

CHAPTER 1: INTRODUCTION

1.1 Background of the Study

The needs for organized and accurate information concerning water supply and sanitation have been realized by various sectoral agencies and have been incorporated in policies and programs also. But actions in this regard have not been initiated seriously. To date no information system has been firmly established, whether national or district based. Sector related information is sketchy and could not be used for the sake of planning of new water supply and sanitation projects and operation and maintenance of the completed projects as well. Owing to the importance of information management the Department of Water Supply and Sewerage (DWSS) as the lead sector agency has initiated programs in this regard. In the *National Water Supply Sector Policy (Policies and Strategies) 1998* explicitly stated the importance of information management in the sector development activities. The policy also includes strategies on information management. The policies on information management include:

-) *To formulate information policies for the sector in and for the water agencies in particular,*
-) *To establish appropriate organizational structures for information management, and*
-) *To take appropriate measures to ensure that all sectors make necessary provisions for the development of management capacity.*

Management Information System (MIS) is one of the important tools for the sectoral development planning and monitoring evaluation. In this consequence; Department of Water Supply and Sewerage (DWSS) had planned to prepare District Water Supply and Sanitation Profile for all the 75 districts of Nepal. Towards that plan; Department of Water Supply and Sewerage through its regional and district water supply offices has prepared the District Profiles of some other district. The district profile containing all information about water supply and sanitation (WATSAN) sector is an essential tool for planning and monitoring the quantity as well as quality of water supply and sanitation facility. Ninth five-year plan (1997-2002) had made a significant headway by making a target to provide piped water supply and sanitation facilities to all population in the country. The target was achieved with mixed results such that 71.6% of total national population has been covered by Drinking Water Supply facility. Moreover, the Tenth five-year plan (2002-2007) has aimed that “access to drinking water will be increased to 85%”. But it was not so effective. A good information system is essential, for making policy and preparing national plan

and district plan/profile with detail information of WATSAN sector is hoped to work as a good information system.

DWSS is the leading agency for fulfillment of water need of the population. Besides DWSS, other government and non-government organizations are also working in this field. They are working well, but due to lack of coordination and information system; water supply projects and plans are being overlapped in some areas and in some parts population are lacking water supply projects and plans. Various donor agencies are showing their interest to provide assistance in the government plans to meet the target of “water for all”. ADB is one of them, which is continuously supporting the rural water supply sector development program since 1985 through the First, Second, Third and Fourth Rural Water Supply & Sanitation Sector projects. DWSS has launched several activities in this regard and now another project namely Small Towns Water Supply & Sanitation Sector Project is ongoing. Of the many programs run inside the districts in the area of Water Supply and Sanitation, Community Based Water Supply and Sanitation Project (CBWSSP) is one. CBWSSUO in close coordination with DDC is working for improvement of Water Supply and Sanitation Situation inside the districts. Preparation of District Water Supply and Sanitation Development Profile is one of the main activities of CBWSSP and District Development Committee (DDC). This study is intended to provide detailed information on the present situation of water supply and sanitation of Rolpa district and also to plan for future, for achieving the goal of Nepal Government - to provide the safe and quality WATSAN facilities for all.

1.2 Statement of the Problem

Effective Information Management System in WATSAN sector is felt need for sustainable planning and implementation of community water supply and sanitation project. In this consequences, one of the basic objectives of a water supply project is to provide safe potable water to the consumers, this aspect has been highly overlooked in current water supply programs in the district. Specific programs targeted at improving upon the water quality need to be developed and implemented. Regular Sanitary Inspection of the system and source should be made mandatory to minimize contamination possibilities. Curative interventions, especially to eliminate biological contamination, are also required at least in the rainy season. Chlorinating the supplies by bleaching powder must also be practiced. Community education on upkeep of collected water quality during storage, handling and use should be imparted. Maintenance survey should be an integral part of the DWSO activity and should be undertaken at least once every year for all commissioned projects;

- *What are the existing situations of implemented WATSAN projects in Rolpa districts?*
- *How those projects are managed for major repairs and rehabilitation?*
- *What process is to be taken for sustainable implementation of project activities?*
- *What are the fields based training for maintenance worker for O/M?*
- *What are the modalities of projects to be implemented? And to be defined based on the availability of human resources to effectively monitor the program?*

1.3 Objectives of the Study

The general objective of the research is: to examine and evaluate the actual WATSAN situation in Rolpa district. The specific objectives of this study are:

- To acquire a better understanding of the WATSAN Projects in Rolpa district.
- To study the number of WATSAN projects in different modalities.
- To find water supply and sanitation coverage
- To study functional status of the projects.
- To synthesize lessons from experience and come up with recommendations for future planning and implementation of WATSAN projects.

1.4 Scope of the study

WATSAN is a basic need of human, so it is a priority sector of Government of Nepal (GoN). In this regard, GoN had set an ambitious target to provide basic water supply facilities to all the population by the end of the ninth plan period, i.e. 2002 A.D. Sanitation lags far behind, when compared to the coverage in water supply, and the present national coverage in sanitation, in terms of access to a safe excreta disposal facility, is assumed roughly around 20%. The ninth plan has targeted to increase this coverage to 50% by the end of the plan period. The coverage in water supply, presently at about 71.6% on the national average, at time and again subject to questions regarding the authenticity of the data. This WATSAN- MIS will solved major doubts raised include the non-agglomeration of coverage figures attained by other agencies, definition of coverage itself, functioning status of the systems reported as completed, swelled population figures in remote areas that have been projected at district average, non accounting of the migratory effects in lower hills and terai, etc.

This MIS will also help for further assessing the workload and investments required to achieve GoN goal to provide safe water supply and sanitation facilities in the district.

1.5 Organization of the study

This study is divided into six chapters:

Chapter 1: Introduction

Chapter 2: Literature Review

Chapter 3: Methodology

Chapter 4: Description of Study Area

Chapter 5: Analysis and Discussion

Chapter 6: Conclusion and Recommendations

CHAPTER 2: LITERATURE REVIEW

2.1 Concepts

The focal issue in the water supply and sanitation sector today is how schemes can be made to last, and how the sector's development can be made sustainable in essence. Once the service delivery points are in place, and the initial capital investment is made, the ideal expectation is that the consumers own them and carry out post-construction supervision and maintenance activities so as to derive the desired benefits for a minimum duration of the design period. Reality however, differs. It has been found that most rural water supply schemes completed over the past decades have not been able to live their design periods.

The implementation of the project is not so far complete task of the planner as well as researcher. There should be the impact evaluation and sustainability potential of the implemented project. Normally it is done after the project is handed over to the respective community. Without its study it is difficult to know the current functional situation of the project.

The need for organized and accurate information concerning water supply and sanitation has been mentioned in several documents by various sectoral agencies, but as yet no centralized information system has been firmly established. The project hopes to establish a two-way information system, which involves all levels of the hierarchy from the communities to the central facility in DWSS. NMIP hopes to engage sector agencies and concerned stakeholders, so that data collection and reporting by NMIP meets their needs.

The problem of lack of information lies in two main areas. First there is little in the way of record keeping at the district level and so though initially the design data is produced it is lost after construction is completed. Later status surveys may also be done for various purposes but again are lost as a result of weak record keeping at the district level. Additional records of agreements on water sources and the make up of Users' Committees are also not always kept in an easily retrievable manner. Secondly, regular surveys of the situation of completed water supplies are not being done. A system of regularly visiting schemes will eventually be required if DWSS plans to improve the level of service and begin water quality monitoring. There is in fact very little emphasis placed on the follow-up for projects once completed despite much evidence that this can result in major improvements in the scheme sustainability. It is assumed that once the project is handed over for operation and maintenance to water and sanitation users' committee and/or local agency the WSSDO office has completed their responsibilities and that communities are

adequately prepared to take over the scheme. In fact the regular contact with Users' Committee (UCs), village maintenance worker (VMSWs) and water and sanitation scheme users can be an effective way of keeping the community motivation high.

2.2 Theoretical Framework

Water is truly unique commodity. Without it life does not exist. Life can however, become equally uncertain even when there is water all around. While excess water in the form of floods and water deficit in the form of droughts have struck Nepal time and again, consumption of unsafe water has claimed thousands of lives annually.

Water is one of the main natural resource supporting the economy of Nepal. There are 6000 river and rivulets of about 4500 Kms length contributing 170 billion cubic meter of surface runoff. In terms of its use for different purposes, nearly one third of the population do not have access to safe drinking water, and only one fourth have access to proper sanitation. About 33% of the agricultural production is based on irrigation system and 17% of land has round irrigation and less of 700 MWs of hydropower is installed. In 30 years the population will be doubled and consumptive use like for drinking water and irrigation will rise substantially. A careful planning is therefore essential for use of water resource.

Majority of Nepal's 21.50 million people are poor and more than 85% live in rural areas. The biggest task faced by the government is to provide majority of its people with the basic human needs including provision of safe water supply facility.

No curative, but preventive measures such as provision of safe and sustain water supply only can reduce the high infant mortality and morbidity rates. For underdeveloped countries like Nepal, the degree of ease at which the people have access to safe water is then the indicator of the health status of the people, says Dr. Halfdahn Mahler, former Director General of World Health Organization. The number of water taps per 1000 persons is a better indication of health than the number of hospital beds.

