,654							Scheme no. I	1 to 4	1,412	Spring	1993	97,290	0	0
							Scheme no. II	5,6	754	Spring	1993	46,130		
							Scheme no. III	7,8,9	1,017	Spring	1993	54,083		
7,089	Fukot	1 to 4	2,113	Spring		100,685							119,252	218,339
3,764	Syuna	1to9	6,435	Stream Fugad		314,030							0	0
3,448														
2,047							Sipkhana	1to9	4,788	Spring	1992	234,262	0	0
							Mumra and curie	1 to 9	2,600	Spring	1992	148,920	0	0
							Dhandukuke gaun	6	405	Spring	1992	18,225		
3,273	Scheme No. I	1 to 5,7	2,173	Stream		99,785							0	0
	Scheme No. II	6 to 9	2,010	Stream		93,050								
6,629							Lusa	1,2	785	Stream	1993	36,075	0	0
							Serljyula	3,4	1,772	Spring	1993	79,740		
							Luyanta, Bhatgaun	7,8,9	1,525	Spring	1993	75,525		
							Raku	5,6	723	Spring	1993	33,885		
							Dulne Naina	7	1,525	Spring	1993	75,525		
2,741							Herakuna	1,2	1,319	Spring	1993	60,305	0	0
							Lamasangh	3,4,7	1,386	Spring	1993	80,520		
							Paltako mela	7,8,9	691	Spring	1993	31,095		
							Uttigairada	8,9	394	Spring	1993	18,260		
							Chaile pani	9	379	Spring	1993	17,405		
6,526							Scheme No. I	1 to 5	1,954	Spring	1995	87,930	49,140	93,242
							Scheme No. II	2,4	545	Spring	1995	29,075		
							Scheme No. III	5	672	Spring	1995	30,240		
							Scheme No. IV	9	471	Spring	1995	21,195		
							Scheme No. V	9	693	Spring	1995	31,985		
2,523							Kumal gaun	1to9	4,901	Spring (Baigera)	1993	306,340	0	0
4,385							Scheme No. I	1to8	5,869	Stream	1995	248,520	0	0
							Scheme No. II	9	543	Spring	1995	22,680		
4,078													180,432	183,506
4,660							Scheme No. I	1	674	Spring	1992	138,240	0	0
							Scheme No. II	2	272	Spring	1992	129,600		
							Scheme No. III	3 to 6	2,412	Spring	1992	114,048		
							Scheme No. IV	8,9	1,917	Spring	1992	172,800		
							Scheme No. V	9	394	Spring	1992	144,288		
1,907													84,366	85,803
2,818							Scheme No. I	1,2	1,159	Stream	1995	63,636	0	0
							Scheme No. II	3,4	618	Spring	1995	17,280		
							Scheme No. III	Part of 5	258	Spring	1995	13,932		
							Scheme No. IV	Part of 5	245	Spring	1995	13,560		
							Scheme No. V	6,7	541	S.F Stream	1995	29,874		
							Scheme No. VI	8,9	1,030	Stream	1995	56,470		
2,989													132,262	134,515
3,749							Lubada	2	160	Stream	1995	7,200	0	0
							Chikhaya	1, half of 2 ot 9	3,827	Spring	1995	172,215		
							Kamkhat	Half of 3	275	Spring	1995	12,375		
2,579													114,096	116,040
1,785							Khalna	1,2,3	879	Stream	1992	155,520	0	0
							Jubitha	4to9	2,253	Spring	1992	172,800		
							Khalna bazar	3 part of 3 no ward	300	Spring	1992	51,840		
1,959													86,688	88,164
3,240							Rakalbada	9	445	Spring	1995	25,087	0	0
							Badam bada	8,7	582	Spring	1995	32,880		
							Dharali and Bhat pani bada	6, part of 8	613	Spring	1995	29,925		
							Dhand vigma	5	225	Spring	1995	12,531		
							Vigma bajar (Main way)	part of 4 & 5	175	Spring	1995	7,875		
							Bajedibada	part of 2 & 3	327	Spring	1995	18,429		
							Nagma, upallo and Tallo	Part of 2 and 1	585	Spring	1995	30,285		
1,252	Parauthi	2,318		Spring		104,310							30,657	42,022
1,580							Bherula khola	1	839	Spring	1995	35,055	0	228,813
							Ghatte gad	2,3	1,536	Stream	1995	74,225		
							Ratapani mul	4 to 7	3,927	Spring	1995	166,080		
							Dune mul	8,9	1,234		1995	52,325		
							Chhirik helne mull	Part of 9	229	Spring	1995	9,585		
1,151													123,561	141,814
1,399		22,010				1,065,681			80,650			4,805,186	926,750	1,444,005

