CHAPTER I

INTRODUCTION

1.1 Background of the Study

Nepal is landlocked mountainous country situated in the middle belt of the mighty Himalayan range. The country is rectangular in shape and is enclosed between 26 22' N to 30 27' N latitudes and 80 4' E to 88 12' E longitudes. The east-west average length is 885km and north south average width is 193kms. The total area is around 147181sq km with a population of about 23.6 millions.

Nepal is an agrarian country where 81 percent of its total economically active population is engaged in agriculture (Bjracharya, 1994). Agriculture is the source of livelihood of Nepalese people. Agriculture contributes more than 40 percent of total gross domestic production and gives employment to large percentage of the population (Pant and Joshi, 2060). The bulk of the national income is generated from agricultural sector. The agricultural production account near about 70 percent of the total exported value of the country.

Nepal has uneven distribution of land and population. The hill and mountainous together account for 41.6 percent of total population of Nepal supported by 27.4 percent of cultivated by only 48.4 percent of the total population (Shrestha, 2001). So Agriculture can be considered as the backbone of Nepal in its all around development. Agriculture development is integral of the socioeconomically development.

The total cultivated land of country is 18 percent, where rice, maze, wheat wheat, jute, tobacco, sugarcane, millet, oilseeds are the main crops (Agnipath Weekly, 2055) and 33 percent of Nepal could be potentially cultivated of irrigation and soil fertility management facilities were available (Karan & Ishi, 1997). The main crops are mainly produced in summer season when rainfall is generally adequate. Most of the rainfall is concerned with in a few

month of the year. About 80 percent of the total annual rainfall occurs within the period from June to September (Regmi, 1978). So, the crop production can't give amount of profit without irrigation facility.

Irrigation project plays vital role in agriculture for the food grain, vegetable and fruits production. The surface irrigation is the main system in various parts of the country. By tradition methods of irrigation are Pynes, terraces, well and canal irrigation in Nepal (Shrestha, 1986).

Now a days in the hills and valleys various project have been implement for the development of canal irrigation in the Nepalese context. For the better economic improvement towards hill irrigation, it is necessary to give high priority to implementing small scale irrigation projects in economic planning because such type of project are favorable in small plots. Such project in hill and valley region will lesson dependency in the Terai for more food grain for the hill.

The yields of particularly all crops are increased by a rational and specific application of water. The quantity of water to give best result for the certain crop in a specific area can be determined experimentally. Any quantity less than or in excess of optimum gives smaller yields (Singh 1975).

When the permanent and regular supply of water is assured the superior crops naturally takes place of inferior crops resulting in increased value. Thus introduction of irrigation, wheat, replaces, barely, sugarcane, transplanted rice and vegetable can be introduced and rain cropping eliminates or at least reduced.

Nepal has 2641752 hectors agricultural land out of the total area, where only 66.8 percent (1765840 hectors) land is possible for the irrigation. However, there are 1168144 hectors land is irrigated end of the 10^{th} plan.

In the Western Development Region (WDR) of Nepal many hill irrigation projects have completed many canals. In the Western Development Region of

Nepal, total lands have occupied 2939800 hectors and 420976 hectors for the agriculture purpose. But, only 190924 hectors land are irrigated in this development region. Whoever, Kaski district has occupied 201700 hectors land. But it's covered 11969 hectors irrigated land by many irrigation projects such as Fewa Tal irrigation project, Bijayapur irrigation project, Seti irrigation project, Begnas irrigation project, Chapachour irrigation project, Phalebas irrigation project, Chapakot Tar irrigation etc. are prominent.

Lekhnath Municipality is located South eastern part of the Pokhara Valley. It has covered 7893 hectors land of the district. The cultivated land of the valley has 1980 hectors where paddy, maize, wheat, oilseeds, vegetable are the main crops. There are five irrigation projects in the Municipality flat area. Begnas irrigation project, Bijayapur irrigation project, Sisuwa irrigation project, Kimbesi irrigation project and Guduwa irrigation project have occupied 1980 hectors land. Begnas irrigation project covered 580 hectors land out of the total irrigated land of the municipality. Agricultural production can be insured by irrigation land during the time of drought.

Lekhnath Municipality has 58816 population with 14937 household. About 1658 household and 6192 population live in the Begnas irrigation catchments area (population monograph, 2068). The cause of population growth is an economic status that is heavily based on agriculture sector and it can be improved by developing agriculture system. By the development of irrigation facilities particular community, society or locality can uplift through agricultural development.

1.2 Statement of the Problem

Nepal is an agricultural country depending on the uneven and uncertain monsoon rain. It is said that Nepalese agriculture is the gamble of monsoon (Mathema, 1969). Water is essential for plain growth. But the monsoon in Nepal is irregular and uncertain and varies from year to year and place to place. Due to the uncertainty of monsoon sometime heavy flood destroys all

of crops and human life. Sometimes great famine occurs and directly affects the un-irrigated land. Therefore, the irrigation is most essential thing to solve these problems to increase the agricultural production and productivity on dry land. So people mobilization is key in command area by which the irrigation project running smoothly.

Nepal is second richest country for water resources in the world (ICIMOD, 1992). But the crop production almost entirely depends on monsoon. The economic conditions of the Nepalese farmers are miserable. Lack of capital, skill manpower, rugged topography, transportation problems are responsible for the development of irrigation project. So people mobilization is key factor to responsible for the beneficial irrigation to people.

Recent years the government of Nepal has been lunching various large and small scale irrigation projects in different parts of the country. Begnas irrigation project also is one of them. People established various kind of management & mobilization system across Nepal.

Lekhnath Municipality has five irrigation projects with 1980 hectors land irrigated on the valley floor. There is about 53 percent population that cannot fulfill their requirement of food. Municipality has 33.86 percent poor population and Begnas irrigation project command area constitutes about 10 percent poor population. This project has 580 hectors land irrigated. This command area has 1658 household with 6192 population. But the mobilization process in Begnas irrigation project till today. People mobilization process in a project increase the capacity & capability of irrigation system.

Farms are taking benefit from it. What are the change brought the expansion of irrigation facilities?

How many people have experienced higher standard of living? Are pertinent question to be answered?

This study attempts to answer the following research questions:

- Organization pattern on Begnas Irrigation Project.
- The people mobilization process through users group in Begnas Irrigation Project.
- The dispute management, classification of duty and techniques of sustainability of the Irrigation Project.

1.3 Objectives of the Study

The general objectives of the study is to assess the impact of Begnas irrigation project on its command area. The specific objectives of the study area as follows:

- To analyze the people mobilization system of Bengas irrigation project.
- Intervening process to people mobilization pattern on Begnas irrigation project.

1.4 Significance of the Study

Begnas Irrigation Project is the medium scale project of Nepal. This project has not tried to study anyone. So this study will be helpful for any scholar, who is interested to know about the impact of this project on people and society. It is expected to explorer the problems related to people mobilization & their thinking process will be helpful for the management of the project in order to meet the desired objectives and goals. This study is highly important for formulating and implementing plans and projects pertaining to mobilization which to accelerated grow of agricultural production.

1.5 Organization of the Study

This dissertation consist of seven chapters, each with sub-topics. The first chapter is introductory party of the study. The second chapter is devoted to literature and conceptual framework. This third chapter deals with research

methodology of the present study. The fourth chapter includes socio-economic condition of study area. Fifth chapter includes mobilization process in Begnas Irrigation Project. Sixth chapter includes water allocation and distribution method and condition of the study area. The seventh chapter includes summary, conclusion and recommendation for the study.

CHAPTER II

LITERATURE REVIEW

2.1 Concept Overview of the Study

Review of completed research are one of the most important component of research because researcher should gain out the experiences of other proper survey of the literature will help the research to gain insights on particular research problem in a much more specifies. This research based on theoretical notion of people mobilization inspired by Elinor Ostrom's (1933-2012) theoretical analysis of irrigation project, mobilization and sustainability through people's participation. Elinor Ostrom's theoretical notion of sustainability of irrigation project based at eight design principles.

Clearly defined boundaries

The boundary area of Begnas Irrigation Project is 580 hectors where all the people can use the water from canal directly or indirectly. People on this area are uses for the study.

Proportional equivalence between benefits and cost

In the study area the Begnas Irrigation Project structure constructed by Nepal government in the association of Chinese government there after benefits and cost bear by the user.

Collective choice arrangements

According to Elinor Osterm the decision making process in the based on the favor of local people that decision must banded by law and order of the users group association.

Monitoring

The monitoring is one of the important aspect of the irrigation projects success guarantee the monitoring process also plays the vital role for effectiveness of irrigation system.

Gradated sanction

Users who violate operational rule and regulation likely to receive gradated sanction (dependent on the seriousness and the on tent us the office) from the users management committee.

Conflict resolution mechanism

Users and their officials can have conflict which they can manage them self as well as they can maintain the water allocation and distribution properly.

Minimal recognition of rights to organization

The decisions right of users to device their institution not challenged by external or government and any other agency.

Nested Enterprises

Appropriate provision, monitoring enforcement, conflict resolution and governance activities are organized on multiple layers of rested enterprise in which the upper part of project I can have greater access to water and lesser to downward part this problem can be manage by organizational management.

2.2 Theoretical Overview of People Mobilization Process

Agriculture is the oldest occupation of the world. The historical background of this occupation may be traced back as old as the human civilization (Upreti, 1980). It is supposed that the irrigation & agriculture may have developed simultaneously probably irrigation started when prehistoric man planted crops in low land area. Mediterranean Agriculture has long tradition after four million at proto agriculture experimentation, agriculture emerged in

the eastern Mediterranean basis seventy five hundred years ago (Bufzer et.al., 1985). The Egyptians used water from the Nile to irrigate adjacent field as early as 5000 B.C. Historical records show that kind Menes (who live around 3100 BC) had a large masonry dam build to control the Nile river and provided water for irrigation (Encyclopedia, 1973). Baby lonian records that irrigation works were in use before the reveal that irrigation works were in use before the time of king Hammurabi about 2200 B.C. (Encyclopedia, 1975). The practices of irrigation spread to China form region used the water of the river of irrigation. The history of irrigation in Nepal at least Kathmandu Valley is as old as its adjacent land (Mallick, 1981/82). Mallick adds that rice was cultivated in Nepal since the Vedic period which provides that Nepal has a long history of irrigation practices.

Water is normally supplied to the plants by nature through the agency of rain precipitation, which included natural supply of water and artificial supply of water in a cultivated land. This process is known as irrigation. Irrigation as the natural or artificial application of water to soil, to propose of supplying moisture essential or beneficial to plant growth are essential (Singh, 1975:1). An artificial device for the supply of water to the cultivated land is irrigation. Therefore irrigation is mainly a device to supply the necessary amount of water required to the plants of cultivated land.

The sources of irrigation are classified as canals tube-well, boreholds and pumping sets, tank, pound and natural flow or combination of two or more of specific sources (CBS, 1989). The process of utilization of water involves the construction of engineering. Works of appreciable magnitude it would be called artificial irrigation (Singh, 1979). There are three irrigation methods which are as follows:

a) Surface irrigation

b) Sprinkler irrigation

c) Sub-surface or sub-irrigation

Irrigation and people mobilization in Nepal

It is difficult to say the actual date irritation in Nepal. The farmers were irrigating their land by the taping stream water since long, lifting water by human efforts was prevented in the hills. From the recorded history in the medieval period during of Malla dynasty, irrigation canals (Rajkulo) were constructed by the Government to irrigate the different kingdoms inside the Kathmandu valley. Later on during Shah dynasty irrigation canal appears to be constructed in the Gurkha region of Nepal (Bhimsen Kulo). During Rana Period, farmers started building their own canals in the Terai plains of Nepal. The 16 and 36 villages of Rupandehi are classical examples. Likewise cannals are found in Babai Karnali rivers, built by local people. Engineering construction of Sarada canal started possibly between 1920 and 22; likewise the Trijuga canal was constructed in 1928. Catuv on Government involvement started in the construction of irrigation canal. Juddha canal of Bara is another example. Department systematic irrigation development started after 1950 (Sharma, 1997).

