

CHAPTER - I: INTRODUCTION

1.1 Background

Nepal is a landlocked mountainous country situated in the middle belt of the mighty Himalayan range. The country is rectangular in shape and is enclosed between 26⁰22' N to 30⁰27' N latitudes and 80⁰4' E to 88⁰12' E longitudes. The east-west average length is 885km and north south average width is 193kms. The total area is around 147181 sq km with a population of about 23.2 millions.

Nepal is an agrarian country where 81 percent of its total economically active population is engaged in agriculture (Bjracharya, 1994:1). 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, 2060:110). 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 land. The terai constitutes 58.9 percent of cultivated land inhabited by only 48.4 percent of the total population (Shrestha, 2001:14). So Agriculture can be considered as the hub

of Nepal in its all around development. Agricultural development is an integral part of the socioeconomic development.

The total cultivated land of the country is 18 percent, where rice, maze, wheat, jute, tobacco, sugarcane, millet, oilseeds are the main crops (Agnipath Weekly, 2055:13) and 33 percent of land area of Nepal could be potentially cultivated if irrigation and soil fertility management facilities were available (Karan & Ishi, 1997:71). 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, 1978:7). 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, 1986:72).

Now a days in the hills and valleys various projects have been implemented for the development of canal irrigation in the Nepalese context. For the better economic improvement towards hill irrigate, 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 hilly and valley region will lessen dependency in the Tarai 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 1975:30).

When the permanent and regular supply of water is assured the superior crops naturally takes place of inferior crops resulting in increase 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 hectares agricultural land out of the total area, where only 66.8 percent (1765840 hectares) land is possible for the irrigation. However, there are 1168144 hectares land is irrigated end of the 10th 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 hectares and 420976 hectares for the agriculture purpose. But, only 190924 hectares land are irrigated in this development region. However, Kaski district has occupied 201700 hectares lands. But it's covered 11969 hectares 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 project etc. are prominent.

Lekhnath Municipality is located South eastern part of the Pokhara Valley. It has covered 7893 hectars land of the district. The cultivated land of the valley has 1980 hectars 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 Gaduwa irrigation project have occupied 1980 hectars land. Begnas irrigation project covered 580 hectars lands 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 55105 populations with 11859 household. About 1015 household and 5001 population live in the Begnas irrigation catchments area. 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, 1969:87). Water is essential for plant 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 sometimes heavy flood destroys all of the 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.

Nepal is second richest country for water resources in the world (ICIMOD, 1992:4). 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. Due to these problems irrigation facility cannot be developed in Nepal. So, these key factors are responsible for economic growth.

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.

Lekhnath Municipality has five irrigation projects with 1980 hectares land irrigated on the valley floor. There is about 53 percent population that can not 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 hectares land irrigated. This command area has 1015 households with 5001 populations. But the impact of the project has not been studied yet. In fact, irrigation is a key factor of agriculture. It increases the crop production and diversification from how the farms are taking benefit from it. What are the changes brought the expansion of irrigation facilities?

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

This study attempts to answer the following research questions:

- What is the condition of economic impact of Begnas Irrigation Project?
- How many households and population are getting benefit from the project?
- How many persons have changed food grain & vegetable production?
- How many people changed their eating habit?
- How many households do implement modern multiple crop system?

1.3. Objectives of the Study

The general objective of the study is to assess the impacts of Begnas irrigation project on its command area.

The specific objectives of the study area are as follows:

- i. To analyze the economic impact of Begnas irrigation project.
- ii. To examine the existing crop production before and after irrigation project.
- iii. To assess the changes in the cropping pattern after the 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 both to agricultural and project sectors which will be helpful for the management of the project in order to met the desired objectives and goals. This study is

highly important for formulating and implementing plans and projects pertaining to accelerated growth of agriculture.

1.5. Organization of the study

This dissertation consist of six chapters, each with sub-topics. The first chapter is introductory part 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 4th chapter includes socio-economic condition of the study area. The fifth chapter present the general existing condition in the study area before and after the irrigation facility with findings and analysis of data. The last chapter includes summary, findings and recommendations of the present study.

CHAPTER - II: Literature Review

2.1 A Brief History of Irrigation

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, 1980:47). 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., 1985:479-509). The Egyptians used water from the Nile to irrigate adjacent field as early as 5000 B.C. Historical records show that king Menes (who live around 3100 BC) had a large masonry dam build to control the Nile river and provided water for irrigation (Encyclopedia, 1973:899-900). Babylonian 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, 1975:227-329). The practices of irrigation spread to China from Babylonla. The Chinese Pilglain Sunghan has mentioned that the of Pamir 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, 1981/82:1). Mallick adds that rice was cultivated in Nepal since the Vedic period which provides that Nepal has a long history of irrigational practices.

Water is normally supplied to the plants by nature through the agency of rain or 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 & natural flow or combination of two or more of specific sources (CBS, 1989:12-13). The process of utilization of water involves the construction of engineering. Works of appreciable magnitude it would be called artificial irrigation (Singh, 1979:1).

There are three irrigation methods are as follows:

- a. Surface irrigation
- b. Sprinkler irrigation
- c. Sub-surface or sub-irrigation

Irrigation in Nepal

It is difficult to say the actual date of 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 canals of Rupandehi are classical examples. Likewise canals 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. Cuv on Government involvement started in the construction of irrigation canal. Juddha canal of Bara is another example. Dept. of irrigation was restructured from earlier canal and Geology department systematic irrigation development started after 1950 (Sharma, 1997: 159)

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 (38000ha.) and west Gandak, command area development in these large projects was initiated in sixth and seventh plan periods and is still continuing presently 100 Government developed surface irrigation summers in Terai (Sharma 1997:16).

In the history of modern surface irrigation, Fewa 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. Bijayapur–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 Klulo and Rajkulo in the Kathmandu are example of ancient irrigation system (Sharma, 1992:114) 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 plan in 1956 only three canals viz Chandra canal (in 1946) (Shrestha, 1981:63) were constructed under Rana Regime, several irrigation project were constructed since 7th plan and since 10th 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 project 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.

2.2 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, in come 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, 1978:57). APROSE has analyzed Dedgauntar irrigation project, small farmer have got the highest percentage of irrigated 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 times.

Lamsal (1989:41-42) 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 (1987:100-101) 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 brought great reforms in the agriculture sector in Narrayanpur VDC of Chitwan.

Gautam (2000:59) has studied an economic impact of Babai irrigation project at Bardiya district. According to his conclusion Paddy production has increased by 80percent 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 (1991:90-94) has studied "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.

Vaidya (1968:9) 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 that irrigation cannot be developed due to lack of skill manpower and modern technology, modern equipment and lack of capital.

James (1968:44) has studied in the Yunan state about the "Irrigation management". He concluded that 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 (1981:107) 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 that of small farmers. The per hectare ratio is smaller farmers but big farmers are leading in the local committee in all sectors.

Pandey (1998:78) has studied about the "Impact of irrigation of Rural Development". He found that small size landholding families are more in the irrigated areas than in the non-irrigated areas. In irrigated area, for example

71.44percent people are affected by irrigation. They grow two crops with the advent of irrigation scheme.

In words of Panta and Jain (1997:34) 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

According to Leaky & T.B. Wills (1977:161) irrigation can be defined broadly as the artificial control of soil, moisture for agricultural purposes with the aim of increasing crop production. In Physical terms this control is achieved by applying water on the land when soil moisture became depleted and at the same time by making provision for the removal of excess water from the soil surface of profile.

We know that irrigation facility plays a significant role for the production of crops and it brings change in socio-economic status of the people. Economic condition of farmers can be changed by the growth of crop production.

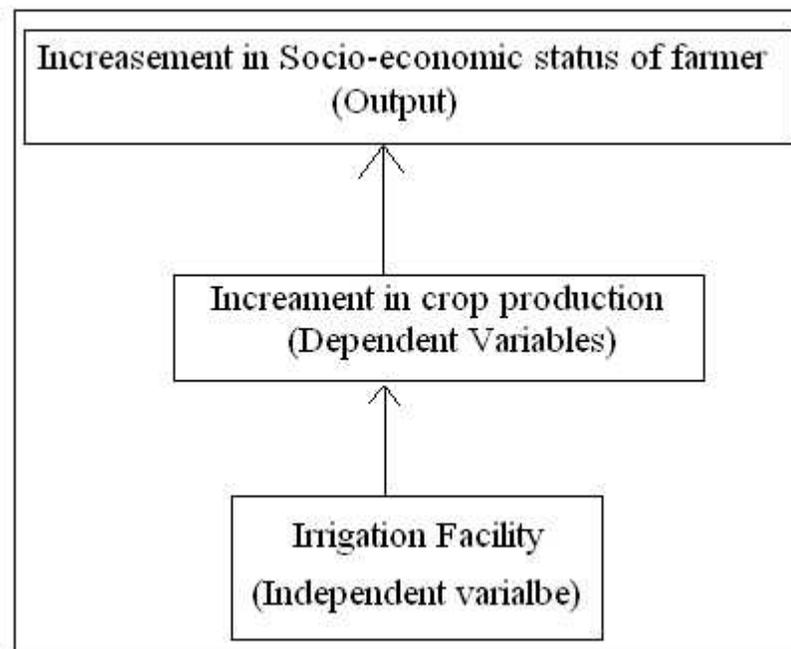
Begnas irrigation project is the backbone for agricultural development in the command area. Researcher has aimed to certain the socio-economic changes in the people or farmers of the Begnas irrigation command area.