The millennium development goal passed in the summit by 147 participants' countries of the world in Johannesburg, states:

- i. Halve, by the year 2015, the proportion of the world's people whose income is less than \$ 1 a day and the proportion of people who suffer from hunger and, by the same date, to halve the proportion of people without access to safe drinking water;*

- ii. *Increase access to sanitation to improve human health and reduce infant and child mortality, prioritizing water and sanitation in national sustainable development strategies and poverty reduction strategies where they exist.*

As in the Ninth Plan, the Tenth plan will also have a very strong focus on poverty. The Plan's main purposes will be to decrease poverty of women, untouchables people from the remote area and highly backward sector through empowerment, human sector development security and targeted programmes and improving economic and development opportunities. The National Water Supply Sector Policy-1998 and 2004 aims at achieving the following principal objectives:

-) To provide and ensure safe, convenient and adequate water supply to all Nepalese people with sanitation as its integral component with specific focus on the disadvantaged groups;*
-) To reduce incidence of water related diseases extensively prevalent in Nepal.*
-) To lessen sufferings and drudgeries of women and children who are traditionally involved with collecting water and taking care of domestic sanitation and hygiene and*
-) Preparation of water supply and sanitation database in the center i.e. in DWSS*

Successful management of water for the population would depend on identification of the issues critical to managing them. It is hoped that the research will be useful not only for current researchers in the sector, but also to the aspiring engineers, social scientists and rural development specialists who would like to contribute in the process of providing sustainable water supply and sanitation systems to the citizens. A good deal of work still needs to be carried in covering the sociological impact needs of the sector. The sector needs to address both technical and sociological aspects of water supply and sanitation, and amalgamate the two disciplines to produce relevant and useful inter-disciplinary tools, techniques and methods.

2.3 Review of the study

Nepal is among the poorest and least developed countries in the world with nearly half of its population living below the poverty line. Agriculture is the mainstay of the economy, accounting for 38% of GDP. About 65% of the people of Nepal are served by water supply facilities whereas only 33% of the people have access to sanitation facilities. Water born diseases claim about 40,000 under five year child deaths

(UNICEF 1987, updated 2000) and the country suffers an estimated loss of US\$1200 millions each year. Lack of knowledge about water and sanitation is becoming a very serious problem in Nepal. These facts show that the sanitation condition of the communities/people should be improved immediately.

The drinking water supply sector has been one of the priority area for investment of GoN and thus substantial amount of internal resources are being mobilized achieve the sector objectives. As it is obvious to all that the set target cannot be achieved with the internal resources alone, hence there have been continuous supports from various bilateral and multilateral agencies in this sector. The details of the resources allocations are shown in the following chart and table while the allocations do not include direct payment made by donor agencies (*DWSS, 2003*).

The national coverage achieved in the water supply sector at the end of ninth plan is estimated as 71.6% and as of sanitation sector is 25%. Accordingly, top priority has been given by Government of Nepal (GoN) increase coverage of water supply facilities. GoN aims at supplying safe and easily accessible water to all its citizens till 2017. To achieve this ambitious target GoN, I/NGOs and other stakeholders in this sector trying to do better.

Impact evaluation and sustainability study is the - study of current situation and overall impact of project within the community as well as its functional status of the project. This is done after the implementation of the project. Drinking Water is the basic needs of all human beings. Safe Water supplies and environmental sanitation are vital for protecting the environment, improving health of the people as well as alleviating poverty. An estimated 80% of diseases and over 1/3rd of deaths in developing countries are related to the consumption of contaminated water and on average as much as 1/10th of each production time is sacrificed to water related diseases. Concerted effort globally during the IDWSS (1981-1990) in which the commonly agreed premise was that "All people, whatever their stage of development and their Social and Economic Conditions, have the right to have access to drinking water in quantity and of a quality equal their basic needs" has a given adequate impetus to the development of drinking water supply sector in the world as whole. Inspired by this statement and having been realized that the development of drinking water supply and sanitation sector (WSSS) brings in enhanced socio-economic benefits and health improvements, GoN has declared its commitment to provide safe drinking water to all by the year 2002.

In Nepal a large mass of the population is still deprived of safe, convenient and adequate drinking water and sanitation facilities. The rural population in hills and midlands still obtain their water from springs, ponds, canals, stream, sand rivers,

which are in most cases, grossly contaminated. The water has to be fetched from a long distance involving heavy ups and downs and thus the quantity of water used is minimum and just enough to sustain life. The condition in Terai areas too is not better despite availability of enough ground water, very often, shallow tube wells and dug wells too, are polluted. Due to faecal contamination, water born diseases such as cholera, diarrhoea, and dysentery infection hepatitis are the major causes of mortality and morbidity especially amongst children. It is very sad to note here that the infant mortality rate in the country is as high as 107 per thousand with 44 % of the infant and child mortality caused by diarrhoeal disease alone.

CHAPTER 3: RESEARCH METHODOLOGY

This chapter deals with the methods that have been adopted for the study. The present study is based on both secondary data collected from Water Supply and Sanitation Division Office, Rolpa.

3.1 Rationale of the selection of the study area

Research study focuses on Water Supply and Sanitation (WATSAN) status of Rolpa district. The study focuses on overall WATSAN situation of the district. I think such type of study is relevant and contemporary as a Masters Degree student of social science. Till date no researches has done in this particular area of study. The reasons to selecting the area in this study are as follows:

- i. To know the WATSAN status of Rolpa district.*
- ii. Use of WATSAN database for further planning and implementation of water supply projects.*

3.2 Population

Universe of this research study is the whole Rolpa district i.e. water supply and sanitation project area of whole district.

3.3 Sample size and Technique

Among the total households WATSAN benefited population are the sample size.

3.4 Research Design

An exploratory and descriptive research design has been applied to conduct the research. This study is mostly a secondary research and data has been obtained from WSSDO Rolpa. Data collected from the field has been analyzed in tabulated and descriptive manner. Exploratory methods have been applied to interpret the data. And the research have been described the basis of evaluation of the activities of project in the study area.

3.5 Nature and sources of data

All quantitative data are collected by the survey research using the Questionnaire. The present study is based on mainly secondary data collected by WSSDO Rolpa. In addition some secondary data such as population, figures have been drawn from official documents including different community reports of the VDC/DDC.

3.6 Techniques and tools of data collection

3.6.1 Interview Schedule

This method will Guide to explore the perception and the Choices of Methods and Techniques. The researcher has focused on water supply and sanitation status of Rolpa district.

3.7 Reliability and Validity of Data

Concepts and variables which are used in the study are operationally defined. The study is mostly dependent upon the secondary data so it has content validity as well as empirical validity. Relevant primary and secondary data are verified by crosschecking in the field as well as from the sources of data.

3.8 Data Processing and Analysis

Data were analyzed in order to know the status of WATSAN status. The last and final stage is the data processing and analysis, which is one of the important parts of this research work. The data collected through various techniques in the fields has been analyzed quantitatively and descriptively. The checklist has been used to verify and to confirm the information provided by informants. The presentation of qualitative information in tabulated form has been carried out by using simple mathematical tools like percentage, graphs, average, ratio etc. Similarly to clarifying and simplifying the description maps, diagrams, chart, figures and photographs has been used as far as possible.

CHAPTER 4: STUDY AREA

4.1 General

Rolpa lies on the Rapti zone of the Mid-western region in Nepal. The district covers an area of 1879 square kms and falls between latitude 28° 07' N to 28° 32' N. The longitude boundaries of the district are marked by 82° 21' E to 82° 55' E. The district ranges in elevation between 701 meters to 3639 meters above MSL. The district is bordered by Baglung & Pyuthan District in the east, Salyan & Rukum district in the West, Dang & Pyuthan District in the south and Baglung & Rukum district in the north. There are 51 VDCs in the district.

The district headquarter is Liwang which is at a distance greater than 100 km from Bhaluwang, which is linked with motorable road. A fairly good network of communication services is available in Liwang. The Table 4.1; below shows the accessibility of VDCs by distance.

Table 4.1: Accessibility of VDCs by Distance

S. N.	Distance Range (Km.)	Distance from					
		All Weather Road Head		Seasonal Road Head		District Headquarters	
		Nos. VDC	Percent age	Nos VDC	Percent age	Nos. VDC	Percent age
1	0 to 50	0	0	0	0	0	0
2	50 to 100	0	0	0	0	0	0
3	Above 100	51	100	51	100	51	100
	Total VDCs	51	100.00 %	51	100.00 %	51	100.00 %

Source: WSSDO, 2007

4.2 Physical Features

4.2.1 Topography

Physiographically, the district can be divided into two zones namely High Mountain and Mid Mountain. Of these productive land is 59855 hectares (or 1.72%).

The High Mountain and mid mountain zones of this district are also covered with snow in the winter season of the year so the human settlements are in scattered nature in these zones. The human settlements are mostly on the valleys of High Mountains. Negligible small valleys and plain area located in the district are more appropriate place for people to live.

4.2.2 Rivers

Major rivers in the district are Bheri, Lungri, Madikhola, Sharada khola & Nausaya Khola. Usually watersheds drain into kholsas and streams, which feed these rivers.

Climate. Due to the variation in altitude and topography, the climate of the district varies widely from Sub-tropical, Mild-temperate to cool temperate.

The average annual rainfall in the district (1990) was found to be 1581.7 mm at this station. More than 80% of the precipitation occurred in the monsoon season.

According to the climatological records of Nepal published by Ministry of Water Resources, Department of Hydrology and Meteorology in June 1990, the average maximum temperature is 29.5°C and minimum temperature is -5.5°C. The average humidity ranges from 50 to 94 corresponding to 8:40 hrs. and 17:40 respectively.

4.2.3 Vegetation

The vegetation is dependent basically on the climate and altitude of the area. The vegetation found in Rolpa district is not very different from other hilly areas of the country with the similar type of climatic condition. Salla, Banjh, Uttis, Chilaune etc. are the trees found within the different parts of the district.