Master plan for irrigation development in Nepal 1900 has attempted to provide comprehensive information in this regard. The important Government developed projects before 1951 revolution were mostly in the Terai of which 10000 ha. Chandra canal (1928) is best known and serving till today. After fifties construction of medium size Terai irrigation project (Kankai, Manusmara, Sirsa-Dudhaura, and Tilawe etc) was carried out. The 1954 Koshi agriculture with India led to the construction of Sunsari Morang (66000 ha), while the 1959 Gandaki agreement to Narayani (389000 ha.) and west Gandaki, command area development in these large projects was initiated in sixth and seventh plant periods and is still continuing presently 100 Government developed surface irrigation summers in Terai (Sharma 1997).

In the history of modern surface irrigation, Few Tal irrigation project and Bijayapur Irrigation project are the first in Pokhara and its periphery. These project were completed during the first five year plan.

Bijaypur Begnas Irrigation Projects (II), Hyangja Irrigation Projects etc. are other irrigation projects in Kaski.

Dedkali was popular lifting in Terai. Some small plots of Terai were traditionally irrigated by the terrace to terrace baris in rotation in the hills. Bhimsen Kulo and Rajkulo in the Kathmandu are example of ancient irrigation system (Sharma, 1992) in Nepal. Many irrigation projects were built under the Rana period.

An indigenous type of canal was built in Pokhara Miruwa in the early period of Rana rule, now it is out of operation and reduced to ruins which exist even today.

Before the implementation of the periodic development plant in 1956 only three canals viz Chandra canal (in 1946) (Shrestha, 1981) were constructed under Rana Regime, several irrigation project were constructed since 7^{th} plan and since 10^{th} plan have been constructed many large irrigation project in Nepal. Now a day in the hills of Nepal, various irrigation projects have been introduced for the development of canal irrigation.

In Western Development region various typed of hill irrigation project, Bijayapur irrigation project, Begnas irrigation project, Hemja irrigation project, Gaduwa irrigation project, Seti irrigation project (Kaski), Handetar irrigation project, Bhoreletar irrigation project, Sardikhola irrigation project, Rampur plant irrigation projects etc. are the important hill irrigation projects in this region. Of these projects, the impact study of Begnas irrigation project is going to be done in this work.

2.3 Review of Previous Study

The massive literature in the field of agriculture shows the academic richness of this sector. Various institutions, research schools, sociologists, economist, geographers have undertaken several research workers, conversing the impact of irrigation in Nepal.

Some irrigation impact-evolution study has been carried out by Agriculture Project Research Center (APROSC).

Among them the impact irrigation studies of Gajun irrigation project (1978), Khageri irrigation, Mahakali irrigation project (1979) etc. constitute valuable literature in this field. In the report of Khageri irrigation project, it has printed out that diversified occupation depends up on agriculture where 73 percent of land is irrigated. More formers have adopted improved variety of paddy and maize. Employment is higher in irrigated area where there is higher production, income expenditure and saving. Irrigation has help for 69.66 percent income in output per Bigha land. Report has concluded that Khageri Canal is very poor due to the serious staying problems (APROSC, 1978). APROSE has analyzed Dedgauntar irrigation project, small farmer have got the highest percentage of irrigation land (61 percent) highest impact of irrigation is on the small farmers. There is an increase 11.21 percent in employment per Ropani and farm income is higher in the project in two time times.

Lamsal (1989) carried out impact of the "Vijayapur, Begnas irrigation project" who has pointed out that a large number of farmers are benefited by irrigation facility. Production of rice, wheat & vegetables has increased production tremendously soon after the completion of Canal irrigation many people irrigated there resulting in the emergence of settlement.

Pangeni (1987) has studied on the topic of impact of Chitwan irrigation project at Chitwan district. According to his conclusion production of crops & its area has increased after the irrigation project cropping pattern has been slightly changed due to irrigation facilities. So this project has bought great reforms in the agriculture sector in Narrayanpur VDC of Chitwan.

Gautam (2000) has studied an economic impact of Babai irrigation project at Bardiya district. According to his conclusion Paddy production has increased by 80 percent and the cropping intensities change 1.4 times to 1.7 times in the

study area. Food grain & winter vegetable crops production are increased in this area.

Bastola (2050) studied on "The economic impact of irrigation in Rampur Palpa". He concludes that by the irrigation facility there has been improvement in agricultural system. The production of crops & productivity of land has been increased and cropping pattern was also changed after irrigation facility in the study area.

Parajuli (19914) has studies "The Impact Study of Pokhara Irrigation Project", he concludes that the cropping pattern has also been changing. People have adopted intensive agriculture and multiple cropping systems. Farmers are more oriented towards cash crops (especially vegetable farming) after complete the irrigation project and scale of production was also increased.

Vidya (1968) has reported that the irrigation is very important factors. He also stated that the relationship between irrigation and crops production has been positive and also stated the irrigation cannot be developed due to lack of skill manpower and modern technology, modern equipment and lack of capital.

James (1968) has studied in the Yunan state about the "Irrigation management". He concluded the water is avoided to monoculture at any given time of the year. There were usually tree crops grown over the courses of the year. The introduction of irrigation has brought changes in cropping system.

Pokherel (1981) has found holding of land is still quite concentrated on a few hands. The cropping intensity of small farmers is higher than that of the big farmers. Access to irrigation facilities to big farmers is higher than of small farmers. The per hectare ratio is smaller farmers but big farmers are leading in the local committee in all sector.

Pandy (1998) has studied about the "Impact of irrigation of Rural Development". He found that small size landholding families are more in

the irrigated areas then in the non-irrigated areas. In irrigated are, for example 71.44 percent people are affected by irrigation. They grow two crops with the advent of irrigation scheme.

In words of Panta and Jain (1997) the absence of proper irrigation facilities the farmers themselves have evolved and agricultural pattern to suit the monsoon period. However in a predominantly agricultural economy such as Nepal, effective development of irrigation is a pre-requisite for increased agricultural production. Extension of irrigation can bring about in general a substantial increase in agricultural production in the country and can serve as means for the diversification and intensification of agricultural production.

From the research studies reviewed are about the people mobilization as well as the effect of economic and social variables. Specially the pattern of change before and after the irrigation.

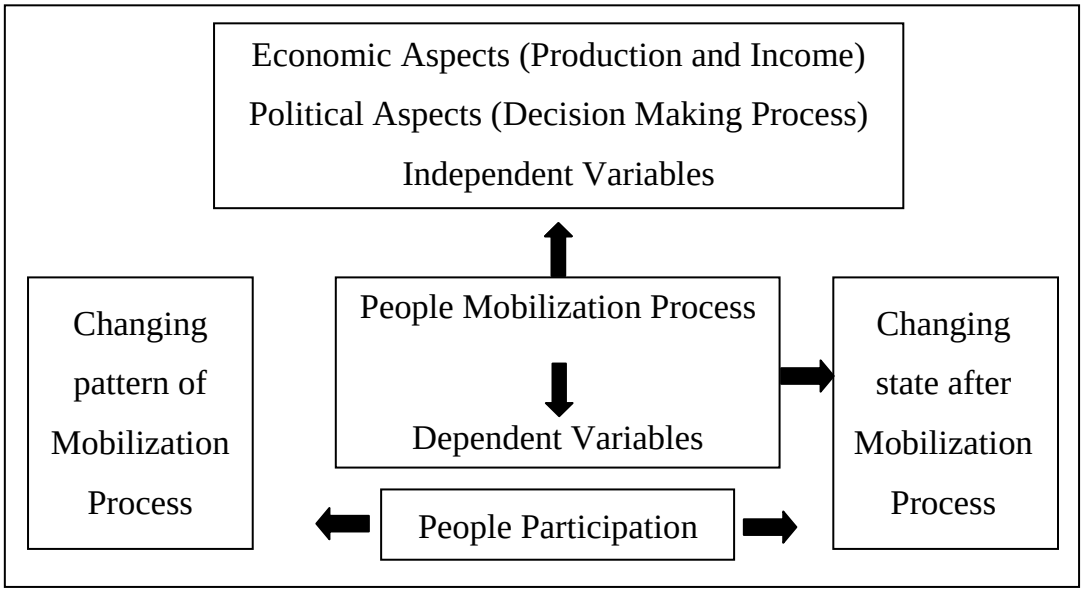
But the past research have no particular method of people mobilization as from which people use and mobilize their potential to manage and water allocation pattern of their of own.

So this research will reveal the mobilization through the actual people participation as well as the conflict and distribution management through uses group and their activities as well as awareness and fore sight about irrigation project.

2.4 Conceptual Framework

The relevant literature researcher may clearly state the new technology, modern inputs, irrigation facility, high yielding varieties play a vital role in the increment of crop production. The increase in the crop production has improved to some increase in saving. So, it brings change in the socio-economic status of farmers. It ultimately uplifts their livelihood. Based on the relevant literature conceptual framework has been developed.

Figure 2.1: Conceptual Framework of Study



The figure shows that irrigation facility is the independent variables because irrigation increases productivity. The crop production increment is the dependent variable because the growth of crop production is largely influenced by the irrigation facility. Lastly, the outcome of large amount of crop production has improved the socio-economic status of the farmers. In this study, researcher has selected only one variable via irrigation.

CHAPTER III

METHODOLOGY

3.1 Rationale of the Selection of the Study Area

Lekhnath Municipality is located in the south eastern part of the Pokhara valley Approximately, it lies within geographical limit of 28^{o} 05' N latitude & 84^{o} 02' E E to 84^{o}; 08; E longitude. The elevation range is from 677 meters above the sea level (masl). It is surrounded by different VDC & Pokhara sub-metropolitan city (Lammichhane, 2000).

Lekhnath Municipality has 5 irrigation projects Begnas irrigation project, Bijayapur irrigation project, Gaduwa project. Lekhnath municipality has covered 7893 hectors, where 67.2 percent or 5305.57 hectors land have occupied by the agriculture and grazing land. The total irrigation land have occupied 1980 hectors, where Begnas irrigation project has covered 580 hectors land which lies in ward no. 11, 12, 14 Khudi Phat and Satmuhane There are 5001 population and 1015 households Municipality valley bottom covers 60.28 percent or 4758 hectors land which are extended up to the narrow stream courses as well as lakeside (IUCN, 1998:20).

3.2 Research Design

The present study is mainly related with the impact study of irrigation. Hence the research is descriptive type. The design is implied the scenario of the study area. The change of crop production, socio-economic impact and crapping pattern etc. are studied as different variable. However, general hypothesis is also formulated.

The scenario of the study area. The change of crop production, socio-economic impact and cropping pattern etc. are studied as different variables. However, general hypothesis is also formulated.

3.3 Nature and Sources of Data

The study includes both the primary as well as secondary data. Mainly this study focused on qualitative nature of data but to some extent qualitative data also used in the study. Primary data was collected from the respondents with the help of interview schedule/questionnaire; secondary data were collected from irrigation department government and its other institutions like Begnas Irrigation Group Office different journal and news papers, internet, books as well as different published and unpublished sources.

3.4 Sampling

There are 1658 households in the study area. However, the present study has selected 312 household in the study area based on sampling due to the irrigation at time and resources of the researcher. Questionnaires were used by the random sampling and in the randomly start producers. For this, 312 households have been taken out of total 1658 household.

Table 3.1: Ward Wise Sample

Ward No.	Total Household	Sampled Household
11	548	103
12	472	97
14	638	112
Total	1658	312

Source: Field survey 2013

3.5 Tools and Techniques of Data Collection

The present research is mainly based on primary data. The primary data has been collected through the farmers as respondents by using different methods/techniques of data collection tools such as interview schedules, observation, specific questionnaires and group discussion. (annex B) Besides primary data, secondary data were collected from NGO, Irrigation offices, municipality office and from library sources.

(I) Interview Schedule

A relevant questionnaires has been designed for interview. It has filled in the field by visiting door to door in the study area. Generally interviews has been conducted with the head of the family. The questionnaire also has been pre-tested.

A set of presented questionnaire schedule was used to collect the information at the household level for the collection of primary data 18.81% Percent of sampled household heads are interviewed for information. Researcher himself involves in interview at the door to door of the respondents and direct face to face interview was conducted to acquire real and detailed information necessary for the study. Such information's are about participation effects, benefit sharing and water distribution and ways of maintenance of this irrigation project. Questionnaire schedule is semi-structured and includes both open ended and close ended questions and since researcher himself involved in data collection process possible observation also are applied to perceive the actual situation and the real information.