2.3 Conceptual Framework

The relevant literature researcher may clearly state that 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.

Conceptual Framework

Fig. 2.1



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 Study Area

Lekhnath Municipality is located in the south eastern part of the Pokhara valley. Approximately, it lies within the geographical limit of 28° 13' N to 28° 05' N latitude & 84° 02' E to 84° 08' E longitude. The elevation range is from 677 meters to 1217 meters above the sea level (masl). It is surrounded by different VDC & Pokhara sub-metropolitan city (Lamichhane, 2000:20).

Lekhnath Municipality has 5 irrigation projects Begnas irrigation project, Bijayapur irrigation project, Gaduwa irrigation project. Lekhnath municipality has covered 7893 hectares, where 67.2 percent or 5305.57 hectares land have occupied by the agriculture and grazing land. The total irrigation land have occupied 1980 hectares, where Begnas irrigation project have covered 580 hectares land which lies in the ward no. 12, Khudi Phat. There are 5001 population and 1015 households Municipality valley bottom covers 60.28 percent or 4758 hectares 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 of descriptive type. The descriptive design is implied 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

This section describes method and other specific research techniques employed in the field. A desk review was carried out with references to the impact study of irrigation.

This chapter basically illustrates the research method adopted in carrying out this study. Primarily this section of the study indicates the ground selection of the study site. Research design, nature and sources of data are selection of the researcher. Universe and sample selection, data collection techniques (i.e. Interview, observation and secondary information) and data analysis procedure.

3.4 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:

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

(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) Sampling

There are 1015 households in the study area. However, the present study has selected 173 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, 173 households have been taken out of total 1015 household (annex-A).

(IV) Group Discussion:

The research 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.

3.5 Methods of Data Analysis

The collected data have been tabulated to meet the specific objectives. Both primary and secondary sources were analysed 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 860 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 pop ⁿ .	Percent	No. of pop ⁿ .	Percent	No. of pop ⁿ .	Percent
Below 14 years	121	27.82	119	28	240	28
15-59	281	64.6	274	64.47	555	64.6
60 + above	33	7.58	32	7.53	65	7.5
Total	435	100	425	100	860	100

Sources: Field Survey, 2009

Fig. 4.1: Economically active and dependent population

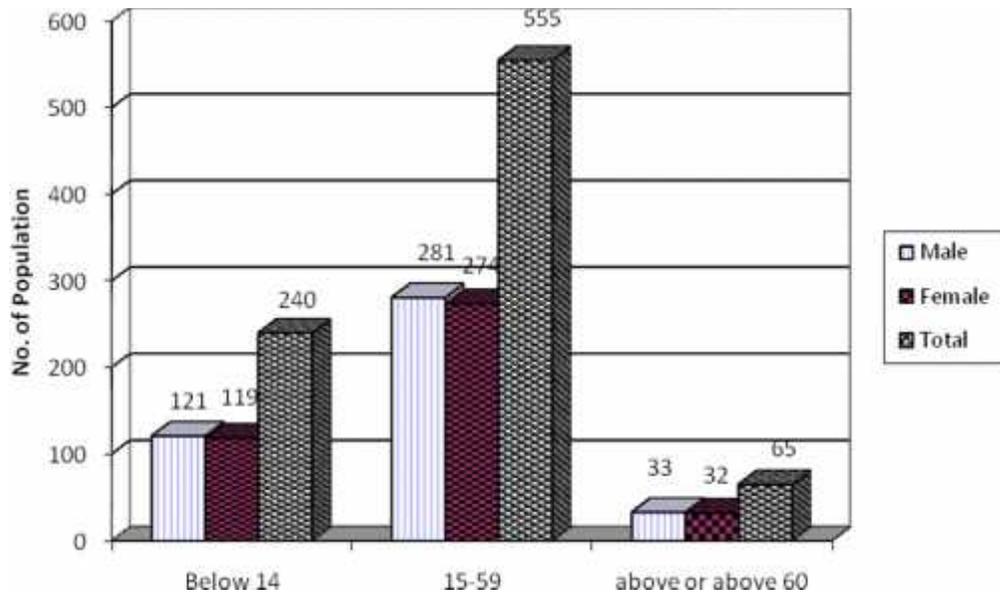


Table 4.1 shows the economically active and dependent population of the study area. The age group of economically active people is generally considered to be 15-59 years but in the context of Nepal, it is 10-59 years. The percentage of working population is 64.5 Percent and other 35.5 Percent people 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.

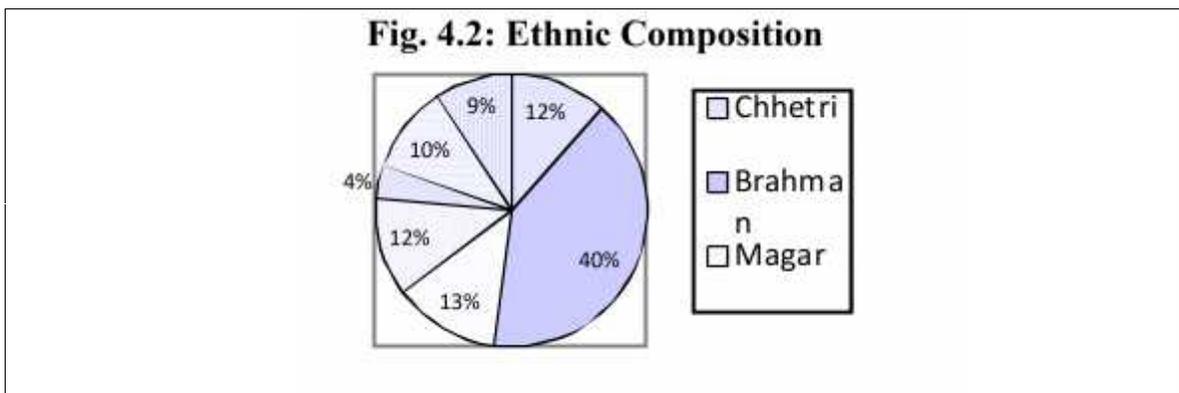
4.2 Ethnic Composition

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, Magar 12.7 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. pop	Percent
Chhetri	20	11.6	100	11.6
Brahman	70	40.5	352	40.9
Mager	22	12.7	110	12.8
Gurung	20	11.6	101	11.7
Newar	7	4.0	32	3.7
Dalit	18	10.4	87	10.1
Other	16	9.2	78	9.1
Total	173	100	860	100

Sources: Field survey 2009





4.3 Literacy and Education

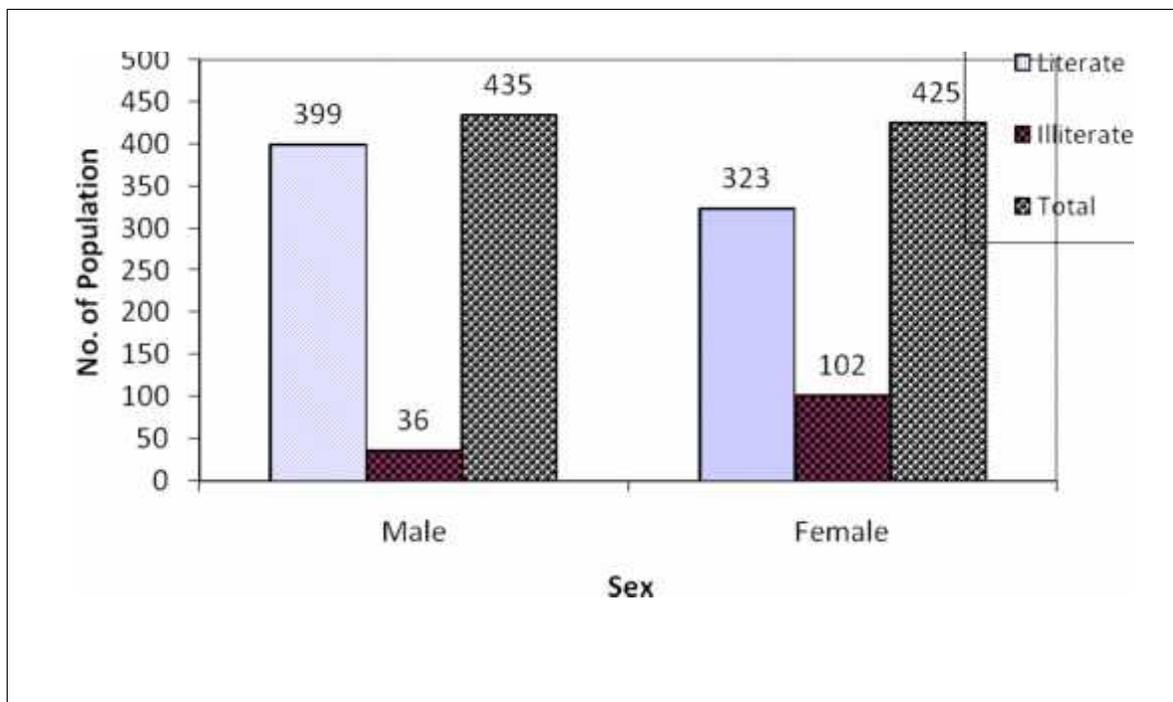
In the study area literacy rate is 84 Percent and illiterate population rate is 16 Percent. Among them 91.7 Percent males are literate and 8.3 Percent are illiterate in the total male population. Female literate population is 76 Percent and 24 Percent female population is illiterate.