4.3 Demography

The district population as per 2001 census is 210004. Of these the male population is 101592 and female population is 108412. The sex ratio, i.e. number of males per 100 females is 94. The growth rate given by 2001 census is 1.56%. Population density with respect to the total district area according to 2001 census is 112 per Sq. Km. and with respect to productive land is 3.73 per ha. The current field survey shows a population of 298743 in 47465 households. This gives an average family size of 6.29 persons. Magar, Chhetri, Kami, Damai, Sanyasi & Thakuri are the major inhabitants. Table 4.2 gives the number of households and population by ethnic distribution in Rolpa.

Table 4.2: Ethnic Distribution of Population

Ethnic Group/Caste	No. of HH	Population(nos.)	% of Total Population
Magar	20780	130790	43.78
Chhetri	15844	99720	33.38
Kami	4984	31368	10.5
Damai/Dholi	1533	9649	3.23
Sanyasi	945	5945	1.99
Unid Dalit	745	4690	1.57
Thakuri	551	3465	1.16
Brahaman Hill	513	3226	1.08
Others	1571	9888	3.31
Total	47465	298743	100

Source: WSSDO, 2007

4.3.1 Migration

Migration usually takes place for supplementary income in large scale; people go to India in search of jobs. This type of migration generally occurs from August/ September to October/ November during the slack season. The field survey shows that on an average there is a small outgoing trend from the district.

4.4 Economy

Agriculture is the main economic activity of people in Rolpa district. However, there is a negligible agricultural export from the district. The farming is generally at subsistence level and in many cases is below subsistence level. Because of land being of poor productive nature, absence of use of modern means of agriculture, lack of irrigation facility and fertilizers: the productivity in agriculture is not satisfactory. Only a small level of irrigation facility is available in the district. Paddy, maize, millet, wheat, barley & potato are main product. Table 4.3 gives the share of different crop production in Rolpa district.

Table 4.3: Area and Percentage of Different Crops in Rolpa district

S.N	Crop	Area (ha)	%
1	Paddy	4700	8.39
2	Wheat	8520	15.21
3	Maize	11190	19.97
4	Millet	1050	1.87
5	Barley	700	1.25
6	Oilseed	110	0.19
7	Potato	1470	2.62
8	Black gram	165	0.29
9	Soya bean	240	0.43

Source: WSSDO, 2007

Single and Mixed cropping systems are prevalent in most of the area. Livestock farming is not well developed and is limited to farming for personal uses. Commonly raised livestock include cows and buffaloes for milking, goats for meat product and bulls for ploughing. Horses, mules and yaks are used to some extent for human and materials transport. Some communities also raise pigs for meat. Chicken and to some extent ducks are also raised. Table 4.4 gives the type and number of livestock in Rolpa district.

Table 4.4: Type and Number of Livestock in Rolpa District (2002/2003)

S.N.	Type of Livestock	Numbers in District (, 000)
1	Ox/ Cow	96.39
2	Buffaloes	48.37
3	Goat/Sheep	120.68
4	Pig	12.77
5	Fowl	189.60
6	Duck	0.05

Source: WSSDO, 2007

People migrate to plains or India in off agricultural seasons for labor based jobs to supplement the economy. Trade is a limited activity. Table 4.5 gives the major

income source of the district by type of activity in terms of house holds engaged in the activity.

Table 4.5: No. of Household by source of income (2001)

S. N.	Source of Income	Number of Households
1	Agriculture land only	1221
2	Livestock only	42
3	Poultry only	116
4	Land and Livestock	1962
5	Land, and Poultry	399
6	Livestock &Poultry	144
7	Land, Livestock &Poultry	33194
8	Others	1434
	Total	38512

Source: WSSDO, 2007

4.5 Infrastructure

Rolpa is not as very remote district still there is slow rate of infrastructure development inside the district. But, some development works like suspension bridge construction are remarkable, district roads and village roads are in way of construction. Irrigation development is also increasing in Rolpa district. Total irrigated land is 1114.5 Ha in 2002 out of 3980 Ha total irrigable area.

4.6 Public Institutions

There are several health, administrative and public institutions in Rolpa district. A record of these institutions is as shown in Table 4.6.

Table 4.6: Health, Public and Administrative Institutions

S.N.	Type of Institution	Nos.
1	Health Posts/Sub-health Post	50
2	Hospital	1
3	VDC offices	27
4	Banks	2
5	Co-operatives/ Sajha	2
6	Post Office	51
7	School	298
8	Campus	1
9	Registered Cottage industries	13

Source: WSSDO, 2007

4.7 Education and Literacy Status

The overall literacy rate in Rolpa is about 37.25%. Of these, the literacy rate of population of 15-24 years of age is 51.5 percent. Primary School net enrollment ratio is 8.3 percent where as percentage of educationally disadvantaged population is 12.32. During the field survey it was estimated that about 70% of the children of school going age (between 5 to 16 years) are found to be attending school. There is one campus for post S.L.C. level education in the district. Table 2.10 gives the details of educational institutions in the district by type of institution.

Table 4.7: Educations Institutions by types, no. of students and no. of teachers

Level	Total Numbers	No. of Students			Nos. of Teachers		
		Male	Female	Total	Male	Female	Total
Pre-Primary	54	598	518	1116	44	10	54
Primary	297	16414	16414	32828	794	128	922
Lower Secondary	60	3945	1936	5881	162	4	166
Secondary	22	831	363	1194	70	5	75
H. Secondary	2	65	50	115	9	2	11
Campus	1	0	0	0	0	0	0
Total	436	21853	19281	41134	1079	149	1228

Source: WSSDO, 2007

4.8 Development Plans and Priorities

Development priorities of the district on a VDC wise basis were studied during the preparation of DWSPDP. The study reveals the priorities as shown in Table 4.8

Table 4.8 Priority ranking on Infrastructure Development Need

S.N.	Development Need	Priority ranking
1	Drinking Water	1
2	Irrigation	2
3	Road	3
4	Trail	4
5	School	5
6	Health Post	6
7	Suspension Bridge	7
8	Electricity	8
9	Others	9

Source: WSSDO, 2007

4.9 NGOs in the district

As of the field study period, early 2007, there are some NGOs registered within the District Administration Office. Of these some are renewed. None of the NGOs have been involved efficiently in the sector of water supply and sanitation development except RRN, GTZ, and UNICEF.

4.10 Experience of Communities on Participatory Approaches

Besides traditional participatory works by which people have built foot trails, improved water sources, built community canals, etc. and have a system of local labor exchange systems like Parma and Bista, the study revealed that many people in the district have been exposed to or have experience in participatory development of works which have been funded externally.

CHAPTER 5: ANALYSIS AND DISCUSSIONS

5.1 Overall Scenario

Coverage is difficult to define and at the optimum level would mean easy access to potable and reliable water supply with individual house connection. GoN in tenth plan policy has defined different service levels depending upon the quantity, quality, accessibility, continuity and reliability of water supply. However, for present purposes coverage is interpreted as a reasonable access to water supply, about within 100m to 150m, from a public stand post or a protected source like improved spring, dug well, tube well, etc.

The present population coverage in this sense in Rolpa district is 75.6% by existing, under construction or ongoing schemes. This includes all the population that has accesses to water supply facility through existing 609 piped water systems. Of the existing systems about 285 schemes are in need of rehabilitation, reconstruction or major repair which indicates towards approximate reduction in coverage by about 48.06%. Table 5.1 shows the WATSAN Coverage status at VDC level.

5.1.1 Implementation Agencies

Main funding agencies involved in the implementation of water supply and sanitation systems in Rolpa district are Water Supply and Sanitation Division Office (WSSDO) which implements its programs through projects funded by GoN resources, loan assistance being made available through the Asian Development Bank (ADB) loans, grant assistance made available by UNICEF; District Development Committee; Village Development Committees; Rural Reconstruction Nepal.

Table 5.1: Percentage by funding agency

S.N.	Donors	Percentage
1	Govt. of Nepal	35.14
2	ADB	26.6
3	WSSDO	7.72
4	DDC	5.58
5	VDC	6.73
6	UNICEF	7.88
7	RRN	3.12
8	Others	7.06

Source: WSSDO, 2007

Figure 5.1: Funding and Implementation Agencies

Figure 5.1 gives the percentage share of involvement of each agency in developing existing water and sanitation system in Rolpa district. According to the chart UNICEF program has benefited 7.88 % and that by DWSSO is 7.72% and ADB program has benefited 26.6%. Table 5.2 gives the basic features of involvement of different agencies in water supply and sanitation in Rolpa district.

5.2 Water supply systems Existing/under construction /Planned

All the 593 existing piped water supply systems in Rolpa district are gravity flow type. Of these 122 systems, 49 systems were constructed during the 8th five year

plan period (2048 B.S.-2053 B.S.) and remaining systems have been completed during the last 9th five year plan period.

Table 5.2: Water supply systems Existing/under construction

S.N.	Construction Completed/or to be completed on	Reported Existing Systems	Percentage (%)
1	Before 2030	0	0.00
2	5th Plan (2030-2035)	7	1.18
3	6th Plan (2036-2041)	14	2.36
4	7th Plan (2042-2047)	78	13.15
5	8th Plan (2048-2053)	278	46.88.
6	9th Plan (2054-2059)	185	31.19
7	10 th plan (2059-2064)	31	5.22

Source: WSSDO, 2007

5.3 Repair and maintenance status of the scheme

The following table 5.3 shows the repair and maintenance status of the schemes. Of these 593 piped water supply systems 285 systems (48.06% of all the systems) benefiting 130414 populations are in need of either major repair or rehabilitation or reconstruction in which about 33 systems cannot be maintained at all. This indicates that in the existing systems more than 50% of them are malfunctioning.