Table 3.3.5 Water Supply Condition in the Jumla District

No. of Village Development Committee : 29
No. of Municipality : 0

Zone / District	Area No.	Village Development Committee in the Area	Population in 1981	Population in 1991	Annual Increse Rate, %	Population in 2000	Population in 2013	Existing Water Supply Project: Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	On-going/Planning Water Supply Project: Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year
Karnali	1	1. Mahat Gaun		2,505	1.040	2,749	3,145							Mahat Gaon w/s	5,6,8	625	Spring	1990/1991
Jumla		2. Chandannath	5,547	5,873	0.573	6,183	6,659	Jumla Water Supply	5,6,7,8	1,750	Stream	1976	60,480	Chandannath w/s	1,2	850	Spring	1991/1992
		3. Talium	3,399	3,271	1.040	3,590	4,107							Pipledi & Ranisari	9	275	Spring	1991/1992
														Talium w/s	4	475	Spring	1991/1992
	2	1. Chhun Chour		1,411	1.040	1,549	1,772											
		2. Dillichour	2,184	2,717	2.208	3,307	4,393											
		3. Patarashi	2,887	2,318	1.040	2,544	2,910											
		4. Gothi Chour	1,581	2,004	2.399	2,481	3,376	Gumba	1	120	Spring	1980	19,008					
	3	1. Garjankot	2,608	2,866	0.948	3,120	3,527							Garjangkot w/s (Dhare Khola w/s)	5to9	1,500	Stream	1990/1991
		2. Depal Gaun	1,924	1,697	1.040	1,863	2,131											
		3. Kartikswami	1,693	1,758	0.377	1,819	1,910	Sankuradhara	1	285	Spring	1988/1989	16,970	Dojam Khola, Are Khola	3to8	1,682	Stream	1990/1991
								Juke Mul	2	254	Spring	1988/1989	16,110					
	4	1. Haku	1,616	1,689	0.443	1,758	1,861							Gidikhola w/s	5,7,8	410	Spring	1991/1992
														Hanku w/s	3,4	520	Spring	1991/1992
		2. Lamra	2,052	1,988	1.040	2,182	2,496	Lamra	1to5	1,050	Spring	1989/1990	43,200					
		3. Tatopani	3,578	3,831	0.686	4,074	4,452	Dangibada w/s	5,7,8	500	Spring	1985/1986	38,880	Tarabi w/s Project	2	650	Spring	1990/1991
		4. Tamti	2,541	2,508	1.040	2,753	3,149											
	5	1. Kundari	3,344	3,531	0.546	3,708	3,980							Safuli w/s	4	550	Spring	1990/1991
		2. Malika		1,322	1.040	1,451	1,660											
		3. Mahadev		1,845	1.040	2,025	2,317											
		4. Lihi	2,535	1,973	1.040	2,166	2,477							Lihi-lormi w/s	9	540	Spring	1990/1991
	6	1. Mahabai		2,500	1.040	2,744	3,139							Mahabai Patnar Khola w/s	6	654	Spring	1990/1991
		2. Kalika		1,843	1.040	2,023	2,314							Chiudi w/s	4	250	Spring	1990/1991
														Kudu w/s	6	370	Spring	1991/1992
														Dhanchu w/s	3	410	Spring	1991/1992
		3. Badki	3,794	3,469	1.040	3,808	4,356											
	7	1. Shanigaun	3,586	3,733	0.403	3,870	4,078							Shanigaun w/s	1to7	1,850	Spring	1991/1992
														Ghoda Khou Mul (Judu w/s Project)	8,9	507	Spring	1990/1991
														Bhojya Pato Naulo (Judu w/s Project)	9	129	Spring	1990/1991
		2. Narakot	2,410	2,760	1.365	3,118	3,719							Narakot w/s	6,7	950	Spring	1991/1992
		3. Dhap		3,102	1.040	3,405	3,895											
	8	1. Pandab Gupha	4,648	2,992	1.040	3,284	3,757											
		2. Birat		2,778	1.040	3,049	3,488							Hatshija w/s	4to8	1,480	Spring	1991/1992
		3. Hatshija	3,136	4,200	2.964	5,463	7,987							Bumramadi Choua w/s	6	425	Spring	1990/1991
	9	1. Bumra		1,139	1.040	1,250	1,430							Patmara w/s	1to4	650	Spring	1991/1992
		2. Patmara	2,113	2,170	0.267	2,223	2,301									15,127		
						83,557	96,787			3,959			194,648					