Table 4.3: Literacy Composition by Sex

	Male	Percent	Female	Percent	Total	Percent
Literate	399	91.7	323	76.0	722	84
Illiterate	36	8.3	102	24.0	138	16
Total	435	100	425	100	860	100

Sources: Field survey 2009

Fig. 4.3: Literacy Composition by Sex



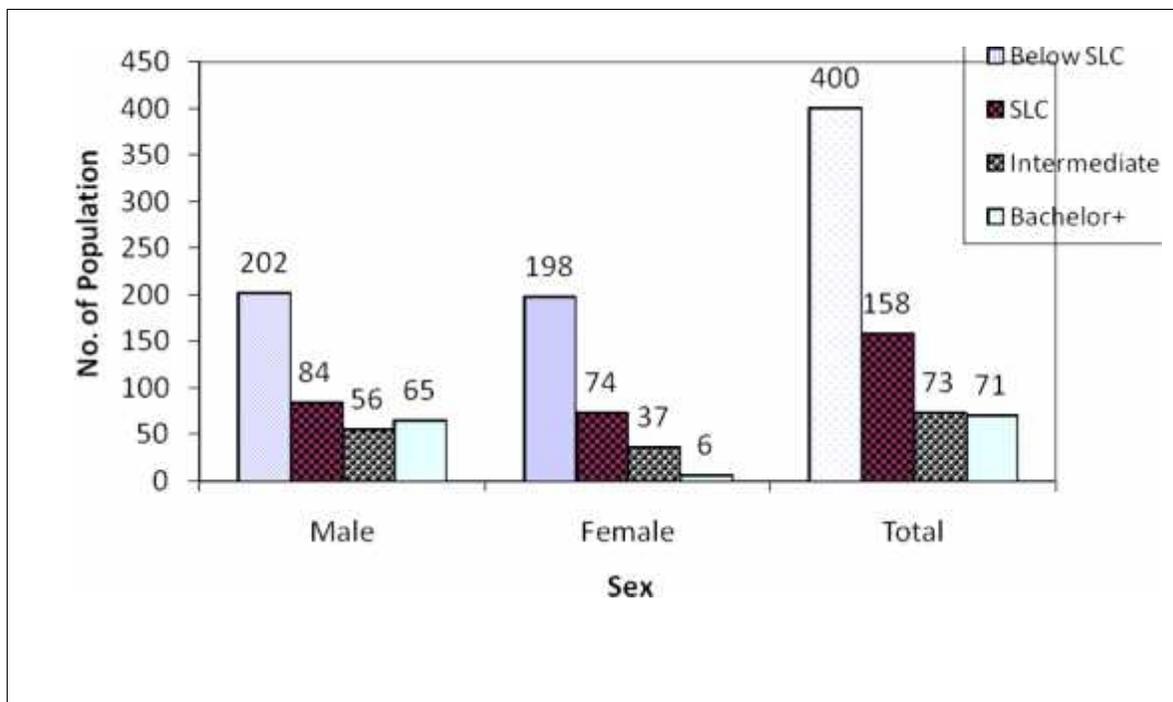
From the table 4.3 we know that female literacy rate is lower than male literacy rate. It indicates that females are dominated in terms of education.

Table 4.4: Educational Status of literate population

	Male	Percent	Female	Percent	Total	Percent
Below SLC	202	50.5	198	49.5	400	55.35
SLC	84	53.2	74	46.84	158	21.9
IA/+2	56	60.2	37	39.8	93	12.86
BA or +	65	90	6	8.4	71	9.89
Total	407		315		722	

Sources: - Field Survey 2009

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 them 60.2 Percent were male and 39.8 Percent were female. Out of total population 9.89 Percent people were B.A or above of 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 in non agricultural activities, such as business service and others respectively.

Table 4.5: Occupational Structure (above 14 years)

Occupation	No of household	Percent
Agriculture	160	92.5
Business	9	5.2
Service	3	1.7
Other	1	0.6
Total	173	100

Sources: Field Survey 2009

Fig. 4.5: Occupational Structure (above 14 years)

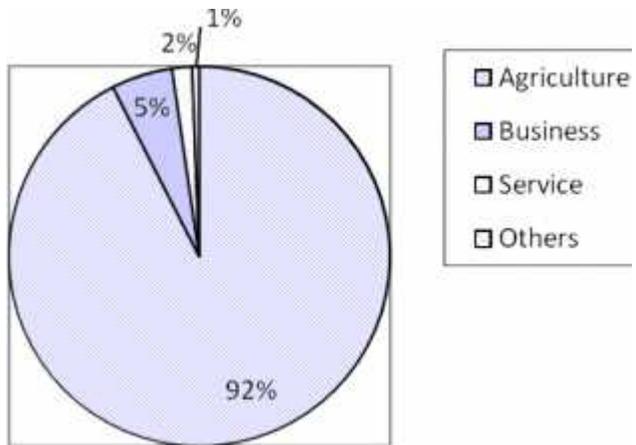


Table 4.5 shows that highest proportion of population is involved in agricultural activities. Business and service come under the second position with 5.2 Percent. Other different occupation accounts for 2.30 Percent

4.5 Birth Place and Migration.

In the study area 52.6 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 & Migration of the People

Birth place	Frequency/ household	Percent
Local	82	47.4
Migrants	91	52.6
Total	173	100

Sources: Field Survey 2009

Fig. 4.6: Birth Place & Migration of the People

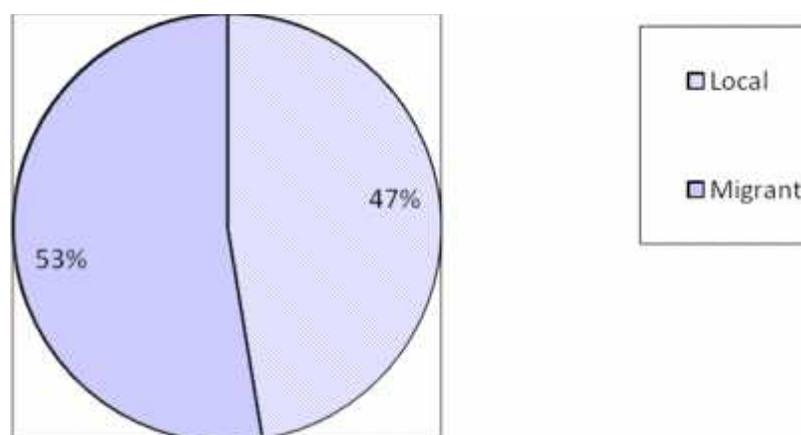


Table 4.7 reveals that 47.4 Percent people are aboriginal and other 52.6 Percent migrated from other surrounding VDCs and other districts to this area. People have migrated in this place due to different causes.

4.6 Causes of Migration

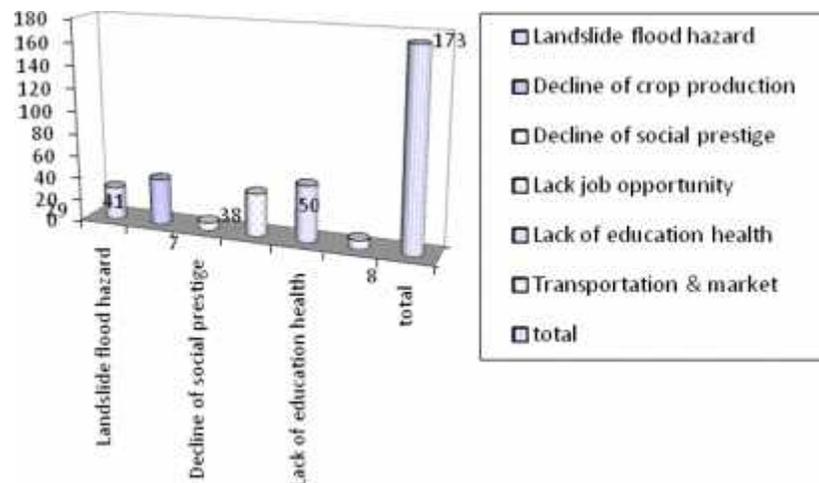
On the basis of birth place larger number of respondents of this study area are born local people 47.4 percent and 52.6 percent people are migrated from other places for various regions. There are many causes of migration from other places in the study area (table :4.7)