Table 5.3: Repair and maintenance status of the scheme

Code	VDC name	No. of Schemes					
		Maintained in good condition	Needs routine maintenance	Needs major maintenance	Requires rehab.	Requires re-construction	Cannot be maintained
01	Aresh	0	1	1	1	1	0
02	Bhawang	6	3	6	2	0	0
03	Bhirul	4	1	1	0	2	2
04	Budhagaun	0	4	3	0	1	0
05	Dhawang	0	6	6	3	0	0
06	Dubaring	0	5	0	1	5	0
07	Dubidanda	2	7	3	2	0	0
08	Iriwang	6	6	2	0	0	0
09	Fagaam	0	4	0	0	3	3
10	Gaam	0	1	2	2	4	0

11	Gairigaun	0	4	0	0	0	0
12	Gajul	5	0	0	5	6	4
13	Ghartigaun	2	4	2	2	0	0
14	Ghodagaun	3	1	0	0	2	0
15	Gumchal	0	2	3	2	0	0
16	Harjang	1	2	1	0	4	1
17	Jailwang	0	0	0	0	11	0
18	Jaimakasala	0	0	2	1	3	1
19	Jankot	0	0	1	2	2	4
20	Jaulipokhari	0	4	7	0	0	1
21	Jedwang	1	3	4	0	2	0
22	Jhenam	0	2	3	2	8	0
23	Jinawang	0	0	0	0	8	2
24	Jungar	0	7	0	0	4	0
25	Kareti	0	1	0	1	5	4
26	Khumel	0	13	0	2	5	0
27	Khungri	3	5	5	7	0	0
28	Korchawang	0	5	0	0	1	0
29	Kotgaun	2	2	2	2	0	0
30	Kureli	1	4	2	1	1	1
31	Liwang	27	12	0	10	3	3
32	Masina	0	3	0	2	1	0
33	Mijhing	2	5	3	2	5	0
34	Nuwagaun	0	10	0	5	0	0
35	Pachawang	4	4	0	0	0	0
36	Pakhapani	1	11	0	0	0	0
37	Pang	0	8	1	0	2	0
38	Rangkot	0	7	3	0	0	0
39	Rangsi	2	4	1	3	1	0
40	Rank	1	9	4	0	0	0
41	Sakhi	1	1	1	1	11	0
42	Seram	0	0	0	0	9	0
43	Sirpa	0	0	2	3	3	1
44	Siuri	1	4	2	4	1	1
45	Talawang	1	8	2	1	2	0
46	Tewang	0	0	0	0	3	0
47	Thawang	3	1	0	0	1	2
48	Uwa	0	0	0	4	2	3
49	Wadachaur	0	3	3	1	0	0
50	Whama	0	6	4	1	2	0
51	Wot	3	0	3	0	1	0
Total		82	193	85	75	125	33
	% of Schemes	13.8	32.5	14.3	12.6	21.1	5.6

Source: WSSDO, 2007

5.4 Water Supply Systems under implementation

There are no water supply systems currently under implementations and no schemes either feasibility study completed or ongoing in Rolpa district.

Table 5.4: Details on the Scheme Phase

Code No.	VDC Name	Number of Schemes				Remarks
		Total	Existing	Under construction	Feasibility Study completed/ ongoing	
01	Aresh	4	4			
02	Bhawang	17	17			
03	Bhirul	10	10			
04	Budhagaun	10	8	1	1	
05	Dhawang	16	15	1		
06	Dubaring	11	11			
07	Dubidanda	15	14	1		
08	Iriwang	14	14			
09	Fagaam	10	10			
10	Gaam	9	9			
11	Gairigaun	5	4	1		
12	Gajul	21	20	1		
13	Ghartigaun	10	10			
14	Ghodagaun	6	6			
15	Gumchal	7	7			
16	Harjang	9	9			
17	Jailwang	11	11			
18	Jaimakasala	7	7			
19	Jankot	9	9			
20	Jaulipokhari	12	12			
21	Jedwang	10	10			
22	Jhenam	15	15			
23	Jinawang	10	10			
24	Jungar	11	11			

25	Kareti	11	11			
26	Khumel	21	20	1		
27	Khungri	21	20	1		
28	Korchawang	6	6			
29	Kotgaun	8	8			
30	Kureli	10	10			
31	Liwang	57	55	2		
32	Masina	6	6			
33	Mijhing	17	17			
34	Nuwagaun	16	15		1	
35	Pachhawang	8	8			
36	Pakhapani	12	12			
37	Pang	11	11			
38	Rangkot	10	10			
39	Rangsi	12	11	1		
40	Rank	14	14			
41	Sakhi	15	15			
42	Seram	9	9			
43	Sirpa	9	9			
44	Siuri	13	13			
45	Talawang	15	14	1		
46	Tewang	4	3	1		
47	Thawang	7	7			
48	Uwa	9	9			
49	Wadachaur	7	7			
50	Whama	14	13	1		
51	Wot	8	7	1		
Total		609	593	14	2	
% of each			97.37	2.30	0.33	

Source: WSSDO, 2007

5.4.1 Operational Status and Management of Existing Systems

Management of completed water supply systems and its sustainable operation and maintenance has been the key issue of rural water supply systems in the recent past. Several models have been tried and the most commonly followed model today is to enable beneficiaries to undertake the responsibility and accountability of the constructed facilities including its' efficient management and regular tariff collection for financial sustainability. In this regard the study collected data on agency responsible for management of the existing systems. Table 3.5 gives the summary of the operational status of existing systems

Table 5.5: Preview of Operational Status of Existing Systems

Code No.	VDC Name	Total Scheme	User's Committee		O&M Fund			VMWs		
			Formed	Registered	Established	Beneficiaries	Others	Employed	Tools & Plants	Paid
01	Aresh	4	2					2	2	2
02	Bhawang	17	17	16	2	2		12	5	9
03	Bhirul	10	10	10	2	2		6	4	2
04	Budhagaun	8								
05	Dhawang	15	15	13	4	4		9	4	8
06	Dubaring	11	2							
07	Dubidanda	14	14	2	7	7		7	8	7
08	Iriwang	14	3	2				14	10	14
09	Fagaam	10	2	2						
10	Gaam	9	5		2	2		2	1	2
11	Gairigaun	4	2							
12	Gajul	20	7		2	2		2	1	2
13	Ghartigaun	10	10	3	2	2		2	4	2
14	Ghodagaun	6	6		1			1	2	1
15	Gumchal	7	2	2	1	1		3	5	3
16	Harjang	9								
17	Jailwang	11								
18	Jaimakasala	7	3		1	1		1		1
19	Jankot	9	3						1	
20	Jaulipokhari	12	12					6	4	4
21	Jedwang	10	10	2				6	4	6
22	Jhenam	15	8		5	5		5	5	5
23	Jinawang	10	7		4	4		4	2	4
24	Jungar	11								
25	Kareti	11	3						1	
26	Khumel	20	17	15	12	12		13	13	12
27	Khungri	20	15		7	7		8	9	7
28	Korchawang	6	6						2	

29	Kotgaun	8	8		2	2		2	3	2
30	Kureli	10	8	8	1			7	7	4
31	Liwang	55	55		19	15		15	30	15
32	Masina	6	5	3	1	2		3	3	2
33	Mijhing	17	12		1	6		6	9	6
34	Nuwagaun	15								
35	Pachawang	8	1	1				8	8	8
36	Pakhapani	12	12	12	4	2		2		2
37	Pang	11	2						4	
38	Rangkot	10	1	1				9	2	9
39	Rangsi	11	9	9				3	4	3
40	Rank	14	4	3				12	5	12
41	Sakhi	15	6		4	4		4		4
42	Seram	9								
43	Sirpa	9	7		3	3		3	5	3
44	Siuri	13	2	1						
45	Talawang	14	2	2				1	2	1
46	Tewang	3	3		3	3		3		3
47	Thawang	7	6						5	
48	Uwa	9	6		2	2		2	2	2
49	Wadachaur	7	5	5				5	5	5
50	Whama	13	12	12	1	1		3	2	3
51	Wot	7						4		4
Total		593	347	124	93	91	0	195	183	179
% of each			58.5	20.9	15.7	15.3	0.0	32.9	30.9	30.2

Source: WSSDO, 2007

The above table indicates some deficiencies information of Water Users Committees (WUCs) and Collection of Operation and Maintenance Funds (O & M fund). Out of 593 schemes, in 347 schemes water users committee has formed which is 58.5% of the total schemes, in which only 124 has formally registered. This is mainly due to the fact that a community-based approach was adopted only since the Third Water Supply and Sanitation Sector Project. However, most of the recent systems constructed under the ADB assisted Third and the Fourth Water Supply Projects have users committee in place and have an upfront operation and maintenance fund collected. The amount of O&M fund was Rs. 500 per public stand post in the Third Project that has been increased to Rs. 1000 per public stand post in the Fourth.

Of the total 188 systems has tools and plants and only 195 systems has managed village water workers. Operation and maintenance fund as in the form of water tax has been established only in 93 Schemes which is only 15.7% of the present schemes. In some of the schemes villager has established the fund by paying corn

generally 5 pathi per house. The requirement of formation of water users committee including women in the remaining schemes is felt necessary in order to upkeep the project in good maintained condition.