Table 3.3.5 Water Supply Condition in the Jumla District

Zone : Kamali
District : Jumla

Existing Water Supply Project						On-going/Planning Water Supply Project						Deficit in	Deficit in
Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	2000, lpd	2013, lpd
						Mahat Gaon w/s	5,6,8	625	Spring	1990/1991	25,920	97,806	115,616
Jumla Water Supply	5,6,7,8	1,750	Stream	1976	60,480	Chandannath w/s	1,2	850	Spring	1991/1992	51,840	165,904	187,345
						Pipledi & Ranisari	9	275	Spring	1991/1992	6,048	133,912	157,171
						Talium w/s	4	475	Spring	1991/1992	21,600		
												69,691	79,725
												148,818	197,671
												114,490	130,972
Gumba	1	120	Spring	1980	19,008							92,622	132,919
						Garjangkot w/s (Dhare Khola w/s)	5to9	1,500	Stream	1990/1991	86,400	53,998	72,316
												83,817	95,884
Sankuradhara	1	285	Spring	1988/1989	16,970	Dojam Khola, Are Khola	3to8	1,682	Stream	1990/1991	104,325	0	0
Juke Mul	2	254	Spring	1988/1989	16,110								
						Gidikhola w/s	5,7,8	410	Spring	1991/1992	43,200	9,968	14,644
						Hanku w/s	3,4	520	Spring	1991/1992	25,920		
Lamra	1to5	1,050	Spring	1989/1990	43,200							54,990	69,127
Dangibada w/s	5,7,8	500	Spring	1985/1986	38,880	Tarabi w/s Project	2	650	Spring	1990/1991	28,512	115,936	132,964
												123,874	141,708
						Safuli w/s	4	550	Spring	1990/1991	21,600	145,270	157,502
												65,296	74,696
												91,127	104,247
						Lihi-lormi w/s	9	540	Spring	1990/1991	38,880	58,570	72,599
						Mahabai Patnar Khola w/s	6	654	Spring	1990/1991	38,880	84,599	102,376
						Chiudi w/s	4	250	Spring	1990/1991	21,600	23,637	36,742
						Kudu w/s	6	370	Spring	1991/1992	17,280		
						Dhanchu w/s	3	410	Spring	1991/1992	28,512		
												171,339	196,006
						Sharigaun w/s	1to7	1,850	Spring	1991/1992	60,480	77,390	86,728
						Ghoda Khou Mul (Judu w/s Project)	8,9	507	Spring	1990/1991	28,110		
						Bhojya Pato Naulo (Judu w/s Project)	9	129	Spring	1990/1991	8,190		
						Narakot w/s	6,7	950	Spring	1991/1992	43,200	97,122	124,172
												153,213	175,270
												147,779	169,055
												137,210	156,963
						Hatshija w/s	4to8	1,480	Spring	1991/1992	51,840	193,997	307,564
						Bumramadi Choua w/s	6	425	Spring	1990/1991	25,920	30,337	38,436
						Patmara w/s	1to4	650	Spring	1991/1992	34,560	65,458	68,979
3,959	194,648							15,127			812,817	2,808,168	3,399,399