Table 4.7: Causes of Migration

Causes	No. of household migrants	Percent
Landslide flood hazard	29	17.0
Decline of crop production	41	23.0
Decline of social prestige	7	4.0
Lack job opportunity	38	22.0
Lack of education health	50	30.0
Transportation & market	8	5.0
Total	173	100

Sources: Field Survey 2009

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: GENERAL CONDITION BEFORE AND AFTER IRRIGATION PROJECT

5.1. Cultivated area before the Irrigation.

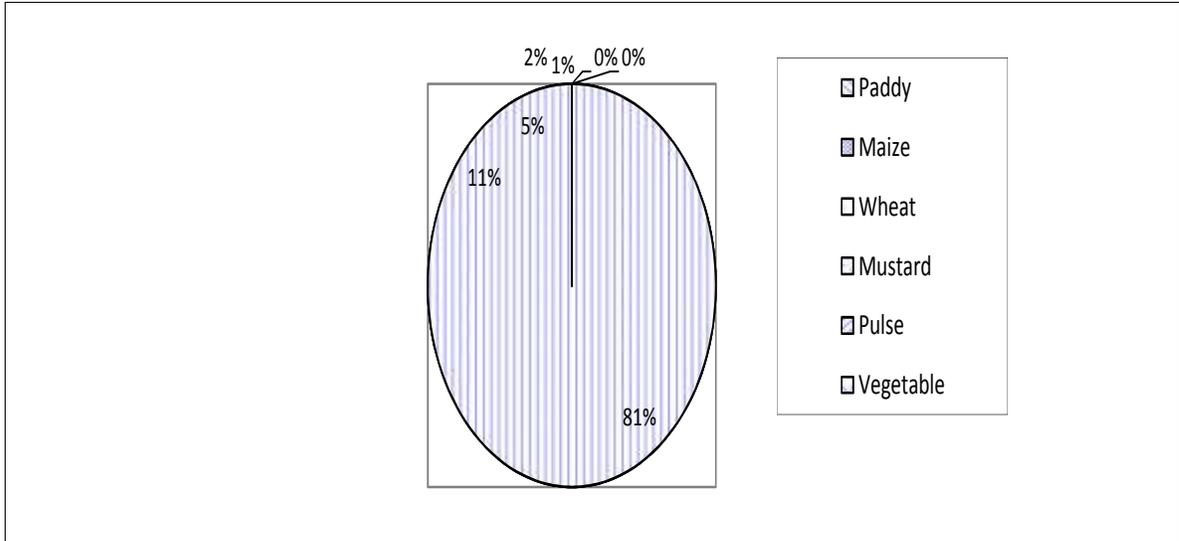
Before the irrigation project the cultivated area was 206 hector. The soil of this area was fertile but due to the lack of irrigation land had not been used properly. Single cropping system was prevalent.

Table 5.1: Cultivated Area

Crops	Cultivated area (in hector)	Percent
Paddy	168	81.5
Maize	22	10.7
Wheat	10	4.8
Mustard	4	1.9
Pulse	2	0.9
Vegetable	-	-
Total	206	100

Sources: Field Survey 2009

Fig. 5.1: Cultivated Area



According to the table 5.1, paddy was dominant crops and produced in 81.5 Percent of the total cultivated land before the irrigation facility. Maize was second crop and produced in 22 hector which is 10.8 Percent of the total cultivated area. Wheat was the third crop and produced in 4.8 Percent of the total land area. In the same way, vegetable was also produced. Mustard was cultivated in 1.9 Percent land and pulse was produced in 0.9 Percent of total cultivated land.

5.2 Production of Crops before Irrigation Facility

Before the completion of Begnas irrigation project, there was lack of irrigation facilities and no any sources of irrigation in the agricultural fields. Only 10 Percent of agricultural land had a seasonal irrigation facility. In that period, irrigation was available only in rainy season by temporary "Kulo" which start from outlet of wet land region. Subsistence farming was the dominant economic activity of this area. This area is the fertile plain region

but due to the lack of proper irrigation facility agriculture couldn't give sufficient production. Before the construction of the Begnas irrigation canal, paddy, wheat, maize, vegetable, mustard etc. were the main production of the study area. The proportion of the land was higher dry crops. Paddy cultivation was limited in wet or swamp land area.

Table 5.2: Crop Production before the Irrigation Facility

Crops	Production in quintal	Percent
Paddy	24.0	33.8
Maize	16.0	22.54
Wheat	15.0	21.13
Mustard	4	5.63
Pulse	12.0	16.90
Vegetable	-	-
Total	71	100

Sources: Field Survey 2009

Fig. 5.2 : Crop Production before the Irrigation Facility

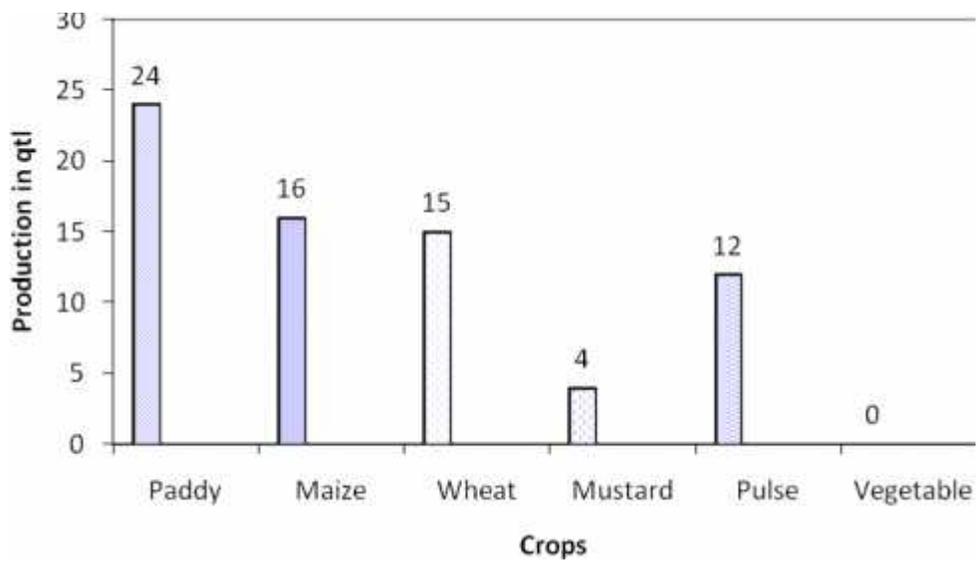


Table 5.2 reveals that paddy was main food grain produced at study area. It was accounted for 33.8 Percent of the total food grain production. Second crop was maize which was produced in 22.54 Percent of the total production. Wheat was the third crop which was grown in 21.13 Percent of the total production. The production of mustard oilseeds and pulse was less. Paddy was grown in rainy season at the dry land. Before the construction of canals this area was dry or semi-dry and crop production was depending on monsoon rainfall. The monsoon rain was not reliable in time.

5.3 Productivity of Crops

Due to the lack of irrigation facility, production of crops was not satisfactory before the irrigation project. The productivity of the crops was low and subsistence farming was prevailing in the study area before the construction of irrigation project. The productivity of crops has been given below (Table :10).

Table 5.3: Productivity of Crops 1987 (Per Hector)

Crops	Production in quintal (per hector)
Paddy	36
Maize	32
Wheat	14
Mustard	4
Pulse	7
Vegetable	-
Total	93

Sources: Field Survey 2009

Fig. 5.3: Productivity of Crops 1987 (Per Hector)

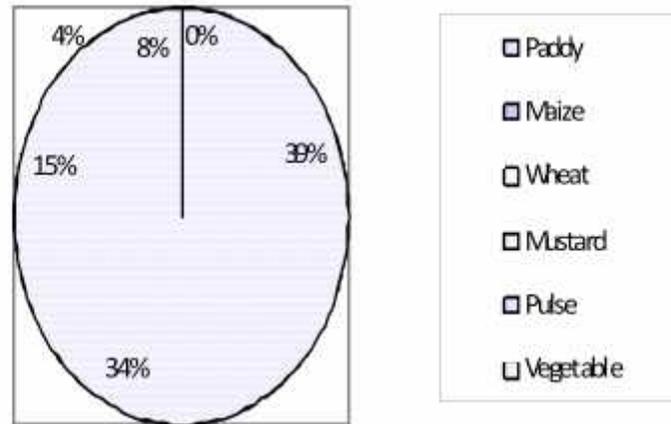


Table 5.3 shows the productivity of crops before the irrigation projects in the study area. The productivity of paddy was 36 quintal per hectare. In the same way, the wheat was produced 14 quintal per hectare. Maize was produced 32 quintal per hectare. Green vegetable was also produced in small scale and other crop was produced 11.9 quintal per hectare before the irrigation facility.