5.5 Point Sources

Developed point sources are natural springs that are protected or unprotected by building a masonry tank over it and providing a tap at the intake structure itself. These sources have been identified and suggested as the proposed point sources in order to future projects. A total of 271 clusters in 51 VDC are in condition of out of reach, which is about 17.4% of total population.

Table 5.6: Point sources

Code No.	VDC Name	Source type & their Nos.								Remaining from any schemes(Ext.,Ong.,Pro.)but using other sources like kunwa,river				Total	
		Schemes with Spring(Sources)				Schemes with River				Nos	H/H	PopIn	% Covrg.	H/H	Pop
		No	H/H	Pop In	% Covra g	No	H/H	Popl	% Cov rg.						
01	Aresh	1	244	1830	38	3	302	2320	47	8	95	710	15	641	4860
02	Bhawang	17	711	3974	87	0	0	0	0	6	106	640	13	817	4614
03	Bhirul	5	134	766	29	5	273	1608	58	5	60	300	13	467	2674
04	Budhagaun	4	121	682	8	6	800	4787	50	14	692	3980	43	1613	9449
05	Dhawang	15	705	6637	55	1	467	2804	36	9	112	706	9	1284	10147
06	Dubaring	11	368	2422	51	0	0	0		11	353	2321	49	721	4743
07	Dubidanda	11	700	4316	44	4	672	4602	42	8	230	1293	14	1602	10211
08	Iriwang	8	409	3199	37	6	328	2463	30	14	361	2924	33	1098	8586
09	Fagaam	7	248	1512	48	3	190	1152	36	2	83	498	16	521	3162
10	Gaam	9	528	2830	76	0	0	0	0	10	169	897	24	697	3727
11	Gairigaun	3	143	827	9	2	584	3501	38	20	794	4939	52	1521	9267
12	Gajul	5	115	720	10	16	981	6198	83	3	83	420	7	1179	7338
13	Ghartigaun	4	237	1884	32	6	343	2401	46	6	172	1187	23	752	5472
14	Ghodagaun	5	441	2453	70	1	105	527	17	3	80	520	13	626	3500
15	Gumchal	7	539	4159	89	0	0	0	0	4	67	364	11	606	4523
16	Harjang	8	389	19	85	1	35	226	8	2	36	260	8	460	2443

				57											
17	Jailwang	6	346	35 68	63	5	154	1474	28	5	45	438	8	545	5480
18	Jaimakasala	3	100	62 9	20	4	256	1519	51	6	14 7	740	29	503	2888
19	Jankot	4	169	96 9	32	5	316	1608	60	3	38	180	7	523	2757
20	Jaulipokhari	1 2	534	31 33	68	0	0	0	0	8	25 5	1427	32	789	4560
21	Jedwang	1 0	601	33 97	78	0	0	0	0	7	16 7	849	22	768	4246
22	Jhenam	1 1	516	40 02	47	4	335	1780	30	11	25 7	1848	23	1108	7630
23	Jinawang	4	131	77 7	16	6	669	4517	80	1	36	233	4	836	5527
24	Jungar	7	330	20 53	25	4	434	2296	33	12	55 5	3213	42	1319	7562
25	Kareti	1 1	391	22 92	82	0	0	0	0	7	87	545	18	478	2837
26	Khumel	2 0	763	39 63	62	1	415	2493	34	6	59	316	5	1237	6772
27	Khungri	2 1	1050	46 91	88	0	0	0	0	8	14 3	771	12	1193	5462
28	Korchawang	3	207	14 74	30	3	446	3125	65	4	35	242	5	688	4841
29	Kotgaun	2	54	37 2	7	6	431	3087	58	10	25 2	1819	34	737	5278
30	Kureli	4	264	18 02	35	6	483	3587	65	0	0	0	0	747	5389
31	Liwang	4 6	1579	78 45	58	1 1	791	4349	29	18	34 0	1592	13	2710	13786
32	Masina	6	515	36 93	60	0	0	0	0	12	34 8	2054	40	863	5747
33	Mijhing	6	189	10 04	13	1 1	1184	5955	82	4	76	391	5	1449	7350
34	Nuwagaun	1 2	457	27 91	50	4	172	1079	19	14	28 5	1709	31	914	5579
35	Pachhawang	5	301	22 98	33	3	100	784	11	10	51 2	4227	56	913	7309
36	Pakhapani	8	328	19 41	32	4	122	822	12	9	56 1	3501	55	1011	6264
37	Pang	1 1	777	40 13	95	0	0	0	0	1	45	255	5	822	4268
38	Rangkot	5	238	18 10	27	5	264	2022	30	34	38 4	2838	43	886	6670
39	Rangsi	1 1	739	30 82	45	1	592	3554	36	12	29 6	2037	18	1627	8673
40	Rank	1 1	305	32 70	35	3	130	1021	15	11	44 4	3938	51	879	8229
41	Sakhi	8	486	29 14	45	7	361	2004	33	12	23 5	1387	22	1082	6305
42	Seram	7	165	10 34	52	2	114	969	36	5	41	304	13	320	2307
43	Sirpa	5	325	16 51	36	4	209	1219	23	11	35 8	1912	40	892	4782
44	Siuri	1 3	377	22 15	61	0	0	0	0	11	23 9	1270	39	616	3485
45	Talawang	8	266	22 92	28	7	342	2415	36	10	35 3	3194	37	961	7901

46	Tewang	0	0	0	0	4	863	6064	88	8	113	838	12	976	6902
47	Thawang	7	705	3695	90	0	0	0	0	3	79	440	10	784	4135
48	Uwa	6	345	1867	42	3	139	995	17	9	332	1684	41	816	4546
49	Wadachaur	7	687	4153	76	0	0	0	0	5	212	1346	24	899	5499
50	Whama	13	662	4340	71	1	210	1264	23	3	59	302	6	931	5906
51	Wot	7	685	4156	66	1	15	103	1	10	338	2896	33	1038	7155
	Total	440	21619	133354	44.6	169	14627	92694	31.0	271	7074	47102	15.8	47465	298743

Source: WSSDO, 2007

Though the coverage percentage by both the source seen to be 75.6% the actual coverage is below this value because 48.6% of total schemes are in non-operating condition. In this way net coverage is below 60%.

5.6 Identified Water Supply Systems for Uncovered Areas

Table 5.7: Extent of population coverage

Source Details and Coverage %															
Code No.	VDC Name	Source type & their Nos.								Remaining from any schemes(Ext.,Ong.,Pro.)but using other sources like kunwa,river				Total	
		Schemes with Spring(Sources)				Schemes with River				No s.	H/H	Popln.	% Covr g.	H/H	Pop
		No s.	H/H	Popln.	% Covr g.	No s.	H/H	Popln.	% Covr g.						
01	Aresh	1	244	1830	38	3	302	2320	47	8	95	710	15	641	4860
02	Bhawang	17	711	3974	87	0	0	0	0	6	106	640	13	817	4614
03	Bhirul	5	134	766	29	5	273	1608	58	5	60	300	13	467	2674
04	Budhagan	4	121	662	8	6	800	4747	50	14	692	3940	43	1613	9449
05	Dhawang	15	705	6637	55	1	467	2804	36	9	112	706	9	1284	10147
06	Dubaring	11	368	2422	51	0	0	0	0	11	353	2321	49	721	4743
07	Dubidanda	11	700	4316	44	4	672	4602	42	8	230	1293	14	1602	10211
08	Iriwang	8	409	3199	37	6	328	2463	30	14	361	2924	33	1098	8586
09	Fagaam	7	248	1512	48	3	190	1152	36	2	83	498	16	521	3162
10	Gaam	9	528	2830	76	0	0	0	0	10	169	897	24	697	3727
11	Gairigan	3	143	827	9	2	584	3501	38	20	794	4939	52	1521	9267
12	Gajul	5	115	720	10	16	981	6198	83	3	83	420	7	1179	7338
13	Ghartigan	4	237	1884	32	6	343	2401	46	6	172	1187	23	752	5472
14	Ghodagan	5	441	2453	70	1	105	527	17	3	80	520	13	626	3500
15	Gumchal	7	539	4159	89	0	0	0	0	4	67	364	11	606	4523
16	Harjang	8	389	1957	85	1	35	226	8	2	36	260	8	460	2443