(II) Observation

The researcher was observed by himself in the study area. The actual condition of respondents, water distribution system, cropping system harvesting was observed in the study area.

(III) Group Discussion

The researcher was conducted by himself from the farmer groups discussion. In this period the water users group member involved in this process. Five or six members were involved in the group discussion and farmers had presented their opinion about the water distribution. Crop

production system and changing their living standard was found. Daily experiences of farmer about the mobilization process shared by people.

3.6 Methods of Data Analysis

The collected data have been tabulated to meet the specific objectives. Both primary and secondary sources were analyses by using descriptive statistics such as average percentage and some indices. Data are represented in term of tables and diagrams to support the explanation.

The study will mostly descriptive type. The exploratory research design will useful to explore the different aspects of the problem under study and descriptive design will be implied to the description of crops production scenario for the study area crop production condition and economic impact will be studied as different variables.

CHAPTER IV

SOCIO-ECONOMIC CONDITION OF THE STUDY AREA

4.1 Population Structure

The total sampled population of the study area is 1540 out of which male is 50.6 Percent and female is 49.4 Percent. There is high production of dependent population. Children and aged together constitute 35.7 Percent of the total population. The production of male is higher than female among 0-14 years and above 60 years of age group. This indicates that the female child birth rate is higher and the longevity of female higher than female.

Table 4.1: Economically Active and Dependent Population

Age group	Male		Female		Total	
	No. of Population	Percent	No. of Population	Percent	No. of Population	Percent
Below 14 years	251	27.82	219	28	470	30.12
15-49	450	64.6	474	64.47	924	59.23
60+above	78	7.58	68	7.53	146	9.35
Total	779	100	761	100		100

Sources: Field survey, 2013

Fig. 4.1: Economically Active and Dependent Population

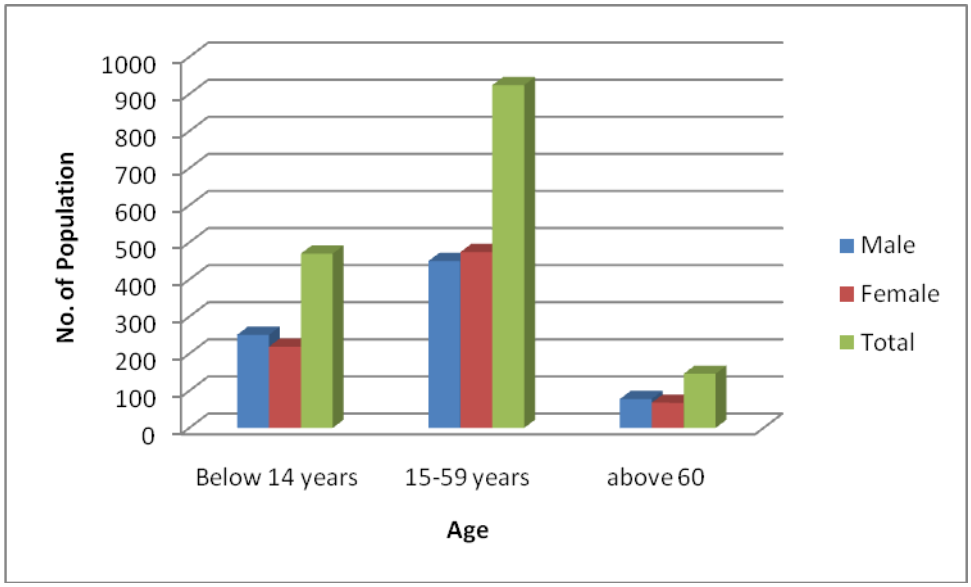


Table 4.1 shows the economically active and dependent population of the study area. The age group of economically active people is generally considered to be 15 - 59 years but in the context of Nepal, it is 10-59 years.

The percentage of working population is 64.5 Percent and other 35.5 Percent people are dependent.

Above table shows that there is a decreasing percentage of population in succeeding higher percentage and adult over than 60 years is lower percentage.

4.2 Ethnic Composition

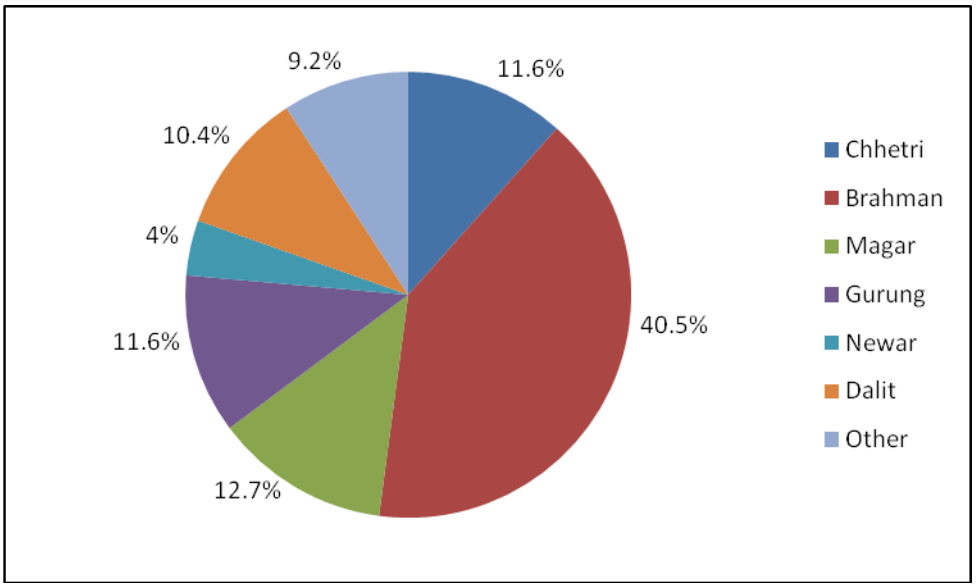
The society of the study area has been heterogeneous. There are many ethnic groups. The following table reveals that Brahman is the dominant caste with 40.5 Percent share lower caste group (Dalit) 10.4 Percent, Chhetri 11.6 Percent, Gurung 11.6 Percent, Newars 4.0 Percent and other different castes are accounts 9.2 Percent of the total households (table 2).

Table 4.2: Ethnic Composition

Caste Group	House hold number	Percent	No. of Population	Percent
Chhetri	36	11.6	182	11.6
Brahman	127	40.5	628	40.9
Magar	40	12.7	197	12.8
Gurung	36	11.6	180	11.7
Newar	12	4.0	57	3.7
Dalit	32	10.4	156	10.1
Other	29	9.2	140	9.1
Total	312	100	1540	100

Sources: Field survey, 2013

Fig. 4.2: Ethnic Composition



4.3 Literacy and Education

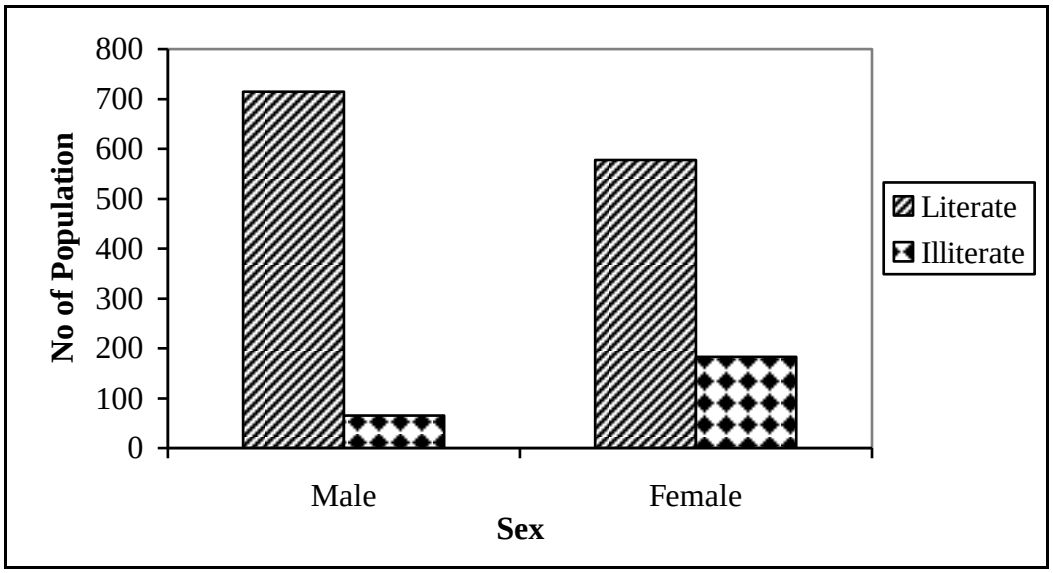
In the study area literacy rate is 84 Percent illiterate population rate is 16 Percent. Among them 91.7 Percent males are literate and 8.3 Percent are illiterate in the total male population. Female literate population is 76 Percent and 24 Percent female population is illiterate.

Table 4.3: Literacy Composition by Sex

	Male	Percent	Female	Percent	Total	Percent
Literate	714	91.7	578	76.0	1292	84
Illiterate	65	8.3	183	24.0	248	16
Total	779	100	761	100	1540	100

Sources: Field survey, 2013

Fig. 4.3: Literacy Composition by Sex



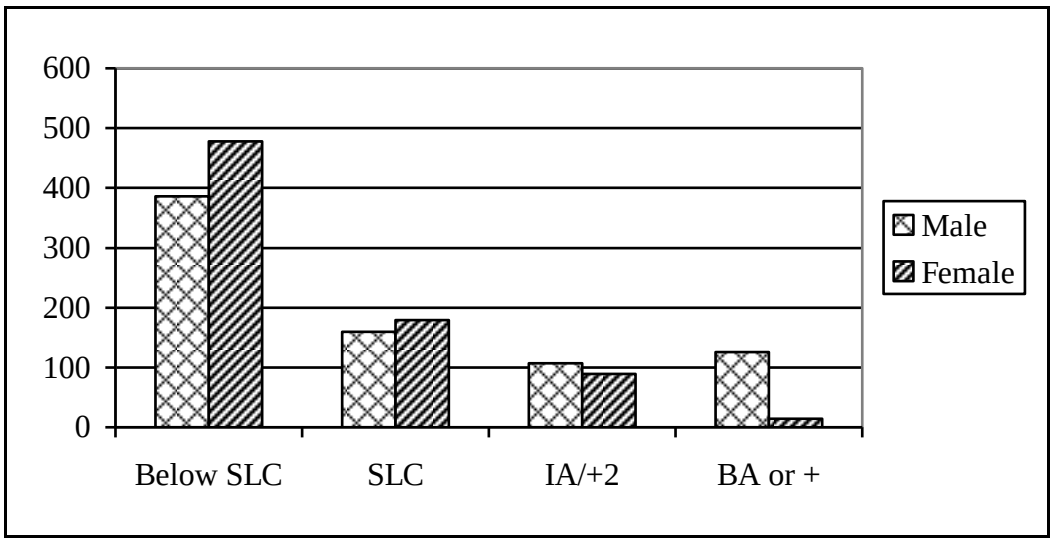
From the table 4.3 we know that female literacy rate is lower than male literacy rate. It indicates that females are dominated in terms of education.

Table 4.4: Educational Status of Literate Population

	Male	Percent	Female	Percent	Total	Percent
Below SLC	386	50.5	478	49.5	864	55.35
SLC	160	53.2	179	46.84	339	21.9
IA/+2	107	60.2	89	39.8	196	12.86
BA or +	126	90	14	8.4	140	9.89
Total	779		761		1540	

Sources: Field survey, 2013

Fig. 4.4: Educational Status of Literate Population



There is much variation among males and females below SLC level. In the higher education there is lower number of female population than male. Only 12.86 Percent people were able to educate above Inter or +2 level. Out of total population 9.89 Percent people were B.A. or above off than only 8.4 Percent were female and 91.6 Percent were male.