5.4 General Condition after Irrigation (2009)

Changes in cultivated area after irrigation facility, the crop production area has also increased in the study area. It means that irrigation brings changes in cultivated area. Table 5.4 shows the crops production area before and

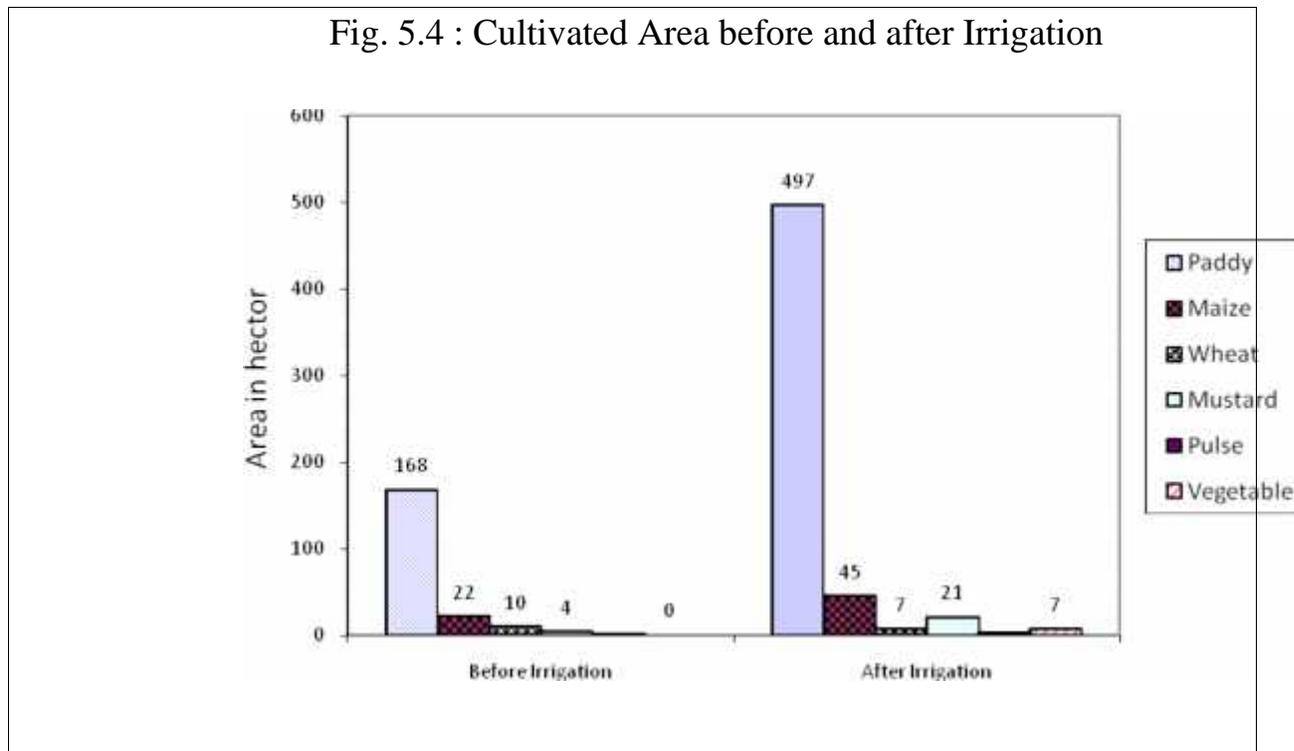
after irrigation project. According to this table crop production has increased due to the irrigation facility.

Table 5.4: Cultivated Area before and after Irrigation

Crops	Before Irrigation in Hector	Percent	After Irrigation in Hector	Percent	Change in Percent	Percent change in Hector
Paddy	168	81.55	497	85.69	159.71	+329
Maize	22	10.68	45	7.76	11.17	+23
Wheat	10	4.85	7	1.21	1.46	-3
Mustard	4	1.94	21	3.62	8.25	+17
Pulse	2	0.98	3	0.52	0.49	+1
Vegetable	-	-	7	1.20	3.4	+7
Total	206	100	580	100	181.56	+374

Sources: Field Survey 2009

Fig. 5.4 : Cultivated Area before and after Irrigation



After the irrigation 181.56 Percent of cultivated land was increase in the study area. Paddy production area has increased by 159.71 Percent. Before the irrigation, paddy cultivation area was 168 hector and it's has reached 497 hector after the irrigation. Wheat production area has increased by 1.96 Percent. Vegetable production area has increased by many times and other cultivated land has increased by 8.74 Percent respectively.

The extension of irrigation has brought changes in cultivated land. The dry lands are converted into irrigated land. There is facility of water supply. After the irrigation facility 374 hector cultivated land has seen increased in the study area. This amount of follow and meadowland has been converted into cultivated land after the irrigation facility.

Before the irrigation facility crop production was totally depended upon the monsoon rain. So, the production and productivity of crops was low and people were not thinking about the increasing of cultivated land. But when irrigation facility has been provided by the Begnas irrigation project, the production of crops has also increased and people has change the 374 hector fallow and meadow land into cultivated land. The increasing of cultivated land has automatically increased the crop production. The cultivated land has increased by 181.56 Percent at the study area in between 1987 and 2009. This became possible by bringing waste land under plough and expansion of irrigation facility to un-irrigated farm lands.

5.5 Production of Crops

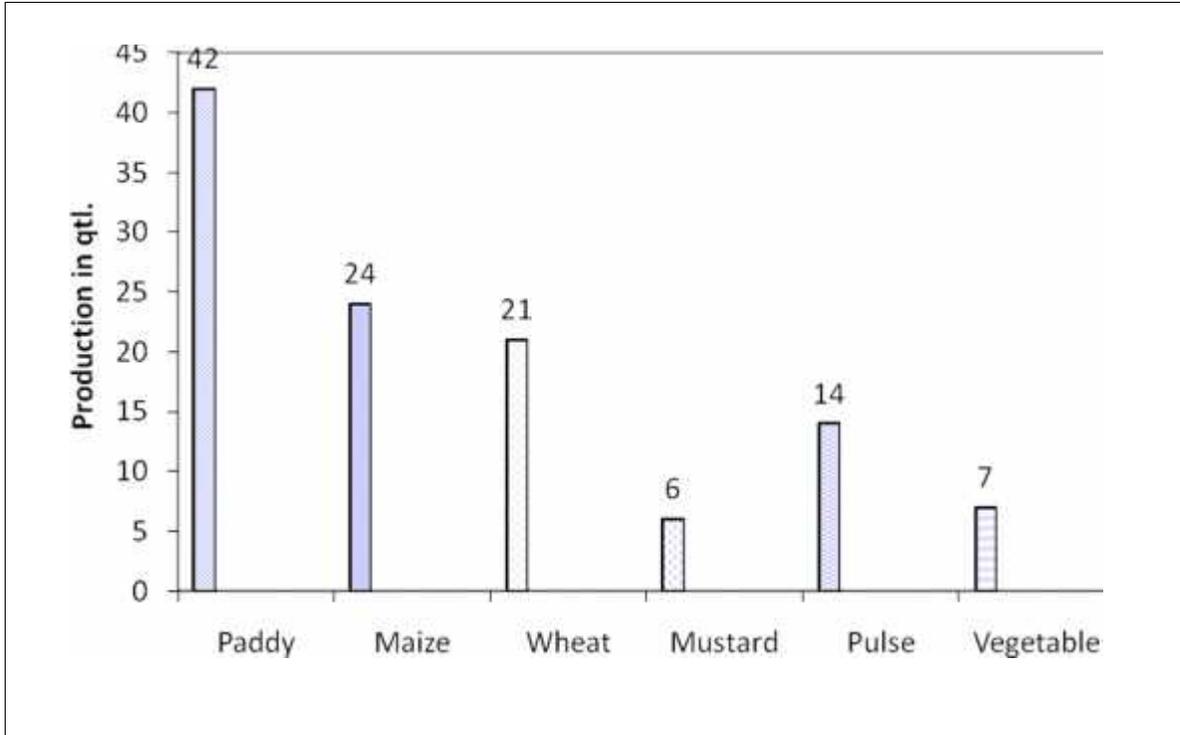
Irrigation facility is available in the study area after construction of canal. But all land has not yet been irrigated. Irrigation has brought a remarkable change in agricultural production in Khudi phat and maize was grown in rainy season and wheat mustard, vegetable were grown in winter season, vegetable were grown in limited area.

Table 5.5: Production of different Crops after Irrigation Facility

Crops	Production in quintal	Percent
Paddy	42	36.84
Maize	24	21.05
Wheat	21	18.42
Mustard	6	5.26
Pulse	14	12.28
Vegetable	7	6.15
Total	114	100

Sources: Field Survey 2009

Fig. 5.5 : Production of different Crops after Irrigation Facility



Total production was 71 quintal before the construction of canal. But now total production of various crops is 128 quintal. Production of crop is increased by 90.88 Percent after irrigation facility. Paddy cultivation is 36.84 Percent of the total crops. Production of wheat accounts 18.42 Percent of the total production. The production of maize is going to decrease after the irrigation facility. It is because maize land is being converted into paddy land by the irrigation facility. Pulse and vegetable accounts were produced 6.15 Percent after the irrigation facility.

5.6 Changes in Crops Production

Expansion of irrigation has increased the production of crops between 1987 and 2009. It is due to the increase of irrigation facility in a cultivated land.