17	Jailwang	6	346	3568	63	5	154	1474	28	5	45	438	8	545	5480
18	Jaimakasa	3	100	629	20	4	256	1519	51	6	147	740	29	503	2888
19	Jankot	4	169	969	32	5	316	1608	60	3	38	180	7	523	2757
20	Jaulipokhari	12	534	3133	68	0	0	0	0	8	255	1427	32	789	4560
21	Jedwang	10	601	3397	78	0	0	0	0	7	167	849	22	768	4246
22	Jhenam	11	516	4002	47	4	335	1780	30	11	257	1848	23	1108	7630
23	Jinawang	4	131	777	16	6	669	4517	80	1	36	233	4	836	5527
24	Jungar	7	330	2053	25	4	434	2296	33	12	555	3213	42	1319	7562
25	Kareti	11	391	2292	82	0	0	0	0	7	87	545	18	478	2837
26	Khumel	20	763	3963	62	1	415	2493	34	6	59	316	5	1237	6772
27	Khungri	21	1050	4691	88	0	0	0	0	8	143	771	12	1193	5462
28	Korchawang	3	207	1474	30	3	446	3125	65	4	35	242	5	688	4841
29	Kotgaun	2	54	372	7	6	431	3087	58	10	252	1819	34	737	5278
30	Kureli	4	264	1802	35	6	483	3587	65	0	0	0	0	747	5389
31	Liwang	46	1579	7845	58	11	791	4349	29	18	340	1592	13	2710	13786
32	Masina	6	515	3693	60	0	0	0	0	12	348	2054	40	863	5747
33	Mijhing	6	189	1004	13	11	1184	5955	82	4	76	391	5	1449	7350
34	Nuwagau	12	457	2791	50	4	172	1079	19	14	285	1709	31	914	5579
35	Pachawang	5	301	2298	33	3	100	784	11	10	512	4227	56	913	7309
36	Pakhapani	8	328	1941	32	4	122	822	12	9	561	3501	55	1011	6264
37	Pang	11	777	4013	95	0	0	0	0	1	45	255	5	822	4268
38	Rangkot	5	238	1810	27	5	264	2022	30	34	384	2838	43	886	6670
39	Rangsi	11	739	3082	45	1	592	3554	36	12	296	2037	18	1627	8673
40	Rank	11	305	3270	35	3	130	1021	15	11	444	3938	51	879	8229
41	Sakhi	8	486	2914	45	7	361	2004	33	12	235	1387	22	1082	6305
42	Seram	7	165	1034	52	2	114	969	36	5	41	304	13	320	2307
43	Sirpa	5	325	1651	36	4	209	1219	23	11	358	1912	40	892	4782
44	Siuri	13	377	2215	61	0	0	0	0	11	239	1270	39	616	3485
45	Talawang	8	266	2292	28	7	342	2415	36	10	353	3194	37	961	7901
46	Tewang	0	0	0	0	4	863	6064	88	8	113	838	12	976	6902
47	Thawang	7	705	3695	90	0	0	0	0	3	79	440	10	784	4135
48	Uwa	6	345	1867	42	3	139	995	17	9	332	1684	41	816	4546
49	Wadachaur	7	687	4153	76	0	0	0	0	5	212	1346	24	899	5499
50	Whama	13	662	4340	71	1	210	1264	23	3	59	302	6	931	5906
51	Wot	7	685	4156	66	1	15	103	1	10	338	2896	33	1038	7155
	Total	440	21619	133334	44.6	169	14627	92654	31.0	271	7074	47102	15.8	47465	298743

Source: WSSDO, 2007

The population Coverage made by the total existing system reads to be 75.6% but the actual count of the population is not the same because of the fact that over 5.6% of the existing schemes are not in such a condition that they can be either rehabilitated or maintained to reuse. Similarly, over 48% of the total projects require rehabilitation/reconstruction or major maintenance. The need, therefore, is to identify systems that will benefit the remaining 47102 population; the existing

sources in their reach cannot be reused. Some 271 point sources are proposed for the purpose of their development to cover the remaining clusters. Construction cost of these systems will be approximately Rs 30,97,35000 for gravity schemes and Rs. 1,35,50,000 for point source development. The cost per capita approximately works out to Rs. 1191.

However, there is a need to prioritize these systems for implementation mainly because It is highly optimistic to imagine that the required investment will be available during the next years and for this systems should be implemented according to the priority; Sustainability of systems in operation and maintenance will have to be ensured for which the felt need and community willingness to participate needs to exist; transparent system implementation selection criteria helps the bottom up approach and provide equal opportunities to all communities to compete for the available resources, it will minimize top down approach and restrict undue political interference in selection of systems.

5.7 Water Demand

Water demand has been calculated according to DWSS standard guidelines. Types of demand identified and consumption rate for each type of demand is as presented in Table 5.8 below:

Table 5.8: Types and Consumption Rates for Various Types of Demand

S. N.	Type of Demand	Consumption Rate	Remarks
1	Domestic	45 lpcd through PSP, 65 lpcd in yard connection and 112 lpcd in fully plumbed connections	DWSS guidelines
2	Educational/ Institutional	10 lpcd for non residential facility	DWSS guidelines
3	Health post	1000 lpd/ health post	DWSS guidelines
4	Hospital bed	3000 lpd /bed	DWSS guidelines
5	Live stock	20% of domestic use	DWSS guidelines
6	Commercial	10 % of domestic use	Assumed
7	Industrial	As per actual	
9	Unseen, leakage, wastage, etc.	20% of domestic demand	Assumed

Source: WSSDO, 2007

Water demands have been calculated at the VDC level in view of the above criteria and have been aggregated to arrive at a district level scenario.

5.7.1 Domestic Demand

District average population growth rate has been used to arrive at projected population in defined intervals; A geometric growth has been assumed and the population projection has been made according to the formula:

$$P_n = P_0 (1+r)^n$$

- Where, P_n = Projected population of the VDC at a defined future year
- P₀ = Present population VDC
- n = Number of years for which population projection is being made
- r = Rate of population growth

As demand for private taps are increasing even in the rural areas and as these are also being promoted for the reason of better financial sustainability, based on the current socioeconomic scenario of the district following pattern has been adopted in calculating the demand

Table 5.9: Assumed Patterns of Tap Connections (Rural and Urban)

S N	Cluster pattern	% population served by yard connection			% population served by fully plumbed connection		
		2000 A.D.	2005 A.D.	2010 A.D.	2000 A.D	2005 A.D.	2010 A.D
1	Rural	10	10	20			
2	Urban	30	30	30	10	15	20

Source: Field Survey, 2007

5.7.2 Other Demands

Livestock demand is calculated at 20% of domestic demand in rural areas. In urban areas no account is made for livestock as urbanization is expected to reduce the livestock population. For urban areas this demand is expected to be satisfied from allowance to private connections with fully plumbed facility.

There are no signs of sharp rise in commercial activities and are therefore calculated at 10% of domestic demand as defined by the guidelines of Institutional and educational demands are projected at double the growth rate for population growth as increasing development interventions are expected to install more facilities in place. No account has been made for industrial demand as there are no

major industries nor are there any immediate signs of having any major industry before 2010.

Table 5.10: Total Water Demand at District Level (Cum.)

Sr.	Type of Demand	2001 AD	2007 AD	2012 AD
1	Domestic	9420	12211	13219
2	Livestock	1884	2442	2644
3	Institutional	2093	2713	2937
4	Commercial	942	1221	1322
	Total	14339	18587	20122

Source: Field Survey, 2007

Table 5.11: Total Water Demand at V.D.C Level (Cum.)

S.N	VDC Name	Population of VDC	Water Demand(cum)		
			2001	2007	2012
		2007			
01	Aresh	4860	157.50	218.70	236.76
02	Bhawang	4614	194.40	207.63	224.78
03	Bhirul	2674	115.70	120.33	130.27
04	Budhagaun	9449	263.84	425.21	460.33
05	Dhawang	10147	210.51	456.62	494.33
06	Dubaring	4743	202.86	213.44	231.07
07	Dubidanda	10211	187.07	459.50	497.45
08	Iriwang	8586	219.92	386.37	418.28
09	Fagaam	3162	130.28	142.29	154.04
10	Gaam	3727	198.23	167.72	181.57
11	Gairigaun	9267	198.23	417.02	451.46
12	Gajul	7338	223.43	330.21	357.49
13	Ghartigaun	5472	211.91	246.24	266.58
14	Ghodagaun	3500	131.58	157.50	170.51
15	Gumchal	4523	156.47	203.54	220.35
16	Harjang	2443	98.19	109.94	119.02

17	Jailwang	5480	126.68	246.60	266.97
18	Jaimakasala	2888	126.14	129.96	140.69
19	Jankot	2757	134.28	124.07	134.31
20	Jaulipokhari	4560	205.07	205.20	222.15
21	Jedwang	4246	175.50	191.07	206.85
22	Jhenam	7630	238.82	343.35	371.71
23	Jinawang	5527	218.75	248.72	269.26
24	Jungar	7562	202.68	340.29	368.40
25	Kareti	2837	92.12	127.67	138.21
26	Khumel	6772	126.63	304.74	329.91
27	Khungri	5462	186.62	245.79	266.09
28	Korchawang	4841	153.81	217.85	235.84
29	Kotgaun	5278	178.07	237.51	257.13
30	Kureli	5389	136.08	242.51	262.54
31	Liwang	13788	379.13	620.46	671.71
32	Masina	5747	204.62	258.62	279.98
33	Mijhing	7350	276.84	330.75	358.07
34	Nuwagaun	5579	181.08	251.06	271.79
35	Pachhawang	7309	190.22	328.91	356.07
36	Pakhapani	6264	274.46	281.88	305.16
37	Pang	4268	186.44	192.06	207.92
38	Rangkot	6670	148.01	300.15	324.94
39	Rangsi	8673	211.32	390.29	422.52
40	Rank	8229	245.48	370.31	400.89
41	Sakhi	6305	130.68	283.73	307.16
42	Seram	2307	78.71	103.82	112.39
43	Sirpa	4782	289.40	215.19	232.96
44	Siuri	3485	81.72	156.83	169.78
45	Talawang	7901	257.40	355.55	384.91
46	Tewang	6902	117.63	310.59	336.25
47	Thawang	4135	190.40	186.08	201.45

48	Uwa	4546	176.67	204.57	221.47
49	Wadachaur	5499	214.38	247.46	267.90
50	Whama	5906	184.77	265.77	287.72
51	Wot	7155	199.22	321.98	348.57
	Total	298745	9419.81	13443.53	14553.98

Source: WSSDO, 2007

5.8 Sanitation Situation

5.8.1 General

It has now been well understood that benefits of water supply are minimal in the absence of proper sanitation in place. Sanitation refers to a broad range of activities that are associated with personal, domestic and environmental hygiene that are essential to improve upon the quality of life. Despite the understanding of the fact that sanitation is a post requisite to realize the benefits of a water supply system sadly the attention imparted to sanitation is minimal. Even though it is many times argued that sanitation is built in as an integral part in a water supply system, especially in the case of rural water supply systems, it still remains a mere trailing add on activity of low importance to water supply.