4.4 Occupational Structure

The command area of Begnas irrigation project 92.5 Percent of the total population is engaged in agriculture. Only 7.5 Percent people are employed is non agricultural activities, such as business service and others respectively.

Table 4.5: Occupational Structure (above 14 years)

Occupation	No of household	Percent
Agriculture	288	92.5
Business	17	5.2
Service	6	1.7
Other	1	0.6
Total	312	100

Sources: Field survey, 2013

Fig. 4.5: Occupational Structure (above 14 years)

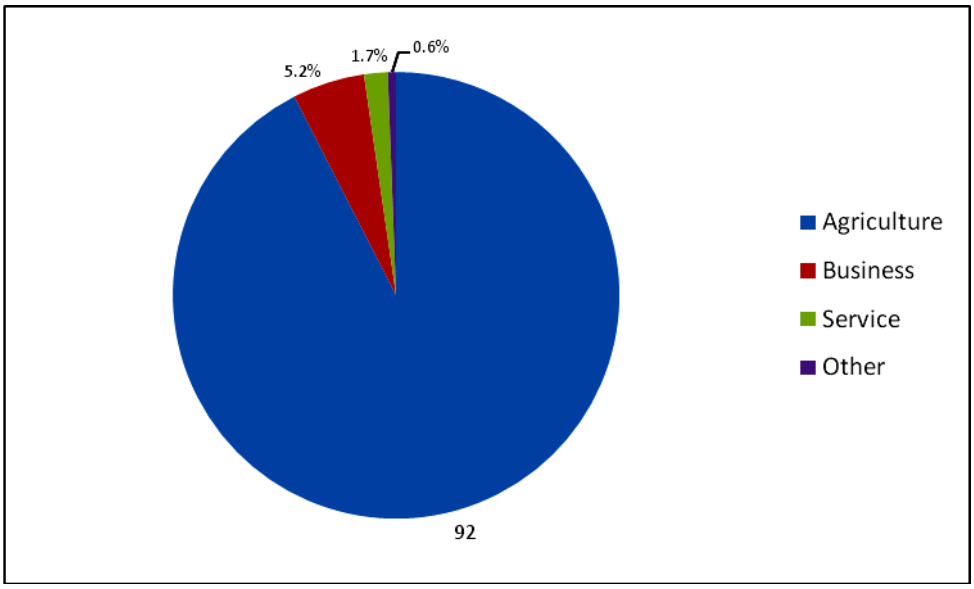


Table 4.5 shows that highest proportion of population is involved in agricultural activities. Business and service come under the second position with 5.2 Percent. Other different occupation accounts for 2.30 Percent.

4.5 Birth Place and Migration

In the study area 52.0 Percent of people are migrated from other places due to the various reasons. Other 47.41 Percent people are aboriginal in this area.

Table 4.6: Birth Place and Migration of the People

Birth place	Frequency/household	Percent
Local	148	47.4
Migrants	164	52.6
Total	312	100

Sources: Field survey, 2013

Fig. 4.6: Birth Place and Migration of the People

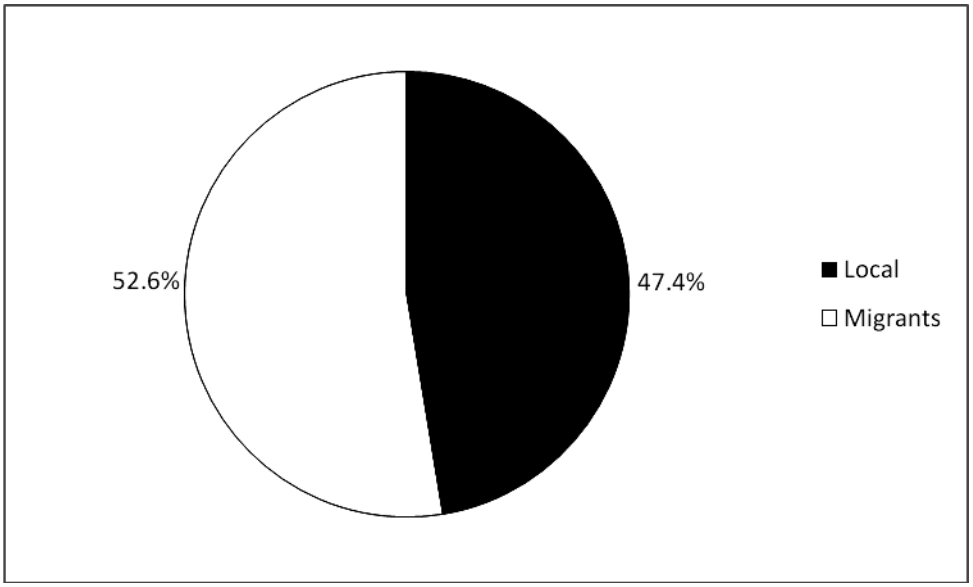


Table 4.7 reveals that 47.4 Percent people are aboriginal and other 52.6 Percent migrated from other surrounding VDCs and other districts to this area. People have migrated in this place due to different causes.

4.6 Causes of Migration

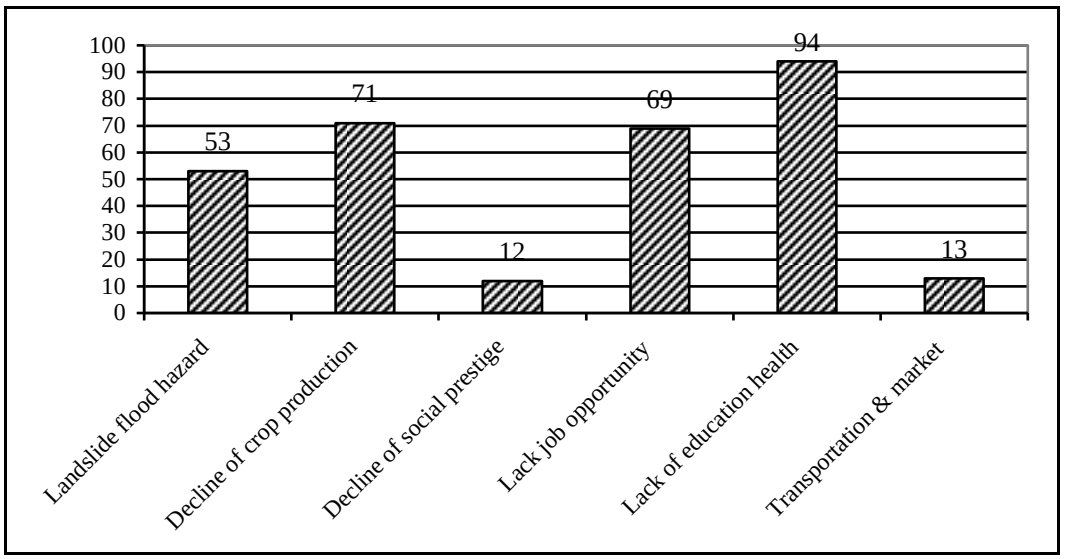
On the basis of birth place larger number of respondent of this study area are born local people 47.4 percent and 52.6 percent people are migrated from other places for various regions. There are many causes of migration from other places in the study area (table: 4.7)

Table 4.7: Causes of Migration

Causes	No. of household migrants	Percent
Landslide flood hazard	53	17.0
Decline of crop production	71	23.0
Decline of social prestige	12	4.0
Lack job opportunity	69	22.0
Lack of education health	94	30.0
Transportation & market	13	5.0
Total	312	100

Sources: Field survey, 2013

Fig. 4.7: Causes of Migration



From the table 4.7 we know that 30 Percent people migrated due to the lack of education. Health transportation and market facility in the birth place. Other 27 Percent People migrated in search of job opportunity in the new place and many surrounding VDCs.

CHAPTER V

MOBILIZATION PROCESS IN BEGNAS IRRIGATIOIN PROJECT

5.1 Theoretical Notion of People Mobilization Process in Irrigation

People mobilization is a process in which a group of people efforts to achieve a common goal which may be more beneficial & fruitful to the society & users group. People mobilization is management as different aspects of the users group towards the success of project & objectives of a project. Which are closely associated with physical structure resources flows.

Users group is formulated intending to cope with vital resources as it is boyar the capability of a single individual. And it is embodiment with certain of the society. Hence it patterns some social behavior like norms, customs, convention etiquette etc. in the society.

The formation of a users group depends upon natural setting, population materials and non-material culture and environment, similarly the procedure farming organization depends on its type goals and nature, for instance forming the political organization elite may be considered as the most valuable estate. While a case of irrigation local farmers (the grass root people of the locality) are the more valuable estate of the organization.

Irrigation has to be treated as hydrological, engineering, agricultural, economical organizational and institutional entity. The human side of both the organization and operation of the irrigation system must be taken into account in irrigation studies.

Uphooff (1986) points out irrigation have to understand as a "socio-technical process which combines both material resources and people. Uphooff also hole the notation that four basic sets of activities-decision making and planning, resources mobilization and management, communication and

coordination and conflict resolution constitute the core of an organization. In other words, an irrigation users group exists to insure that these four sets of activities occur on a regular and predictable basis. Moreover an irrigation is formal if these four sets of activities occur according to explicit, written and possibly legal requirements. But even though they are informal i.e. based on implicit understanding and social sanctions, they still exists on irrigation organization.

Freeman and Lowder Milk (1987) emphasize that it is through people's organized effort that water acquired and distributed and conflict resolution. They conclude that the success of effective delivery and operation of irrigation water entirely depends upon the effective irrigation water entirely depends upon the effective irrigation organization.

Kortein (1982) shares: local associations are capable of mobilization that signify amounts of labor on a long-term basis for maintaining the system; allocating water is close responsiveness to crops needs, resolving local conflicts over water, and coordinating cropping schedules to maximize the productivity of available water. When effective, these local groups have significant advantages over bureaucratic management, their ultimate knowledge of local needs for both water distribution and system maintenance; they can use social pressure to enforce rules and they place the cost of operation and maintenance on those who benefit from the system avoiding a perennial drain on government resources.

In the present study, irrigation is conceived as an adaption where in hydrological engineering, agricultural economic and organizational elements are presents. In turn, irrigation organization is understood as a local farmer's association capable of mobilization of material and labor resources for irrigation system, construction and maintenance, allocating rights to water use and distributing water among the farmers and resolving conflicts, arising from water sharing.

5.2 People Mobilization Process in the Study Area

The farmer in were not organized to utilize the common property of water resource form Begnas Lake before 2048 B.S. They had irrigated their land from the water of kulo of of Kudhi Khola. They had frequent conflict between users for sharing water. Due to scare of water and the urgent need to increase production to feed the increasing population, the farmers had several time of informal dialogue among the users for new irrigation canal from Begnas. They called a mass meeting for the formation of water user management committee for the first time in 2052 B.S. At that time was chairperson of water user committee. The committee was active in the construction new system by getting participation from all users in planning, resource mobilization and implementation. Besides they face many difficulties and the committee is also able to get external support. That committee acts as a self help group. There are different factors that bring water users together to form such help organization. The feeling of water as "community property" is one such major unifying factor. Resource mobilization, water allocation and distribution, sense of belonging to the community, preservation of an individual's share and acquisition of water are other unifying factors.

Since the water user committee was organized for common benefit, the minor operation and maintenance of irrigation system was smoothly carried out. Last 20 years the system at headwork was heavily damaged (In 2013) on the period of field work, the repair and maintenance was beyond the capacity of the local people. Due to which, the system was not functioning for 6-8 months. The water user committee was constantly trying to get external support from municipality, DDC and external aid agencies during that time farmers had faced difficult time. This situation forced them for unification and ultimately their proposal was accepted by DIO. The rehabilitation work (Maintenance) was started and took six months for completion. While working with DIO. Their organization skills have been increased.

By Sharwan 2052 B.S. the formal irrigation organization consisted of nine executive members with the following designations Chairman, Vice-Chairman. Secretary and other six members. The executive committee members were selected from each upstream, midstream and downstream.