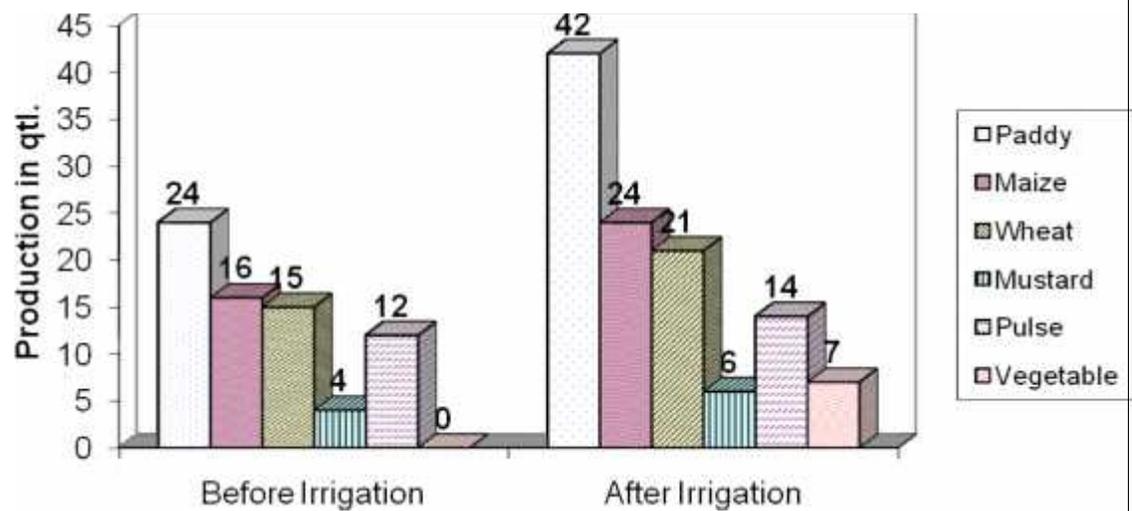
Following table indicates the comparative crops production in the study area. The production of paddy was increased by 75 Percent after the irrigation facility, production of wheat is increasing after the irrigation and it is increased by 37.5 Percent. Likewise the production of maize has increased by 50 Percent. Vegetable has increased by 7 times, mustard has increased by 50 Percent and other has increased about 13 Percent.

Table 5.6: Production of Crops before and after Irrigation

Crops	Production in quintal (1987)	Percent	Production in quintal (2009)	Percent
Paddy	24	33.8	42	36.84
Maize	16	22.54	24	21.05
Wheat	15	21.13	21	18.42
Mustard	4	5.63	6	5.26
Pulse	12	16.90	14	12.28
Vegetable	-	-	7	6.15
Total	71	100	114	100

Sources: Field Survey 2009

Fig. 5.6: Production of Crops before and after Irrigation in quintal



The data indicates that the production of crops has been increased with the increased of irrigation facility in the study area.

5.7 Productivity of Crops after Irrigation Facility.

The productivity of crops also increased after the irrigation facility. Due to the irrigation facility per hector, production of crops has increased after the canal in this area.

Table 5.7: Productivity of Crops 2009 (in quintal)

Crops	Production per Hector
Paddy	48
Maize	42
Wheat	28
Mustard	8
Pulse	16
Vegetable	100
Total	

Sources: Field Survey 2009

Fig. 5.7: Productivity of Crops 2009 (in quintal)

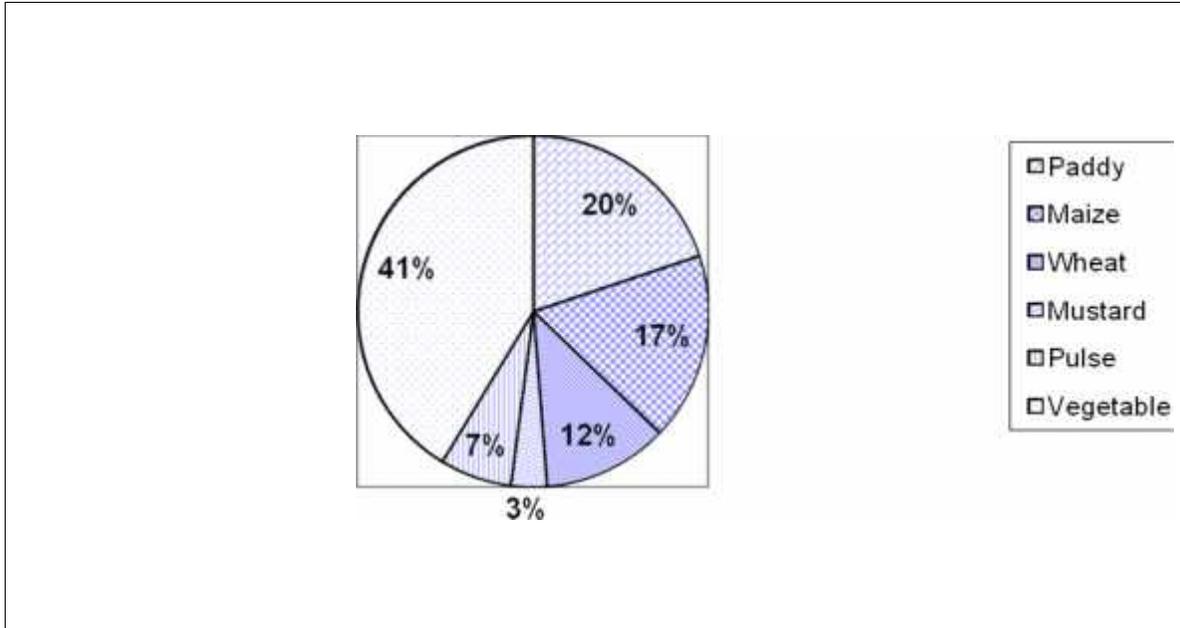


Table 5.7 reveals the productivity of crops after the irrigation facility in the Khudi Phat. The productivity of paddy 48 quintal per hector wheat is product 28 quintal. In the same way, the productivity of vegetable is 100 quintal per hector. The productivity of maize has been increased after the irrigation facility but the productivity of maize has been increased. Productivity of maize is 42 quintal per hector. The productivity of mustard has been 8 quintal per hector and pulse has been 16 quintal per hector. The productivity of crops is increased after irrigation facility in the study area.

5.8 Changes in Agricultural Productivity

The irrigation has increased the productivity of crops. It has made possible to grow crops by using modern technology of production as such the local farmers have adopted high yielding varieties of seeds, chemical fertilizers,

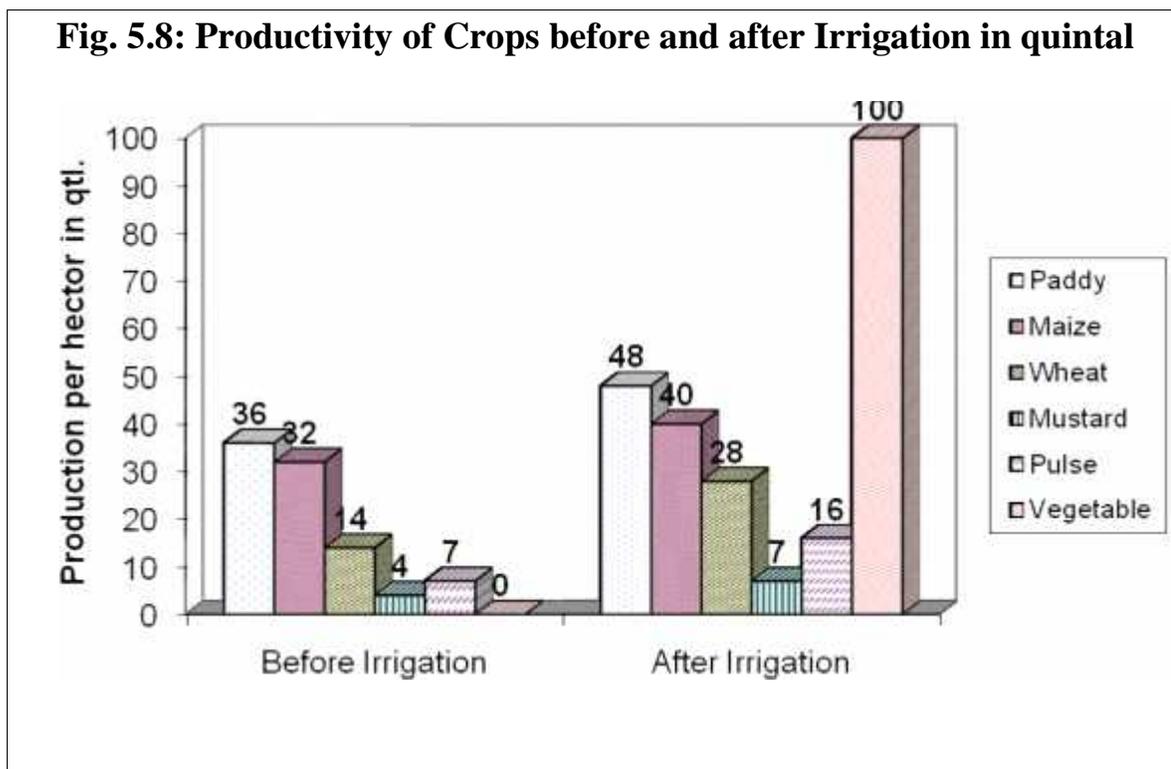
modern tools and insecticides or pesticides by which they are able to increase per the yield of crops.