Improper disposal of human waste, unsanitary living conditions and habits caused by ignorance to effects, water logging by improper tap stand drainage, improper system maintenance leading to entry of contaminants, improper handling and storage of drinking water are major causes that lead to contamination of supplies and that negate the benefits of a water supply system.

As with the rest of the country sanitation situation in Rolpa is not very good. However, interest in sanitary living conditions is increasing due to increased level of awareness and education.

5.9.2 Present Status of Latrine Coverage

The field survey conducted in 2007 shows that there are only 3776 households having any type of latrines observed in Rolpa district which gives coverage of 7.32 percent against the total number of 47465 households in the district.

The method adopted in survey for sampling the toilets for observation is random sampling as following:

- If total number of latrines in a ward is less than 12, all the latrines were observed.

- If 10% of the total latrines in the ward is greater than 12, random sampling method was adopted to fix any 12 latrines for observation.
- Not less than 12 latrines were selected for observation by random sampling if total toilets in the ward are more than 12 but 10% of it is less than 12.

Table 5.11 Type of household latrines in Rolpa district

Code No.	VDC Name	Observation Details											%of managed toilets
		No. of observed toilets	Pit Latrines		Water seal toilets		Others		Unmanaged toilets		Unused toilets		
			No.	%	No.	%	No.	%	No.	%	No.	%	
01	Aresh	22	22	100	0	0.0	0	0.0	12	54.5	1.0	4.5	40.91
02	Bhawang	51	51	100	0	0.0	0	0.0	0.0	0.0	0.0	0.0	100.00
03	Bhirul	33	24	72.73	0	0.0	0	0.0	12.0	36.4	0.0	0.0	63.64
04	Budhagaun	37	21	56.76	6	16.2	0	0.0	0.0	0.0	0.0	0.0	100.00
05	Dhawang	20	20	100	0	0.0	0	0.0	8.0	40.0	3.0	15.0	45.00
06	Dubaring	35	35	100	0	0.0	0	0.0	3.0	8.6	3.0	8.6	82.86
07	Dubidanda	90	90	100	0	0.0	0	0.0	50.0	55.6	10.0	11.1	33.33
08	Iriwang	108	58	53.7	0	0.0	0	0.0	9.0	8.3	12.0	11.1	80.56
09	Fagaam	11	11	100	0	0.0	0	0.0	6.0	54.5	1.0	9.1	36.36
10	Gaam	31	31	100	0	0.0	0	0.0	13.0	41.9	2.0	6.5	51.61
11	Gairigaun	14	14	100	0	0.0	0	0.0	0.0	0.0	0.0	0.0	100.00
12	Gajul	43	43	100	0	0.0	0	0.0	23.0	53.5	6.0	14.0	32.56
13	Ghartigaun	55	55	100	0	0.0	0	0.0	29.0	52.7	16.0	29.1	18.18
14	Ghodagaun	51	51	100	0	0.0	0	0.0	29.0	56.9	0.0	0.0	43.14
15	Gumchal	30	30	100	0	0.0	0	0.0	12.0	40.0	4.0	13.3	46.67
16	Harjang	20	20	100	0	0.0	0	0.0	9.0	45.0	6.0	30.0	25.00
17	Jailwang	43	45	104.7	8	18.6	0	0.0	29.0	67.4	0.0	0.0	32.56
18	Jaimakasala	40	40	100	0	0.0	0	0.0	17.0	42.5	4.0	10.0	47.50
19	Jankot	22	22	100	3	13.6	0	0.0	0.0	0.0	0.0	0.0	100.00
20	Jaulipokhari	12	12	100	0	0.0	0	0.0	8.0	66.7	1.0	8.3	25.00
21	Jedwang	15	15	100	0	0.0	0	0.0	0.0	0.0	0.0	0.0	100.00
22	Jhenam	59	59	100	0	0.0	0	0.0	32.0	54.2	10.0	16.9	28.81
23	Jinawang	46	46	100	0	0.0	0	0.0	22.0	47.8	3.0	6.5	45.65
24	Jungar	25	16	64	9	36.0	0	0.0	16.0	64.0	0.0	0.0	36.00
25	Kareti	52	52	100	0	0.0	0	0.0	25.0	48.1	6.0	11.5	40.38
26	Khumel	25	13	52	12	48.0	0	0.0	0.0	0.0	0.0	0.0	100.00
27	Khungri	47	40	85.11	19	40.4	0	0.0	25.0	53.2	1.0	2.1	44.68
28	Korchawang	44	36	81.82	8	18.2	0	0.0	5.0	11.4	3.0	6.8	81.82
29	Kotgaun	32	32	100	0	0.0	0	0.0	15.0	46.9	11.0	34.4	18.75
30	Kureli	15	15	100	0	0.0	0	0.0	0.0	0.0	1.0	6.7	93.33
31	Liwang	131	48	36.64	83	63.4	0	0.0	65.0	49.6	2.0	1.5	48.85
32	Masina	29	29	100	0	0.0	0	0.0	16.0	55.2	3.0	10.3	34.48
33	Mijhing	63	47	74.6	16	25.4	0	0.0	30.0	47.6	15.0	23.8	28.57
34	Nuwagaun	11	5	45.45	6	54.5	0	0.0	0.0	0.0	0.0	0.0	100.00
35	Pachawang	108	90	83.33	18	16.7	0	0.0	39.0	36.1	45.0	41.7	22.22
36	Pakhapani	17	17	100	0	0.0	0	0.0	6.0	35.3	4.0	23.5	41.18
37	Pang	14	14	100	0	0.0	0	0.0	9.0	64.3	2.0	14.3	21.43
38	Rangkot	108	108	100	0	0.0	0	0.0	0.0	0.0	0.0	0.0	100.00
39	Rangsi	37	31	83.78	6	16.2	0	0.0	0.0	0.0	0.0	0.0	100.00

40	Rank	108	108	100	0	0.0	0	0.0	8.0	7.4	1.0	0.9	91.67
41	Sakhi	108	108	100	0	0.0	0	0.0	51.0	47.2	18.0	16.7	36.11
42	Seram	78	78	100	2	2.6	0	0.0	46.0	59.0	21.0	26.9	14.10
43	Sirpa	32	32	100	0	0.0	0	0.0	12.0	37.5	3.0	9.4	53.13
44	Siuri	14	14	100	0	0.0	0	0.0	8.0	57.1	3.0	21.4	21.43
45	Talawang	108	108	100	0	0.0	0	0.0	0.0	0.0	0.0	0.0	100.00
46	Tewang	32	32	100	0	0.0	0	0.0	16.0	50.0	2.0	6.3	43.75
47	Thawang	56	56	100	0	0.0	0	0.0	28.0	50.0	4.0	7.1	42.86
48	Uwa	10	10	100	0	0.0	0	0.0	4.0	40.0	1.0	10.0	50.00
49	Wadachaur	38	32	84.21	6	15.8	0	12.0	22.0	57.9	12.0	31.6	10.53
50	Whama	33	33	100	0	0.0	0	0.0	0.0	0.0	0.0	0.0	100.00
51	Wot	108	108	100	0	0.0	0	0.0	51.0	47.2	32.0	29.6	23.15
Total		2371	2127	89.71	20 2	8.52	0	0.00	820	34.6	272	11.5	53.94

Source: WSSDO, 2007

The table reveals the fact that more than 85% of the toilets are of pit latrine type. 272 toilets are not in use among the 2371 observed toilets. Although the toilets percentage of the managed toilet is 53.94, it is observed that about 80% of the managed toilets are kept dirty.

CHAPTER 6: CONCLUSION AND RECOMMENDATION

6.1 Conclusion

While planning water supply schemes for hilly areas of Nepal, emphasis should be given to small gravity schemes or point source wherever possible and feasible. The ninth five-year plan targeted to cover 100% of the population to serve with good service level of water supply by the end of the plan period but the achievement was 71.6%. The Tenth plan has set a target to maintain drinking water supply coverage up to 85%. The main aim is to fulfill the service level criteria defined earlier but their flexible application is emphasized in some difficult situations in the district. If importance is given to the improvement of water supply service, the plan will be more practical.

The high hardship areas in low service level areas are to be given high priority and the development of new water supplies will be directed to these areas. Role of the communities should be designed in such a manner that the project should not be imposed upon the people; instead the implementation of water supplies should only take place when the benefiting communities request it and are ready to assume their part in the implementation and Operation & Maintenance. Prediction of the community attitude cannot be made exact and it is also not possible to precisely define which clusters/ wards of Village Development Committees to be covered in any given year. The plan, therefore, can only give indications of priorities of possible options and set financial and capacity frames for the development.

The coverage percentage of water supply will be gradually increased by completing the construction of ongoing schemes, re-habilitation of existing schemes and construction of new / planned piped water supply and point source development schemes. The coverage scenario is presented below.

The Eighth Five-year Plan (1992-1997) had made a significant headway by aiming to provide safe water to 72% of population and basic sanitary facilities to 25% of population by the end of plan. But this target could not be met. However the Government had again set target of providing water supply to 100 % meeting meet this objective by the end of ninth five year plan period, in which a mixed result was attained with a target achievement of only 72% in this regard. In the Tenth Five-year plan (2002-2007), Government of Nepal has planned to provide safe drinking water

to 85% of national population through mobilization of internal resources, donor assistance and by users' participation.