The chairman presided all organization meetings, played a key role in settling disputes and instructed the secretary to maintain all the labour contribution and financial records. The vice-chair man did these tasks in the absence of the chairman. In turn the six other members helped these officials in discharging their duties. The irrigation organization, locally known as "Sinchai Sammitti" was governed by the rules and regulations prepared in Sharwan 2052 B.S. by the formal irrigation organization after the project was duly constructed. The selection criteria of the nine officials were as follows:

- The official to be selected ought to possess a leadership capacity to mobilize cash, labour and other material resources when needed for construction and system maintenance activities. The leadership capacity was judged by the villagers from the role played by these officials in the village.
- The secretary had to be capable of maintaining records regulating irrigation fees, fine collection and attendance of the participant in canal maintenance activities.
- The officials had to be capable of collecting compensation (such as fines) from water theft.
- The officials had to be impartial durries the conflict resolution process.
- The officials should not be corrupt in the eyes of general members.

If an official was found not to comply with the five criteria laid down above the general members processed to discuss ways to recognize the existing association. A general member stood in front of the assembly and nominated

a person as a potential official. This same general assembly then asked other farmers whether the proposed candidate is acceptable or unacceptable to them. When the majority accepted the nomination, the proposed candidate choose officials. If any proposed candidate was unanimously opposed. Then another person was nominated until the selection process was fully completed. The officials tenure lasted for a period of six months but could continue so long as the officials discharged his/her duties well, an assessment which was made by general members in separate meetings:

The duties of the officials of the irrigation organization were as follows:

- effective mobilization of resources such as cash, labour and material resources for the necessary maintenance activities.
- properly maintain the organizational regarding income and expenditures.
- strictly collect fines from water thieves and farmers whose absence during system maintenance.
- effectively resolve conflicts arising from water stealing.
- actively deal with agencies who can supply needed sources for the rehabilitation of the existing canal.
- communicate information such as canal damage to all the members for an emergency maintenances activity and
- instruct the water distributor (Locally known as "Pale") to make regular checkups of the canal and the rotational distribution of water as fixed by the organization.

The officials of the irrigation organization were not remunerated as their job was voluntary. But when found corrupt, they were dismissed from the position during a general members assembly. As in the selection process, the majority decision was followed. Almost all key informants reported that the

irrigation organization though sometimes full of minor disagreements, has been successful in fulfilling its responsibilities.

5.3 Function of the Users Group through Mobilization Process

In order to smooth functioning of the user group, the monthly meeting of the main committee where held on a regular basis. The minute of the meeting has been recorded. The general meeting involving all water users was conducted once a year (Before Monsoon). The general meeting could be held if they have made the decision which is beyond the authority of the committee. These kind of general meetings were held when there were the huge tasks for repair and maintenance. The meetings of other were held as per the need of the community.

The principal functions of the user group of the study area as elsewhere are decision making, resource mobilization, water acquisition, water allocation and distribution, system maintenance and conflict resolution. These functions have been elaborately discussed below along with a brief conceptual exposition of each of them. They sometime organize meeting to manage conflict on command area.

5.3.1 Co-ordination among User Group

The committee primarily coordinates with line agency and agriculture development office for getting technical assistance for irrigation management and agriculture development. In addition to these, they have maintained coordination with Lekhnath Municipality, District Development Committee. District Irrigation Office and District Forest Office for the protection and management of forest area where the irrigation canal passes the rough.

5.3.2 Resource Mobilization among the Farmers by User Group

Resource mobilization is the most visible organization activity in irrigation management. Labour is the most extensively mobilized resource, although money and materials are also important; likewise, farmer information should

be regarded as a major available resource (Uphooff 1986). Information can also be used as another major available resource.

U. Pradhan (1988) pointed out the resource mobilization is a process by which an individual or a group is able to secure individual or collective control over the resources needed for individual or collective action. Resources already controlled prior to the mobilization efforts, the process or mechanism of pooling the resources and supplementary resources provided by outsiders. One can think of resources as being tangible or intangible for example money, physical materials, leadership or information. For an irrigation system water, land, money, capital, skilled and unskilled labour, organization, leadership and information would be mobilized internally and others externally.

Resource mobilization is one of the most important functions of the irrigation organization since it is only through the effective mobilization cash, labour and material resources that an irrigation system can develop and be sustained for a long period of time.

People of the study area practiced considerable internal resource mobilization during canal construction; the following internal resources were mobilized:

- Household labour,
- Fees: the service charge for water distributions,
- Fines imposed on farmers who were absent during maintenance activities,
- Fines imposed on water thieves,
- Local technology for maintenance activities and to propagate information regarding water acquisition, resource mobilization, water distribution. System maintenance and conflict resolution activities.

The amount of repair work needed to be done was estimated by irrigation organization officials before the start of actual repair. Then household were asked to contribute labour as fixed by the user group and mobilize to control and distribute properly.

The irrigation fees were also collected on the basis of the size of the irrigated householding. The general formula was if one ropani of land was irrigated by the irrigation system, the beneficiary farmer had to pay 25 rupees per season.

Since the start of canal construction both human and financial resources were actively mobilize twice a year for routine and emergency maintenance. In these activities irrigation activities the irrigation organization always recorded the beneficiary's attendance for construction and repair work.

The irrigation organization also fixes the amount of fines relative to the daily wage rate in the village. The general formula was: if a farmer was absent during the repair work of the irrigation system, he was asked to pay the equivalent of day's collected amount as saving to the 'Sammitte's fund. The secretary of the irrigation organization collects or receives payments and fines from the water users. He also keeps the money of the organization and makes records of financial transactions. If he/she is found to have misused the money, he would be dismissed from his post and pressured to return whatever amount of money was misused.

Uphoof (1986) claims that "information can also be considered as a resource in the analysis of an irrigation system. Decision made about water acquisition, human and financial resource mobilization system maintenance and conflict occurrence and the like are expected to be immediately conveyed to the general members" in the study area communication of information helped to achieve coordination in the various functions of the system, viz. if there was an urgent need to mobilize for major repair in the canal, the need was quickly relayed to all the concerned persons by the Pale or secretary. If the operation and maintenances is beyond the capacity of the user's from technical as well

as financial aspects, the WUC will seek outside help either from District Irrigation Office or from District Development committee and Village Development Committee. (Key informants interview, 2013)

5.3.3 Water Acquisition

Uphoof (1986) defines water acquisition as "a process of acquiring water from the surface sources or by creating and operation physical structures like dams, weirs or by actions to obtain for users some share of an existing supply." To achieve this, beneficiary farmers of the indigenous irrigation system must center their attention on the design, construction operation and maintenance of water acquisition activities.

Since this system has permanent headwork, water acquisition is not difficult one: some farmers were initially hesitant to participate in the water acquisition activity. They initially thought that it was almost impossible to acquire water from the river because the canal had to pass through many cliffs, steep slopes and landslide prone hill sides. They also thought that investment in canal construction was a waste of resources. But when the canal was half-constructed the reluctant farmers became optimistic about possible irrigation system and contributed their labour resource system. Thus, village cooperation, though arriving belatedly, played an instrumental role in the completion of the canal. (Key informants interview 2013)

5.3.4. Water Allocation and Distribution

Uphooff (1986) defines the allocation of water as "The assignment of rights to users to determine who shall have access to water." Likewise, he defines distribution as "The apportionment of water brought from the source among users at certain places, in certain amounts and at certain". There was number of methods of water allocation which comprises from priorities, turns, shares, crop priorities and market etc.

5.3.5. System Maintenance

System maintenance is the repairing and cleaning of the canal for regular and efficient water acquisition, distribution and removal. Maintenance activities were usually done before and during the monsoon season. Both routine and emergency maintenance activities were performed by the farmers themselves as the command area, routine maintenance took place in twice a year. Each maintenance task lasted from 5-10 days in depending upon the amount if repair work is required. The important think about this is small maintenance they manage and control and even cost share by user group itself.

5.3.6. Conflict Resolution

Conflict is usually manifested in the form of competition, ordinary discussion with physical threat fight war etc. It two or one individual groups posed the right to use particular resource system at a time conflict over it's use become a normal phenomena.

De Los Reyes (1980) deals with the causes of irrigation conflict. She claims that many disagreements among farmers in indigenous irrigation system from its physical layout when the system depends on a single source.

5.3.7. Decision Making

There is provision of two levels of decision making body in Khudi Phat irrigation system. These are general assembly is composed of representative of each household. All the members are welcomed to participate in general assembly, which is held once in a year. The income and expenditure report will be presented by the executive committee, which should be passed by majority of the general assembly. Two-third of the representatives of the total beneficiary households must be present for holding the assembly. This assembly can recommend for amendment in the constitution of the water user committee. The general meeting is called once in a month to discuss and decide on specific issues. Most of the decision in past were made from the

consensus. If there is no consensus, the majority voice will be considered in decision making. In case of equal vote on issues, the chairman will play the role of deciding vote. If the committee could not make the decision on major issues, they will invite all users for having the consensus from each household. This kind of situation was occurred in last year at the time of great flood during monsoon. Due to the consensus or getting commitment from all users, the huge amount of labour contribution became possible.

5.4 Roles and Responsibilities of Irrigations User Group

The rules and responsibilities of the executive committee officials such as chairman, vice-chairman and secretary are listed below:

Position	Role and Responsibilities on Mobilization
Chairman	• Chaired general council and committee's meeting. • Setting meeting agenda, time, date and place. • If there is no consensus during the meeting, act as a decision maker. • Representative of the committee. • Called emergency meeting when required. • Co-ordination and linkage with various institutions. • Monitor the function of committee. • Resolve conflict.
Vice-chairman	• Assist, chairman in his/her work. • Carried out all duties and responsibilities of chairman in his absence. • Providing feedback about the functioning of the committee. • Monitoring of the performance of canal.
Secretary	• Call meeting as per the rule of the committee. • Call meeting as per the decision made by the chairman.

	• Keeping record of all minute, attendance and other. • Prepare annual report in order to present to general council.
Treasurer	• Keep financial record up to date. • Collect fee and fined as per the rules. • Present financial report in general meeting and general assembly. • Performed other duties as demanded by committee.
Members	• Regular and active participation in the meeting. • Play a role in decision making. • Act as a bridge between committee and users.

It has been found that there is clear role and responsibilities within the members of water users committee, the users have also understood the roles and importance of committee in smooth functioning of the irrigation system. The ownership of the user is high.

CHAPTER VI

WATER ALLOCATION AND DISTRIBUTION

6.1 Mechanism of Water Allocation and Distribution

There is five sub canal and one main canal on Begnas Irrigation Project. The user group manage the water allocation and distribution on command area. The terms "allocation and distribution" are used interchangeably in much of the irrigation literature. But they have different meaning and the distinction between them is important in the farmer managed system. "Allocation" refers to entitlement to water from an irrigation system and principal or basis by which water rights are shared among the irrigators. Water "allocation" identities the fields or farmers that have access to water from the system and the amount or duration of the water delivery to each. Water "distribution" refers to the physical delivery of water to the fields. The actual distribution may or may not be in accordance with the allocation scheme, depending on the effectiveness of the organization and physical structure." (Yoder et.al, 1986)

Water allocation, in the context of the research site, refers to the farmers' entitlement to water from an irrigation system. Water right was given to those farmers who has contributed labour, cash to the construction operation and maintenance activities of the canal. One didn't claim the right to water use unless one had contributed to the irrigation system. According to Upreti (2000) non-members were strictly prohibited to use the water obtained from the irrigation system. Almost, every irrigation system is involved with one or other forms of water right arrangement. The type of water right depends on the nature of water source itself, the intensity of its use national codes and some other factors such as preceding uses. The supply of water and hence, the water right management primarily depends on the nature of water source like

its physical environment, frequency of rainfall over the year, and size and capacity of the water production unit. Pradhan, (1989) also mentioned that "water allocation and distribution are important and distinctive task for the irrigation mobilization, water allocation is an assignment entitlement to water from an irrigation system and water distribution is the implementation of the allocation principle as agreed by the beneficiaries." In other word water allocation means the entitlement to water from an irrigation system and are shared among the beneficiaries and distribution means the physical delivery of water to the fields.

In BIP Sinchai Samittee was responsible in managing the water distribution to each user's field. In case of paddy field, the rotation for irrigation the field will be decided either by head or from tail portion as per the consensus of the farmer beneficiaries. The allocated time for the distribution of water in case of paddy field is day after day per tole W.U.A with farmer beneficiaries has formed group at head, middle and tail stream to have a rotation from one field to another field smoothly in other crops like wheat, lentil, onion, there is also rotation system from head to tail.