Table 5.8: Productivity of Crops before and after Irrigation (in quintal)

Crops	Production per hector before irrigation (1987)	Production per hector after irrigation (2009)	Increased percent	Absolute increase (in qtl)
Paddy	36	48	33.33	12
Maize	32	40	25.0	8
Wheat	14	28	100.0	14
Mustard	4	7	75.0	3
Pulse	7	16	128.57	9
Vegetable	-	100	Many times	100
Total	93	239		

Sources: Field Survey 2009

Fig. 5.8: Productivity of Crops before and after Irrigation in quintal



From the table 5.8 we know that the productivity of crops has also increased after irrigation facility. Productivity of paddy per hector was 36 quintal before irrigation facility, but after the irrigation, productivity of paddy per hector has increased by 33.33 Percent and the production is 48.9 quintal. The productivity of wheat per hector has increased by 100 Percent after irrigation. Likewise the productivity of vegetable has increased by many times. Maize has increased by 25 Percent, mustard has increased by 75 Percent and pulse has increased by 128.57 Percent after the construction of irrigation project. The productivity of all crops has been increased after the irrigation facility due to the available of proper irrigation for crops.

5.9 Cropping Intensity

The cropping intensity has also changed between 1987 -2009 in the study area .The main factor to bring changes in intensity of crops is irrigation. Cropping intensity was calculated on the basis of following formula.

$$\text{Cropping Intensity (C.I.)} = \frac{\text{Sum of the crop Area}}{\text{Cultivated Area}}$$

Table 5.9: Cropping Intensity (1987-2009)

Crops	Intensity of cropping before irrigation (1987)	Intensity of cropping after irrigation (2009)
Paddy	29	85.7
Maize	3.8	7.8
Wheat	1.7	1.2
Mustard	0.7	3.6
Pulse	0.3	0.3
Vegetable	-	1.2
Total	33.5	99.8

Source: Field Survey 2009

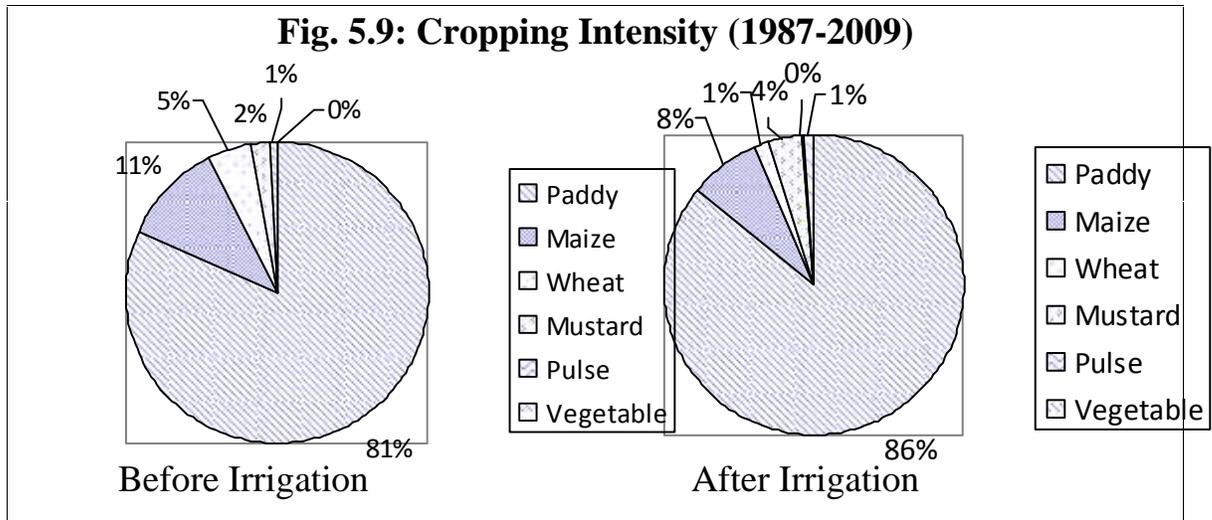


Table 5.9 supports that the cropping intensity has increased after the irrigation facility. Total intensity of crop has slightly changed at after irrigation facility. Before irrigation the total intensity of crop was 33.5 Percent, which has increased 66.3 Percent after the irrigation facility. The

intensity of wheat production has increased 1.2 Percent after the irrigation facility. The intensity of paddy production has also increased by 85.7 Percent. The intensity of vegetable production has increased by 120 Percent. The overall noticeable change has been marked in all the crops after irrigation. Maize except which has been found declined. It is due to the increase in the paddy field people have replaced the area under maize to paddy cultivation.

5.10 Cropping Pattern

5.10.1 Cropping Pattern before the Irrigation Project

Before the construction of Begans irrigation project agricultural activities were fully depends on monsoon rainfall in this area. There was not any source of irrigation. During that period there was diversified cropping pattern. Various types of crops were produced such as paddy maize wheat mustard vegetable.

Paddy and maize were grown in summer season, paddy in dry land. Wheat, mustard, pulse and vegetable were grown in winter season and dry season.

Table 5.10: Cropping Pattern before in Irrigation (1987)

Area	Summer crop	Winter crop
Wet land	Paddy	Wheat, Mustard, Pulse
Dry land	Maize	Mustard, Pulse, Sugarcane

Source: Field Survey 2009

According to table 5.10 Paddy was grown in wet land during the summer season and cultivated in July. Maize was produced both in wet land and upland during the summer season but mostly grown in dry land. Mustard was grown in dry and wet land and vegetables were used to produce in wet land during the winter season.

5.10.2 Present Cropping Pattern

Irrigation has brought a remarkable change in cropping pattern. People used to grow various types of crops in dry land after the irrigation facility. At present cultivated land has been irrigated in the study area. Due to this irrigation facility people also have started growing diversified crops.

Table 5.11: Cropping Pattern after Irrigation

Area	Summer crop	Winter crop
Wet land	Paddy	Wheat, Mustard, Vegetable
Dry land	Paddy	Mustard, Wheat ,Vegetable

Source: Field Survey 2009

Cropping pattern has changed after the irrigation facility. After the construction of irrigation canal, paddy used to produce both in dry and wet land during the rainy season. Similarly, wheat are also used to grow in both wet and dry land during the winter season.

5.10.3 Changes in Cropping Pattern

The increased of irrigation facility there have changed in cropping pattern. Before the irrigation, paddy is used to produce in dry land during rainy season. Before the construction of irrigation canal wheat was produce

only in wet land. But after the irrigation, wheat occupies dry land also during the winter season. People are practicing to grow different types of vegetable at tar. Before the irrigation substance, type of farming was adopted by the people. But present day people are slowly changing there agriculture system and adopting the commercial type of farming.

5.10.4 Cropping Calendar

Table 5.12: Cropping Calendar

Crop	Time
Yearly Paddy	April - July
Late Paddy	June - November
Wheat	November - March
Maize	March - July
Mustard	October - February
Winter Vegetable	September - February
Sumer Vegetable	February - September

Source: Field Survey 2009

From the table 19, double cropping system is practice in the study area. During the there months period March - June the cultivated lands in the command area remain fallow. This may be because irrigation water is not sufficiently available during this period. Cropping pattern and cropping intensity is generally dieted by water availability. We have already known that the intensity of cropping has changed after the irrigation facility. That means after the irrigation facility people at the study area are adopting

double cropping system. Irrigation facility will be helpful for the practice of triple cropping system in the study area after the regular supply of water from irrigation canal.

5.11 Use of Chemical Fertilizer

Comparative data at the chemical fertilizer per hector at the Begnas irrigation project command area for different crops before and after irrigation facility is presented in table 5.13. Use of chemical fertilizer has increased after the irrigation facility. The increase of chemical fertilizer has also helped to increase the production of crops.