Table 3.3.6 Water Supply Condition in the Dolpa District

No. of Village Development Committee : 23
No. of Municipality : 0

Zone / District	Area No.	Village Development Committee in the Area	Population in 1981	Population in 1991	Annual Increse Rate, %	Population in 2000	Population in 2013	Existing Water Supply Project: Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	On-going/Planning Water Supply Project: Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year
Karnali	1	1. Dural	1,496	1,791	1.816	2,106	2,661	Dural Water Supply Project	1.4.5	1,850	Stream	1985	83,250	Locha Water Supply Project	8	199	Stream	1992
								Tipla Water Supply Project	2.3	481	Spring	1989	25,500	Locha Water Supply Project	9	86	Stream	1992
Dolpa		2. Jufal	1,185	1,515	2.487	1,890	2,601	Juphal Water Supply Project	1to9	1,089	Stream	1989	51,455					
		3. Majhfal	1,215	1,435	1.678	1,667	2,069											
	2	1. Suhu	955	1,111	1.525	1,273	1,550							Suhu Water Supply Project	7.8.9	350	Spring	1994
														Suhu Water Supply Project	5.6	280	Spring	1994
														Suhu Water Supply Project	1.2.3.4	720	Spring	1994
		2. Tripurakot	1,496	885	1.300	994	1,176	Tripurakot Water Supply Project	1.2.3	731	Stream	1988	59,895					
		3. Pahada	1,202	1,414	1.638	1,637	2,021							Pahada Water Supply Project	5	230	Spring	1993
														Pahada Water Supply Project	8.9	235	Stream	1993
														Pahada Water Supply Project	7	212	Spring	1993
	3	1. Likhu	1,330	1,463	0.958	1,594	1,804							Liku Water Supply Project	9	431	Stream	1993
														Liku Water supply Project	6.7.8	431	Spring	1993
														Liku Water Supply Project	1.2.3.4.5	1,092	Spring	1993
		2. Khadang (Laha)	743	821	1.003	898	1,023							Daire Water Supply Project	8	228	Spring	1993
														Daire Water Supply Project	6.7	330	Spring	1993
	4	1. Kalika	823	887	0.752	949	1,046	Kalika Water Supply Project	1to8	989	Stream	1989	56,290					
								Kalika Water Supply Project	9	205	Spring	1989	7,690					
		2. Narku	982	1,028	0.459	1,071	1,137											
		3. Sarmi	1,321	1,416	0.697	1,507	1,650							Horta Water Supply Project	7.8.9	450	Stream	1992
	5	1. Rimi	1,312	968	1.300	1,087	1,286							Rimi-Kai Water Supply Project	1.3	284	Stream	1992
														Rimi-Kai Water Supply Project	2.4	283	Stream	1992
														Rimi-Kai Water Supply Project	5.6	338	Stream	1992
														Rimi-Kai Water Supply Project	7.8	228	Stream	1992
														Rimi-Kai Water Supply Project	9	166	Stream	1992
		2. Kaigoun		705	1.300	792	937							Rimi_kai Water Supply Project	4.5.6.7	302	Stream	1992
														Rimi-Kai Water Supply Project	1.2.3	241	Stream	1992
														Rimi-Kai Water Supply Project	8.9	307	Spring	1992
	6	1. Foksundo	407	456	1.143	505	586											
		2. Raha	743	510	1.300	573	678							Raha Water Supply Project	4.5.6.7.8.9	650	Stream	1993
	7	1. Bhijera	395	403	0.201	410	421											
		2. Khaldang	1,665	1,736	0.418	1,802	1,903											
		3. Binja	858	1,015	1.695	1,181	1,469											
	8	1. Lawan	1,395	1,273	1.300	1,430	1,691							Bandanda Lawan Water Supply Project	6.7	517	Stream	1992
														Bandanda Lawan Water Supply Project		172	Spring	1992
		2. Dho	703	704	0.014	705	706											
		3. Sharat	1,474	1,514	0.268	1,551	1,606							Saharatara Water Supply Project	8.9	445	Stream	1992
														Saharatara Water Supply Project	3.4	383	Stream	1992
														Saharatara Water Supply Project	6.7	344	Stream	1992
														Tarakot Water Supply Project	5	205	Spring	1992
	9	1. Chharka	532	555	0.424	577	609											
		2. Bhukot		627	1.300	704	833											
						26,903	31,463		5,345	284,080						10,139		