Water distribution is the actual physical delivery of water to field. In the Khudi Phat irrigation project, the irrigation organization followed the system of employing one water distributors, locally known as the 'Pale' to handle this task, and one watchman employing by DIO since operating the project. The duties of watchman are not satisfy; he stays only like employ officials. Besides these 'Pale' (who is appointed by WUA) served system. The duties of the Pale's were as follows:

- be watchful of the water at all times to prevent water stealing;
- if water is stolen, warn the water thief not to disregard the distribution rules; if the thief refused to obey, the 'pale' had to inform to the irrigation officials for further action:
- minor repairing;

- prevent cattle and
- turn water to user's fields on the rotation schedule fixed by the executive officials.

The amount paid to pale was fixed by a general formula as follows: if one ropani of and was irrigated by the irrigation system, the beneficiary farmers have to pay Rs.25 to the pale, which was already fixed by 'Sinchai Sammittee'. The Pale was always watchful of the canal in all season. Water discipline was strictly maintained during the period of dry season by the Sinchai Sammittee.

6.2 Conflict Resolution

Many social science researchers also stress the conflicts inherent in irrigation system as well as the mechanisms for the resolution of these conflicts. B. Pradhan (1982) claims that water sharing faces problems and disputes because farmers in the head generally take as much water as they need at the cost of tail-enders. Though the disputes sometimes get serious and violent, farmers have themselves developed social mechanisms for their resolution.

Conflict may arise in any topic related to irrigation system in the organization. It may come over the matter of water allocation and distribution, maintenance of the system and construction and rehabilitation of the system. Mostly three type of water conflicts are seen in irrigation system.

- Conflicts between irrigation systems.
- Conflict with water user and the concerned agency within a system.
- Conflict among water users of a system.

The conflicts between irrigation systems occurred basically due to lack of clear definition of water rights concerning a particular natural resource. The conflicts between water users and the concerning agency within a system was reflection of the gap between the goals and the interest of the two parties. And

the third conflicts among beneficiaries are types of conflicts of a system were more common and serious than the farmer of two types.

Water sharing is replete with problems and conflicts as very farmer tends to maximize his benefit, at the cost of others. The following were among the main causes of conflicts in water sharing among farmers in the study area:

- the use of more water by upstream farmers at the cost of midstream and downstream farmers:
- the release of excess water by upstream farmers in the midstream and downstream fields.
- nocturnal water stealing of other farmers and the use of this water in one's own field and
- non-participation in system maintenance by potential beneficiaries of irrigation.

Of these nocturnal water stealing occurring monthly during dry season and sometime summer season also. Water conflicts were resolved by the farmers themselves in several ways as follows:

- farmers caught, stealing water were, at times, physically punished by the damaged party,
- in the general, water thieves were fine and collect the amount on organization's account. The amount of the fined depends on the nature of damage, the frequency was decided by officials of the irrigation organization,
- the upstream farmers who used more water during the dry season at the cost of midstream and downstream farmers were first issued a warning by the irrigation organization. If they continued to ignore the warning, they were denied the use of water for a period of time specified by the organization, and

- if the upstream farmers intentionally released excess water in the fields of midstream and downstream farmers and there by caused crop damage, they were required to pay a fine to the damaged party. The amount frequency was decided by officials of the organization.

All these social mechanisms developed by the irrigation organization had so far been successful in resolving water conflicts. Besides these the traditional adjudication process appeared more affective and functional than legalistic ones.

The traditional process occurred between or among the farmers using the irrigation facility, the incident was immediately reported by the affected party to the chairman of the irrigation organization, locally known as "Sinchai Sammittee". The chairman immediately ordered the Pale to communicate this incident to the eight other executive members. All nine executive members then assembled in the particular place, (When irrigation office is broke-out by Maoist) and faced the conflicting parties. In this, the conflicting parties reported their side of the problem. After the hearing, the officials of the irrigation organization met separately to judge the case. The decision was usually a unanimous one (uncontroversial one). When there were differences of opinion among executive members; the majority voice was held as the final decision. The decision was always accepted by the conflicting parties. Sometimes, elite persons were called on meeting.

Sometimes, factions would appear in the irrigation organization particularly between the upstream and downstream farmer. This would usually happen during the dry season when every farmer in the upstream area would want to use more water at the cost of downstream farmers. When this happens, the executive members from the downstream would put more pressure on the executive members who participate from the upstream area and forced immediate penalties for upstream farmers who would be found violating the water distributional rules.

In such, the officials of the irrigation organization played vital role in resolving conflict cases. So far, water conflicts had not been forwarded to the formal courts yet for resolution because the organization members themselves served as effective legislators and enforces of the rules and regulation.

6.3 Irrigation Facility on Command Area

Irrigation has played an important role in increasing the production as well as cultivated area. The easiest and best way of meeting water requirement of crops is by construction irrigational canals from rivers (Parajuli, 1991). In the study area, the river Middim has irrigated the cultivated area is Khudi Phat satmahune and sainik. To some extent these areas were dry and semi-dry before project. The agro-production and cultivated area have been increasing after the operation of this project. Table 5.7.1 contains the irrigation facility before the construction of BIP.

Table 6.1: Availability of Irrigation before BIP

Answer	Households	Percent
Yes	214	81.65
No	58	18.35
Total	312	100

Sources: Field survey, 2013

Before the construction of Khudi Phat irrigation project, there was not any regular means of irrigation except in Satmuhane Phant (Current Midstream of the command area) which was irrigated by indigenous Kulo of Khudi Khola. Due to the lack of sufficient water, people were unable to transplant paddy in monsoon too. Lack of sufficient water sometime resulted conflict between farmers in Paddy transplanted time before BIS. The irrigation system was in very poor condition. Some farmers were depending upon rainfall for transplant to Paddy. (Key informants interview). It means that Kulo was insufficient and irregular too supply the irrigation water.

Table 6.2: Source of irrigation before BIP

Source of irrigation	No. of Households	Percent
Kulo	192	61.25
Khola	42	13.60
Rainfall	21	6.80
None	57	18.35
	312	100

Sources: Field survey, 2013

Table indicates that 61.25 Percent of the households had used Kulo in limited area, 13.6 Percent source of irrigation was Khola: 6.8 Percent depend upon rainfall for irrigation and 18.35 percent had not any sources of water for irrigation.

Irrigation is essential for producing various types of crops and vegetables. It is artificial water supply to the field from streams and river are linked by canals. Paddy and vegetables need a lot of water for their real growth. Earlier mentioned that, before the operation of this project some of the cultivated area of Khudi Phat was dry and semi-dry and some of them depend upon monsoon rainfall for crop-production. As the irrigated area was smaller, the total production was also lower. In the past, people had hard life in agriculture in the lack of irrigation. Cultivated area as well as its production also limited in the study area before the operation of these projects. (BIP)

The project irrigation facility has been made available in Khudi Phat since (2050, Ashad). But all cultivated land of this valley has not yet been irrigated. Anyway, after providing irrigation facilities it has brought more prosperity and happiness to the peoples of Khudi Phat.

As a whole, 94 Percent of the cultivated land of the study area has been provided with irrigation facilities and its production has increased. Vegetables constitute the main cash crop in this area which consumers can by buy easily. "People say that we crop vegetable to utilize the leisure time but it constitutes

the main cash crop". The price of local vegetables has been relatively cheap then imported vegetable. Owning to the increased irrigation facilities with the operation of BIP. People's daily life has been slightly changed and raised also.

6.4 Major Crops and Cropping Pattern

6.4.1 Crops before the Project People Mobilization Process

Because of insufficiency and irregularity of irrigation, crop production depends upon the monsoon rainfall in the study area. In that case diversified cropping pattern was prevalent in the study area. Various types of crops such as paddy, wheat, "Ghaiyya", millet, maize limited vegetable; mustard-oilseed, etc were product. On the basis of irrigation facility, land was categorized into two types: the khet (wet land) and pakho (dry land). In the khet paddy cultivation is dominated and in the dry up land maize and millets cultivations is dominated.

Paddy production was the first ranking crop, maize and "Ghaiyay' the second ranking crop in the study area. Similarly, wheat is the third ranking crop, followed by millet, mustard-oil seed. The production of vegetable was un-measurement able.

Present Cropping Pattern Influenced By Mobilization Process

The main crops grown in the BIP command area is paddy. The summer paddy of which seeding trans-planting and harvesting time is Ashad/Sharwan to Aswin/Kartik is given throughout the command area. The second major crops in the study area are wheat and harvesting date of wheat is Kartik/Mangsir to Magh/Falgun. Similarly, Aarmali (Chaite Dhan) also a second major crops in the study area. Which seeding/transplanting and harvesting time is Chaitra/Baishak to Ashad/Sharwan. Recently growing vegetable at commercial scale is becoming increasing popular. Before BIP Ghaiyya was also a major crops in the study area but now BIP totally replace it's production. And also vegetable seems to replace wheat production in

future. It needs much more chemical fertilizer and market price of the product is not attractive also.

Maize is third important crops in terms of the area coverage. It is grown on spring season. The winter crops grown in the study area are mainly potato or garlic and onion.

- **Cropping Calendar**

The farmer is the command area grow three crops a year. A mentioned earlier the main crops in the command area are paddy, wheat and maize. The cropping calendar of major crop is presented below:

Table 6.3: Cropping Calendar

Seasons	Crops	Planting/Seeding seasons	Harvesting season
Spring	Maize	Falgun/Chitra	Ashad/Shrawan
Spring	Chaite Dhan	Falgun/Chitra	Ashad/Shrawan
Summer	Paddy	Ashad/Shrawan	Kartik/Mansir
Winter	Wheat, Veg, Onion, Potato, Garlic	Kartik/Mansir Aswin/Kartik Aswin/Kartik	Kartick/Mansir Magh/Falgun Magh/Falgun

Sources: Field survey, 2013

As shown on the table maize and Chaite Dhan (Armali Dhan) are shown in spring season in command area. The showing and harvesting months for spring maize and chaite Dhan are Chaitra, Baishakh and Ashad/ Sharawan respectively. In summer season paddy is grown in command area. In summer the irrigation water seems to be sufficient for paddy cultivation throughout the area. The seedling planning and harvesting season for paddy is Ashad/Shrawan and Kartik/Mangsir respectively. In winter wheat, garlic, potato seems to be crop at all. Wheat is plating in Kartik/Mangsir and harvesting in Chaitra. In common area planting and harvesting seasons for

lentil, veg etc. are Aswin/Kartik and Magh/Falgun. Potato is also planting in Aswin/Kartik and harvesting in Magh/Falgun.

6.5 Factor Affecting the Cropping Pattern

During the sample household study key interview the following factors played the important role in affecting the cropping pattern:

6.5.1 Awareness

Farmers have no knowledge about the cost benefit of each crop in one hand and no technical knowledge how to grow the high value crops on the other hand. They have little information about the market and time of growing seasons for each crop to sell for a good price.

6.5.2 Traditional Practice

Farmer's attitude towards the traditional practice of growing crops is still positive. They are religious and other social cultural values viz, they thought that the person who have more rice is prestigious person in the society.

6.5.3 Risk

Farmers expressed that the shifting from one cropping pattern to another is risky business. They will shift within the traditional practices. Some time they will try to grow vegetable, oil seed, wheat in more area and less area for maize. They knew that such kind of crop are based on the improved seeds, chemical fertilizer, modern technologies and knowledge, more labour and water also. They expressed that if the chemical fertilizer, pesticide, and technical knowledge are not available, the area under such kinds of crops will be decreased. They also expressed that there is high degree of correlation between yield of wheat crop and use of fertilizer. Therefore, high risk crop like high value vegetable crops have low priority and low risk crops like maize, mustard have high priority in selecting the crops.

6.5.4 Market Price

They expressed that the cropping patterns also vary in regards to prevailing market price especially on mustard, garlic onion. The coverage area under maize will be high and demand of maize is also higher.

6.5.5 Availability of Labour

Availability of manpower in household level and in the market is also deciding factor for choosing crops. Due to this constraint, the area under labour intensive crops will be reduced.