Implementation program will also focus on consolidation of water supply and sanitation programs through the completion of ongoing schemes and rehabilitation/ improvement of existing facilities/ schemes, as well as that area in need of repair, in order to provide a basic level of services.

6.2 Recommendations

The following procedure is suggested for the use of the plan in the preparation of annual implementation plan. The request from the communities are filed / collected in Department of Water Supply and Sewerage via Community Based water Supply and Sanitation Program.

Preliminary costing of the requested schemes and schedules will be made. Department of Water Supply and Sewerage puts the requests into the priority order using hardship and preliminary cost as indicator.

This list is then discussed in the District Water Supply and Sanitation Coordination Committee in the district. Commitment and preliminary financing plan is drawn up including Government of Nepal, donors and NGOs.

This estimated prioritized list of requested Village Development Committees programs with possible financing options are then forwarded to the District Development Committee for their consideration and approval.

The sanitation program should be carried out as an integral part of the water supply scheme because without improvement of sanitation situation is fairly difficult. Construction of demonstration latrines and sanitation education to some extent will be provided to the water users through pre-construction and post construction training during the construction of water supply schemes.

6.2.1 Water Supply Options

The estimated water demand in 2007 is 13443 m³/day. The projected water demand for 2012 is 14553 m³ / day. Therefore it can be assumed that the spring sources will be sufficient for the future demand. But in some VDCs it will not sufficient for the future demand. Therefore in this case, sources of other VDCs and stream sources can be used. However, water requirements for irrigation and industries are considerably higher than the domestic water use. Considering the industrial development in the Rolpa District the water demand can be assumed to increase further in future, but irrigational water demand may decrease due to urbanization and unavailability of agricultural land.

6.2.2 Source Option

There are numerous springs in the area, which are the most common source of water supply in the district. The advantages of spring sources are: Yield is normally more stable. The quality of spring water is normally good and they are easier to protect against pollution.

Springs are normally located in higher elevations and gravity flow to the supply area is feasible. Cost of intake construction is remarkably cheaper than that for others like stream intake.

Despite above-mentioned advantages, few disadvantages such as low yield and difficulty of collecting water from scattered seepage of a spring have to be compromised. Spring sources have concentration of calcium and magnesium which cause scaling of pipeline. Another widely used source for piped gravity system is stream source. Actually the accumulation of flows of many springs in its catchments area contributes to dry season flow. Stream sources generally have greater discharge and many options for the selection of the point of abstraction. But it also has the greater fluctuation in the flow and quality, which results in difficult control measures for contamination.

6.2.3 Technology Option

Many parts of the Rolpa District are enjoying piped gravity system with public taps as collection points. Increasing population needs to be catered with increased number of private and public taps. Gravity piped schemes will continue to be the main technology also in foreseeable future. With regard to the size of the scheme it has been found that small systems covering only one cluster are more reliable and sustainable than the larger schemes.

There is a great scope of protecting springs having low yield and it can be used as point source for water supplies. Pumping would be required where gravity systems are not possible due to the high elevation of the consumption areas. In present situation where the economic potential of the community to pay for high operation cost is low and problems of regular supplies of energy and spares exist, pumping scheme is recommended to be constructed only in very special circumstances.

In some limited cases, where a reasonable sized perennial river exists near by, hydro-rams can be used for fuel free pumping. Rainwater collection systems are recommended to consider on pilot basis in hill top areas.

Planning Horizon

The period of the 10th five-year plan (2002 to 2007) has a target to provide safe drinking water for 85% of total population by the end of plan year.

Consumers to be served

The plan mainly focuses on the human consumption covering domestic, institutional and commercial demand in rural areas of the district. Twenty percent of the water demand for domestic animal is made excluding industrial and irrigation demand. However, 10% of domestic water demand has been accounted for potential development of small-scale industries by the year 2007.

Service Levels

Tenth five year plan targets the water supply coverage of 85% with improved water supply service for increased number of people by the end of the plan period. According to present survey 75.6% of the population of Rolpa district is receiving normal service level from 609 schemes in which 97.37% are existing schemes and among the existing schemes 48% requires rehabilitation/reconstruction or major maintenance and 5.6% of the existing schemes are in such condition that they can not be further maintained and operated. This report plans to increase service level from present remaining population. Population enjoying acceptable conditions will not be taken into the investment program. Taps and Point sources are the main distribution outlets.

Water Quality

World Health Organization has set up guideline standards, which is a must to be met by the water supply scheme to the consumers. Treatment of water, however, is practically unfeasible in most of the schemes. So, the plan emphasizes on the selection of good quality source and its protection in order to secure good quality of water even without treatment. Thus, preference is more for spring sources to any other sources.

Technology

Due to the reason of easy Operation & Maintenance and being sustainable, gravity system or point source water supplies are given maximum preferences. Lack of cost and design data to develop a rainwater collection system makes difficult to plan a reliable project. Other important factors for deciding the appropriate technology are sauce-cultural aspects, home economy, willingness to pay and affordability. Based on the above factors and poor operational records of the large scheme, the plan recommends small systems. Larger systems should be broken into smaller sub-systems with independent tanks and distribution networks. The location of wells and in case of piped water supplies the boundaries of distribution network and location of taps and reservoir tanks should be decided with the consultation of the

consumers. The plan also recommends collection points with platforms large enough for washing, proper drainage systems and properly protected sources.

Environment Aspects

Before planning any project, a sound study of environmental studies has to be done. However, construction and use of small gravity systems is not expected to cause any major adverse environmental impacts. Activities like tree cutting and trench excavation, cleaning of the tank and intake sites, access roads etc. can cause erosion, if correct measures are not taken during the preparation and construction. It is necessary to educate consumers about watershed protection and drainage of the spilled water. To maintain the environmental standard, joint efforts from all concerned stakeholders are required.

Institutional Aspects

Standardization, better coordination and exchange of information are required in a better way than at present. Different implementing, financing agencies, the government donors, NGOs must agree over policies, responsibilities and implementation programs. Better co-ordination and planning for project execution would result in economical use of scarce resources and less overlapping.

Water supply should become an integral part of the overall district planning and should therefore be guided by District Development Committee and coordinated by Local Development Office. District Development Committee and CBWSSP will approve the annual development programs in water supply sector. The DWSS will act as the leading agency in the water supply sector in the district but will shift its emphasis from implementation and operation towards monitoring evaluating and facilitating. The formation of users committee is necessary to motivate the active role of the communities in the planning and implementing of water supply system. It also makes the consumers to assume full responsibility for operation and maintenance of the schemes.

Priority Criteria

The formation of water users committee has become a prerequisite before the implementation of drinking water project. But this arrangement is assuming rhetoric and ritual form. In absence of an effective mechanism to mobilize the Water User's Committees in overall management and decision-making process, sometimes these institutions have become redundant. The general approach of the plan of the water supply development requires the consultation with the benefiting community and its full consent and participation

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Annex

Questionnaire

फाराम - ४ गा.वि.स.को चर्पी सम्बन्धी जानकारी

प्रत्येक वडामा रहेका व्यवस्थित चर्पीको संख्या फारामको (क) खण्डमा लिईन्छ भने (ख) दण्डमा ती मध्ये छनौट गरिएका चर्पीहरू गरिन्छ ।

१) कुनै वडामा रहेका जम्मा चर्पीको संख्या १२ वा कम भए सम्पूर्ण चर्पी अवलोकन गर्ने ।

२) वडाका जम्मा चर्पी संख्या १२ भन्दा धेरै तर जम्मा चर्पी संख्याको १० प्रतिशतले हुन आउने संख्या १२ वा कम भए, क

३) प्रत्येक वडामा रहेका चर्पी संख्याको १० प्रतिशतले हुन आउने संख्या १२ भन्दा बढी भए उक्त १० प्रतिशतले हुन आउने सूचीबाट क्रमबद्ध ढाँचामा ९ वौँ घर छाडी अवलोकनको लागि छाने

नोट :- (१) एक गा.वि.स.को लागि एक पाना प्रयोग गर्ने ।

(२) यस गा.वि.स. प्रोफाईलमा चाहिने जानकारीहरू स्थलगत भ्रमणको बेला सङ्कलन गर्न अनुसू

(३) फोहर चर्पी भन्नाले दिसा देखिने वा भिँगा भन्केको वा गनाउने चर्पीलाई लिनु पर्छ ।

(४) फाराममा समावेश गरिएको क्र.सं ख२-१ देखि ख २-३ सम्मका चर्पी प्रणालीको किसिम बारे जा

जिल्ला :-

		वडा नं. १
(क)	व्यवस्थित चर्पी भएका घरधुरी संख्या	
(ख)	प्रत्येक वडाका चर्पी अवलोकन विवरण	
(ख १)	अवलोकन गरेको चर्पी संख्या	
(ख २)	अवलोकन गरेको चर्पीको प्रकार	
(ख २-१)	खाल्टे चर्पी	
(ख २-२)	“वाटर सिल” भएको चर्पी संख्या	
(ख २-३)	अन्य चर्पी संख्या	
(ख ३)	फोहर चर्पी संख्या	
(ख ४)	प्रयोग नभएको चर्पी संख्या	
(ख ५)	व्यवस्थित नदेखिएको चर्पी संख्या	

(ख ६)	पक्का चर्पी-घर भएको संख्या	
(ख ७)	कच्चा चर्पी घर भएको संख्या	
(ख ८)	कैफियत	
(ग)	वडाको जम्मा वर्तमान जम्मा घरधुरी संख्या	

ख २-१ देखि ख २-३ सम्मको जम्मा संख्या ख१ को संख्या बराबर हुनु पर्छ ।