Table 3.3.6 Water Supply Condition in the Dolpa District

Zone : Kamali
District : Dolpa

ion 991	Annual Increse Rate, %	Population in 2000	Population in 2013	Existing Water Supply Project Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	On-going/Planning Water Supply Project Name	Area Coverge (wards/total wards)	Design Population	Type	Completion Year	Amount, lpd	Deficit in 2000, lpd	Deficit in 2013, lpd
791	1.816	2,106	2,661	Durai Water Supply Project	1.4.5	1,850	Stream	1985	83,250	Locha Water Supply Project	8	199	Stream	1992	10,300	0	0
				Tipla Water Supply Project	2.3	481	Spring	1989	25,500	Locha Water Supply Project	9	86	Stream	1992	4,550		
515	2.487	1,890	2,601	Juphal Water Supply Project	1to9	1,089	Stream	1989	51,455							33,590	65,590
435	1.678	1,667	2,069													75,009	93,126
111	1.525	1,273	1,550							Suhu Water Supply Project	7.8.9	350	Spring	1994	25,500	0	0
										Suhu Water Supply Project	5.6	280	Spring	1994	17,280		
										Suhu Water Supply Project	1.2.3.4	720	Spring	1994	34,560		
885	1.300	994	1,176	Tiporakot Water Supply Project	1.2.3	731	Stream	1988	59,895							0	0
414	1.638	1,637	2,021							Pahada Water Supply Project	5	230	Spring	1993	11,900	38,197	55,512
										Pahada Water Supply Project	8.9	235	Stream	1993	12,500		
										Pahada Water Supply Project	7	212	Spring	1993	11,050		
463	0.958	1,594	1,804							Liku Water Supply Project	9	431	Stream	1993	16,969	0	0
										Liku Water supply Project	6.7.8	431	Spring	1993	33,654		
										Liku Water Supply Project	1.2.3.4.5	1,092	Spring	1993	77,856		
821	1.003	898	1,023							Daire Water Supply Project	8	228	Spring	1993	11,050	12,808	18,409
										Daire Water Supply Project	6.7	330	Spring	1993	16,560		
887	0.752	949	1,046	Kalika Water Supply Project	1to8	989	Stream	1989	56,290							0	0
				Kalika Water Supply Project	9	205	Spring	1989	7,690								
028	0.459	1,071	1,137													48,206	51,162
416	0.697	1,507	1,650							Horta Water Supply Project	7.8.9	450	Stream	1992	34,540	33,290	39,698
968	1.300	1,087	1,286							Rimi-Kai Water Supply Project	1.3	284	Stream	1992	17,904	0	0
										Rimi-Kai Water Supply Project	2.4	283	Stream	1992	17,583		
										Rimi-Kai Water Supply Project	5.6	338	Stream	1992	21,131		
										Rimi-Kai Water Supply Project	7.8	228	Stream	1992	15,144		
										Rimi-Kai Water Supply Project	9	166	Stream	1992	11,002		
705	1.300	792	937							Rimi_kai Water Supply Project	4.5.6.7	302	Stream	1992	19,958	0	0
										Rimi-Kai Water Supply Project	1.2.3	241	Stream	1992	13,859		
										Rimi-Kai Water Supply Project	8.9	307	Spring	1992	17,936		
456	1.143	505	586													22,731	26,351
510	1.300	573	678							Raha Water Supply Project	4.5.6.7.8.9	650	Stream	1993	31,050	0	0
403	0.201	410	421													18,465	18,953
736	0.418	1,802	1,903													81,112	85,637
015	1.695	1,181	1,469													53,132	66,105
273	1.300	1,430	1,691							Bandanda Lawan Water Supply Project	6.7	517	Stream	1992	24,892	26,499	38,263
										Bandanda Lawan Water Supply Project		172	Spring	1992	12,956		
704	0.014	705	706													31,721	31,779
514	0.268	1,551	1,606							Saharatara Water Supply Project	8.9	445	Stream	1992	33,543	0	0
										Saharatara Water Supply Project	3.4	383	Stream	1992	31,513		
										Saharatara Water Supply Project	6.7	344	Stream	1992	27,974		
										Tarakot Water Supply Project	5	205	Spring	1992	10,600		
55	0.424	577	609													25,945	27,412
27	1.300	704	833													31,693	37,488
		26,903	31,463		5,345	284,080					10,139				625,314	532,396	655,484