6.5.6 Availability of Water

A farmer choice of the crop is based on the water need. They will choose wheat, vegetable etc. (which is required more water) if the water is easily available during the critical period in dry season. If not, they will prefer less water demanding crop like, maize, oil seed etc. Therefore, there is interrelation between those above mentioned factors and earlier mentioned that other cultural aspects in deciding the cropping patterns in a certain locality.

6.5.7 Benefit from the People Mobilization on Begnas Irrigation Process

- Increased production
- Timely preparation of paddy seed bed
- Easy and timely transplanting of paddy
- Transplanting paddy twice a year
- Equitable distribution of water
- Water related conflict reduced
- Increased vegetable production

CHAPTER VII

SUMMARY, CONCLUSION AND RECOMMENDATION

This last chapter includes a brief conclusion of the purposive study. The core of the research study's findings has been focused in this along with some recommendation for its betterment.

7.1 Summary

During the assessment process, the main focus was given to investigate and understand the socioeconomic characteristics, management aspects, water conflict management and factor affecting cropping pattern. The change brought by the irrigation development were also assessed as an impact of the irrigation project.

The Begnas Irrigation Project is one of the iconic project which is large and major project. The importance of Begnas Irrigation Project in Lekhnath Municipality is high, because the production rates increase due to it. The significant of the project plays vital role to increase life standard in study area. That's why I chose as a study area.

The problem on a study area is to manage and allocate the water properly. The mobilization process is key to manage the irrigation project. The study analyze the irrigation project support by the users group. There decision to water allocation as well as distribution pattern is focus in the study. The sustainability is also importance factor of the mobilization process.

The main objective of the study to analyze the people mobilization system in Begnas Irrigation Project and the intervening process to people mobilization pattern on this project. The significant of the study to manage and formulate water distribution by the help of users group management committee.

Begnas Irrigation Project covered 580 hectors of Lekhnath ward no. 11, 12 and 14 total households are 1658 in command area 312 households in order to

choose a represented sample from the universe for the study for the study 1658 households were taken by using simple random method. Data collection instrument such as interview schedule, interview, focus group discussion were used. The Elinor Ostrom's theoretical notion of sustainability of irrigation project based on eight design on a project.

In the study are the population of the sample households of the system female population occupied 49.4 percent and male population occupied 50.6 percent. The case of caste ethnic composition of sample households of the water users, Brahamin is the dominant caste who accounts 40.5 percent and ethnic groups accounts 29.3 percent. Similarly Dalit accounts 10.4 percent and followed by 11.6 percent by Chhetri. Occupational structure of the sample households of users group shows that 92.5 percent people are dependent in agricultural sector. Other non-farm works included employment in government and private office 1.7 percent, trade and business 5.2 percent. The educational status also shows that 83.89 percent of the total sample population is literate and only 16 percent are illiterate.

The major findings of the study can be listed as follows:

- The people mobilization irrigation facilities, crop production, cropping pattern and irrigated areas socio-economic activities had increased in the Khudi Phat. The socio-economic condition of households has also been influenced by irrigation mobilization process by the help of increase in production.

- Before starting of people mobilization irrigation facilities, the area had limited agro-producing farmland and the scale of production was also low. But after the completion of the BIP in 2048, its productivity as well as the proportion of irrigated area has increased significantly. Due to the increased irrigation facilities, the cropping pattern has also been changing. People have intensive agriculture and multiple cropping system. Paddy, wheat, maize 'Ghaiyya' and millet are the major crops

of this area. Now a day, farmers are more oriented towards cash crops. Before BIP, 'Ghaiyya' was the third ranked crop but now it is totally replaced by 'Aarmali Dhan'.

- Water allocation and distribution managed by the users group in priority basis in the study area.
- The conflict management in mainly by discussion method on the users group management committee. On their regular meeting organize throughout the year.
- The irrigation development was initiated on the basis of felt need. People of Khudi Phat had realized the importance of water utilization and management as an important vehicle for their development. The villagers organized many more other groups for the development activities. Water acquisition is not a problem in Begnas because of its permanent headwork.
- The diminishing water supply at the lake itself has affected the irrigation management practices. In Khudi Phat the users group has recently made some efforts to control preserve activities around its water source.
- Maintenance of the system is observed strictly disciplined. It has been carried out a regular basis every year.
- If the household failed to provide the labor, they would have option to compensate in cash to the water user management committee comprised of nine members for water allocation, conflict resolution and system maintenance. This committee was found functioning satisfactorily as noticed during the interview with key informants and users. The women participation in committee was low.
- Control of water leakage due to users group by awareness and conflict resolution practice which transparent on the study area.

- The financial system of users group associate was found transparent. The inventories of record about labor and cash contribution from each household were kept accurately and safe. The records were updated every month during the users groups meeting. The general assembly's were held each year. The committee was successful in operation and maintenance with conflict resolution of the system. The decision making process has found democratic. "Apart from family labor, the labor organization system locally known as "Parma" or "Jhara" is prevalent in this area."

- The amount of water sometime not sufficient due to the different problem at that time, users group rotate the turning system in varies branches in a priority basis. This always minimize conflict and smooth running of system.

- Another major problem related with organization is that they have not tried to keep the canal neat and clean.

7.2 Conclusion

The irrigation organization under the system studied intensively seems quite efficient. The government has supported to their initiative as per the felt need of the community. The management is free from controversy and that a free, fair and democratic norms and practice are regulated in overall system operation and maintenance. The management is able to control and regulate the operation of the system at the canal quite impartially and effectively. User group has started intervening the system for repair and maintenance using the resources of both government and the farmers. Under current management funds are raised. This is definitely going to generate local resources which could be used as complementary fund for the repair and maintenance of the system.

There are general meeting and general assembly on regular basis. The collective decision making process of the system is found to effective and

made on time in a democratic manner which are recorded and transparent for all users. That always helps in distribution of water of irrigation on a priority basis.

Regular maintenance before monsoon (June) and emergency canal maintenance in the system is one of the major function of the organization or users. It is found that labour mobilization for the maintenance is conducted on the basis of households. It is observed that there is not strict discipline among users because now a day there is not sufficient water as required to crop production due to many obstacles.

The records about the revenue collection are updated. Any changes made by the committee regarding the rule and regulation are communicated effectively through secretary and members.

The water allocation system has been well established. The conflict regarding resource mobilization and water distribution are seldom and solved internally by the committee.

User group's has good linkage with DIO and municipality in order to get necessary support for upgrading the quality of irrigation system.

Due to construction of the system and people mobilization, the cropping intensity has been increased. The vegetable consumption rate has been increased due to availability of water for kitchen gardening. Actually, farmers are not interested in agriculture farming in the study area. They are measuring their economy in terms of cash rather than the quality of agricultural product. They feel that agricultural farming is slow, less beneficial and risky business. People of the village are also not much familiar with limited available improved seed, chemical fertilizer, pesticide and advance technology.

Irrigation water has facilitated the process of commercialization of subsistence agriculture which is a positive indicator of agriculture development.

The people participation and mobilization was found increased in other community development activities due to positive impact of irrigation management.

7.3 Recommendation

Farmer organization is the important aspect for improving the management of irrigation system. Since the farmers from BIP were organized for fulfilling their common goal, they have success in managing the irrigation system in a proper way. But during the research time many problems were found. Which were not only concerned with the locality but also associates with national level on the basis of these problems the following recommendation are given to minimize the several existed constrain of the irrigation.

- Government agencies usually considered only on physical improvement of the system, as the important aspect. However, in order to functions irrigation properly non-physical elements are the most essential for the sustainability. So both should be equally emphasized.
- There is seems mark discrepancy in water distribution among the farmers in up streams and tail streams. So user group must try to make water distribution more justly and equity.
- Although the cropping intensity and yield has been increased, but the users are not ready for moving towards, introducing high value crops. Therefore, there should be a provision for at least one agricultural extension officer. In the common area in order to provide efficient extension services to the farm households.
- Across the settlement area, the canal should not remain open. It is necessary to put slabs and iron nets to keep the canal neat and clean, those who try to use canal as a dustbin should be punished. It is necessary to generate skilled manpower to maintain, repair and

supervise the operation of the canal to mobilize people property as well as sustainability of project.

- New technology and modern inputs i.e. tractors, thrasher machine etc should be used to reduce the need for manual labour.
- The study area consists being an urban area. As cash crop farming is more profitable in an urban area such crops, eg. Vegetables, fruits should be encouraged.
- People's participation is not only in operation and maintenance but should involve in every decision making process. Otherwise, the turn over programs will not be fruitful and may arise the question of sustainability of system in future.

At last, the present study has shown that the farmer's own initiative in the formation and maintenance of local irrigation organization led to the success of the irrigation development program in Khudi Phat. Moreover, given the opportunity to maintain their sense of ownership towards the irrigation system. Farmers were able to employ democratic practice in handling organizational matters and work our egalitarian procedures to distribute scarce water resource.

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Appendix-I

People Mobilization Process in Begnas Irrigation Projects

Questionnaire

This survey is conducted within cannal command area in Lekhnath Municipality for the partial fulfillment of M.A. in Sociology/Anthropology.

Questionnaire No …….. Date ……..

1. Name of the family head …….

2. No. of family: Male ( ) Female ( ) Total ( )

Age	0-14	15-29	30-44	45-59	60 above
Male					
Female					

Number of family members according to literacy (6 years above)

	Illiterate	Only literate	8 pass	SLC pass	IA	BA or +
Male						
Female						

3. Major occupation of the family members. (14 years above)

S.N.	Occupation	No. of persons		Total
1.	Agriculture	Male	Female	
2.	Business			
3.	Service			
4.	Study			
5.	Industry			
6.	Others			

5. Are you a local or migrant?

(a) Migrant ( ) (b) local ( )

6. What was the main purpose of migration?

(a) To gain the cheap land

(b) For employment

(c) Fertile and plain land

(d) Due to landslide and heavy rainfall

(e) Others ….

7. What are the aboriginal castes of this area?

→ …….

8. Annual income source.

(a) Agriculture (b) Industry (c) Wages

(d) Business (e) Service (f) Others

9. How much cultivated land owned by your family in these days? (in Ropani)

Types of land	Own land	Other land	Contract	Total
Irrigated				
Non-irrigated				
Total				

10. How much cultivated land owned before Begnas irrigation project?

→ …… Ropani

11. There was irrigation facility in your land before irrigation project?

Yes ( ) No ( )

12. If irrigation facility was provided how much land was irrigated?

→ …… Ropani

13. What was the means of irrigation?

Pipe ( ) Canal ( )

River/Stream ( ) Other ( )

14. Achievement after the construction of Begnas irrigation project.

(a) decrease in crop production

(b) increase in crop production

(c) constant in crop production

15. If increase in crop production what are the causes?

(a) Achievement of irrigation facilities

(b) Utilization of improved seeds

(c) Utilization of higher quality of labour

(d) Increase in cultivated land

(e) Purchase the new land by farmer

(f) Utilization of fertilizer

16. If decrease in crop production. What are the causes?

(a) Irregular water supply in all season

(b) Canal has damaged in time to time

(c) Unequally distributed of water

(d) Other

17. Do you get enough quantity of water as when required?

Yes ( ) No ( )

Then, do you think the reason for it? If more than one reason please put them in order to importance.

i) Insufficient water is not then

ii) Turn system in mater release

iii) Water is not released as & when required by the authority

iv) Conveyance system is faulty

v) Head reach below the level of field

vi) Canal runs farmer are not release water

vii) No idea

18. What types of irrigation do you follow if have met land cultivated?

i) Field to field

ii) Canal to field

19. Which all areas of irrigation management do you suggest to have participation?

☐ Design ☐ Construction

☐ Maintenance ☐ All area

☐ No idea

20. Do you believe that irrigation management is possible only through participation?

Yes ☐ No ☐

& why?

→ …….

…….

21. What do you think are the tree major factors (in order to impact then may hinder participation of farmer?

i) Prejudicated attitude of official

ii) Lack of co-operation among farmers

iii) Lack of assured supply of water

iv) Lack of material incentives

v) Easy availability of water

vi) Smallness of holding

vii) Largeness of holding

22. Problems created by farmer association?

Somebody then to be catalyzed participator.

Yes ☐ No ☐

☐ Then, who ☐ Trained official

☐ Farm leader ☐ Voluntary agencies

☐ Others ….

23. Whether you know the existence of canal committee or your local?

Yes ☐ No ☐

24. Are you members?

Yes ☐ No ☐

25. How many members are there?

→ …….

26. Any position you hold then?

→ …….

27. Major activities by irrigation users group

i) Control & Maintenance of canal ☐

ii) Gives leader shop for laymen ☐

iii) Market Production ☐

iv) Dispute Settlement ☐

28. Are you think user group association as effectively as beginning?

Yes ☐ No ☐

if no, then reason suggestion on effectiveness of it

→ ……

29. How the committee manage dispute?

☐ i. By conversion

☐ ii. By authority influence

☐ iii. Politically

☐ iv. By community, itself

30. Are all leaders are working well?

Yes ☐ No ☐

If no, reason

→ ……

31. Government involvement satisfy to you?

Yes ☐ No ☐

32. Did you notice any farmer in your area break structure purposefully & take away water in an unauthorized way?

Yes ☐ No ☐

If yes, Then is conflict

Yes ☐ No ☐

33. Any political clash?

Yes ☐ No ☐

34. Political difference weaker participator mobilization system?

Yes ☐ No ☐

If yes, the reason behind it,

Is there any religion-wise difference?

Yes ☐ No ☐

Signature of Respondent

Signature of Researchers

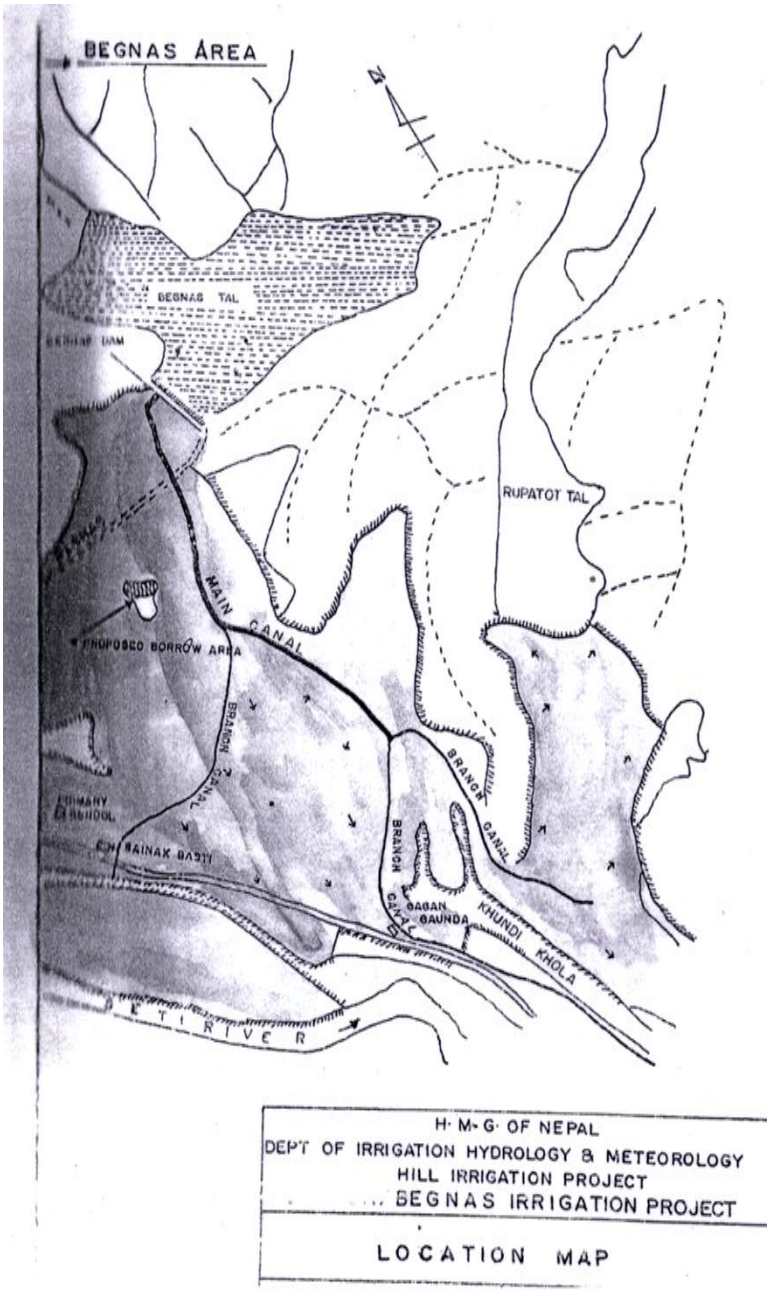
Appendix-II

Lists of Water Users Management

Committee's members in Begnas Irrigation Project

Chair Person	:	Mr. Laxmi Kanta Sapkota
Vice Chair Person	:	Mr. Kisan Pun
Secretary	:	Mr. Buddhi Giri
Treasures	:	Mr. Drona Raj Adhikari
Member	:	Mr. Puspa Bhandari
Member	:	Mr. Akkal Bahandari
Member	:	Mr. Haris Chandra Adhikari
Member	:	Mr. Buddhi Sagar Poudel
Member	:	Mr. Kripan Raj Poudel
Member	:	Mr. Ghana Shyam Khanal

Appendix-III

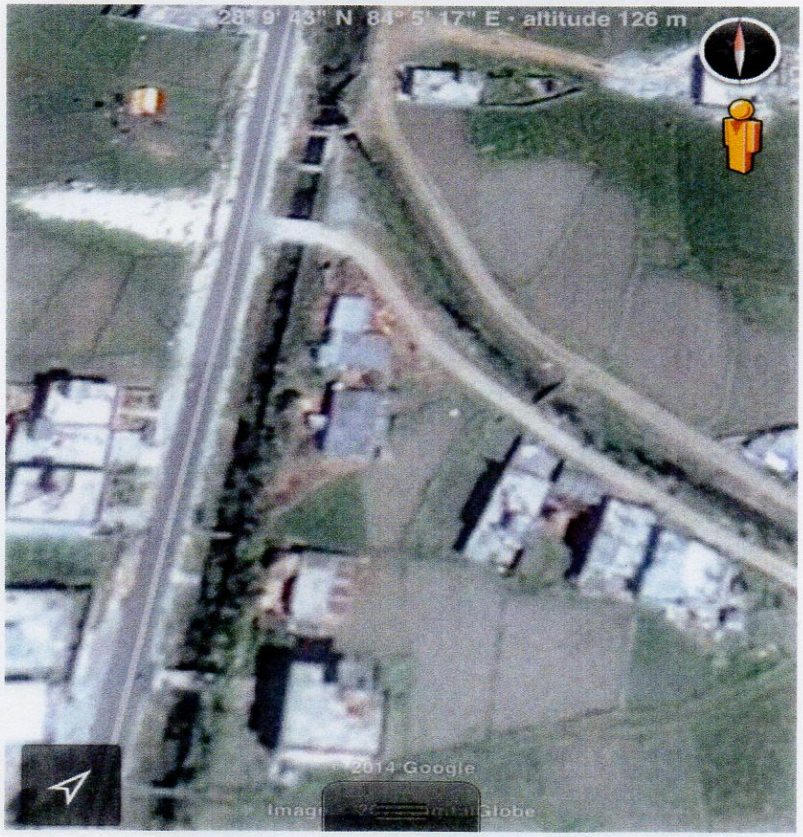


Map of Begnas Irrigation Project

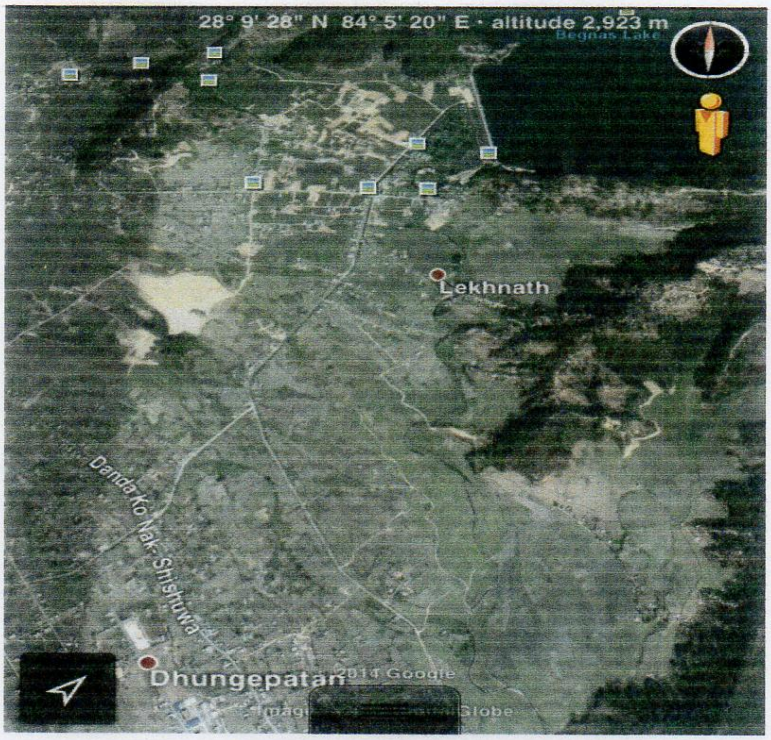
Appendix-IV

List of Photos Command Area

Main canal starting point from Begnas Lake

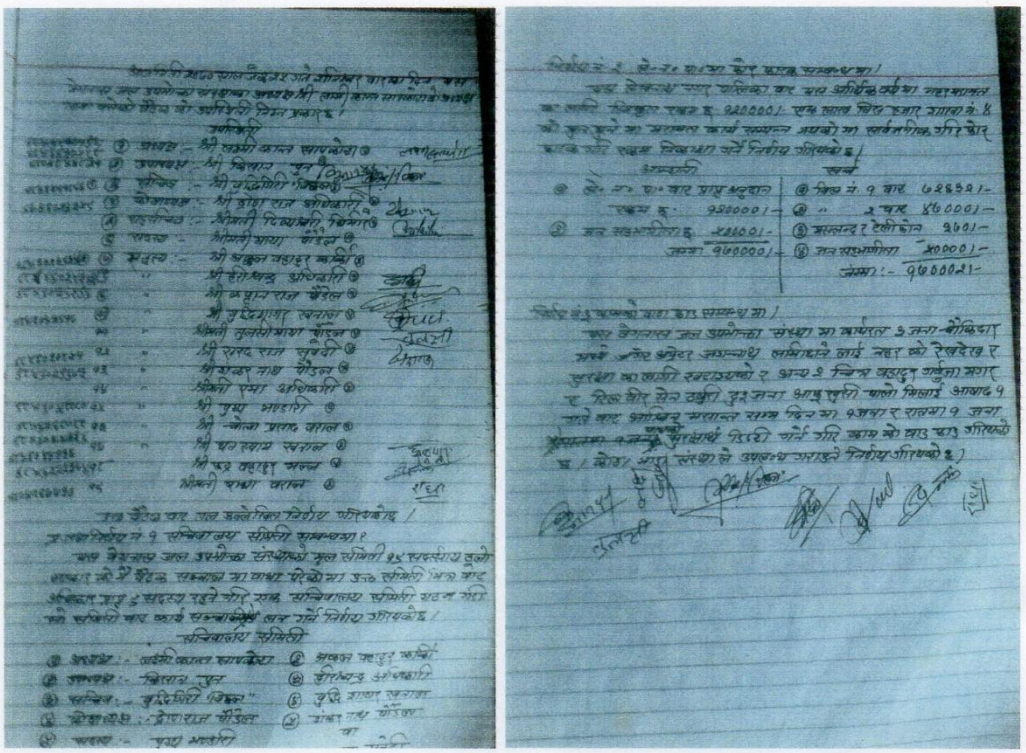


Main branch towards Ekata Kuna



Main command area

Lekhanath Municipality, in circle command area



Attendance of Users Group Member and Balance Sheet Maintance