Table 5.13: Use of Chemical Fertilizer before and after Irrigation (Per hector)

Crops	Before irrigation chemical fertilizer (Kg)	After irrigation chemical fertilizer (Kg)	Change in Percent
Paddy	60	120	100.0
Wheat	50	90	80.0
Maize	15	30	100.0
Mustard	12	30	150.0
Pulse	3	10	233.33
Vegetable	35	100	185.72

Sources: Field Survey 2009

Fig. 5.10: Use of Chemical Fertilizer before and after Irrigation (Per hector)

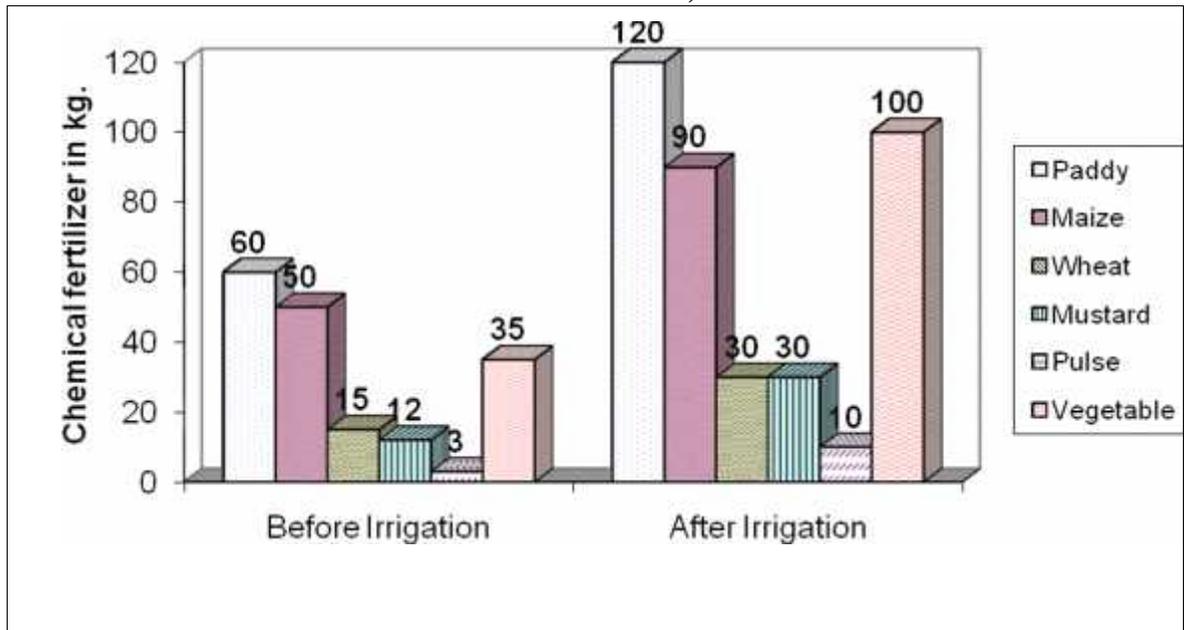


Table 5.13 shows that the use of chemical fertilizer has increased after the irrigation. Before the irrigation use of chemical fertilizer was very low. Only 60 kg per hector Chemical fertilizer was used for paddy production and it has increased by 100 Percent and reached 120 kg per hector. Before irrigation 50 kg per hector fertilizer was used for wheat production, which has increased by 80 Percent and reached 90 kg per hector after the irrigation. Likewise; for the production of pulse and mustard low amount of chemical fertilizer was used before the irrigation facility. But after the irrigation facility it has increased by 133.33 Percent and 150 Percent respectively. Only 15 kg chemical fertilizer was used for maize production before irrigation, which was increased by 100 Percent and reached 30 kg per hector. For the production of vegetable only 35 kg per hector chemical fertilizer was

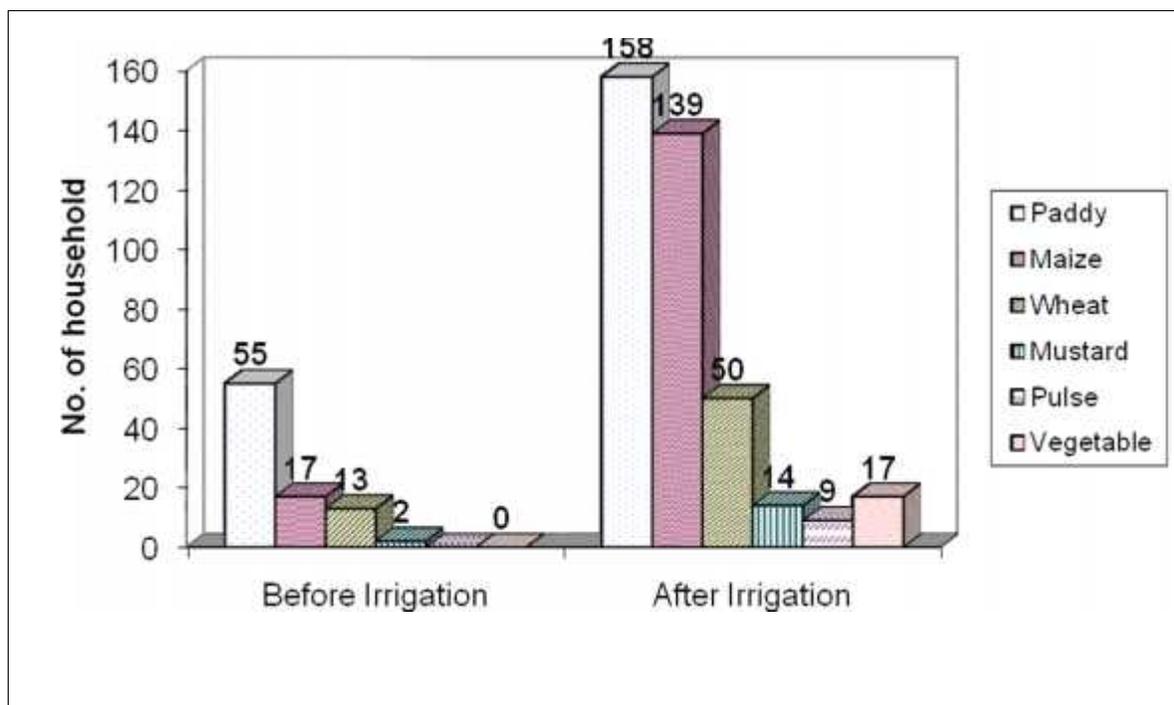
used before irrigation. It increases by 185.72 Percent and reached 100 kg per hector after the irrigation facility.

Table 5.14: User of Chemical Fertilizer (Household)

Crops	Before irrigation user household	Percent	After irrigation user households	Percent	Changes household
Paddy	55	31.79	158	91.33	103
Wheat	17	9.83	139	80.35	122
Maize	13	7.51	50	28.90	37
Mustard	2	1.16	14	8.09	12
Pulse	-	-	9	5.20	9
Vegetable	-	-	17	9.83	17

Source: Field Survey 2009

Fig. 5.11: User of Chemical Fertilizer (Household)



From the table 5.14 shows that limited number of households used chemical fertilizer for the production of crops before the irrigation facility. Before irrigation only 31.79 Percent of the total households use chemical fertilizer in paddy field. But after the irrigation the use of chemical fertilizer paddy field were increased by 91.33 Percent of the total households. For the production wheat only 37.57 Percent of the total household used chemical fertilizer before irrigation and it has increased by 28.90 Percent after the irrigation. Only 0 Percent of households were practiced to use chemical fertilizer for production of pulse before the irrigation but after irrigation 5.20 Percent of the total households have used chemical fertilizer for product pulses. Likewise only 9.83 Percent of the total households were used it for production of maize before the irrigation. Which has increased 80.35 Percent after the irrigation, 1.16 Percent of the total households were practiced to use this chemical fertilizer for the mustard field before irrigation and it has increased 8.09 Percent of the households.

Before the irrigation facility is nil household was used chemical fertilizer for the produced vegetable. But after the irrigation the user of chemical fertilizer in vegetable field have increased in 9.83 Percent of the total households.

In this way apart from the irrigation facility chemical fertilizer is also essential factors for the crop production. In the study area people have used chemical fertilizer in cultivated land after the irrigation facility which became more helpful to increase the crop production. Many people of this

area have known about the role of the chemical fertilizer to increase the crop production and they have increased the use of chemical fertilizer in crop land. As a result the production of crops has increased by 60.56 Percent after the irrigation facility and reached 77 quintal in hector to 114 quintal in per hector. The chemical fertilizer has increased the productivity of crops. So we can say that irrigation facility has also brought a change in the uses rate and user households of chemical fertilizer in the cultivated land.

5.12 Changes in Economy of Begnas Irrigation Command Area at Khudi.

Irrigation is very essential factor for crop production. It has also changed the economic condition of the people by increasing production of crops which raise the living standard of people. It has increased by the irrigation facility. Irrigation has changed the functional structure of the people. It helps to develop the commercial farming. The higher production of crops people have invested the money in other activities.

5.13 Changes in the Functional Structure.

Irrigation is not only essential for crop production but it has also changed the status of society and it's people. The functional structure of the society has been influenced by the irrigation. The place where irrigation facility is available there is low pressure of population on agricultural sector because higher production makes the higher saving. People invest their

money in other activities. Due to the irrigation facility people can grow higher amounts of crops.

In the study area 92.5 Percent population has involved in agricultural sector and more land is used for cultivation. The living standard of the people had increased because there was food deficit before the irrigation facility but after irrigation the production of crop has increased and they have been food surplus. In Khudi (Lekhnath Municipality 12) 5.2 Percent of total population are involved in business. 1.7 Percent population are involved in service and 0.6 Percent were involved in other different occupations respectively.

In the study area the living standard of people has been increased due to the higher amount of crop production which has affected on the occupational structure of people. Increasing crop production means the increasing the source of income of the people.

The main income source of the people in this area is agricultural production. We know that the crop production of this area increased from 71 quintal to 114 quintal during 1987 to 2009. It means the income situation of people in was found comparatively increase definitely after the irrigation facility in the study area. Many people are involved in commercial vegetable farming after irrigation facility. People were invested there saving money in different activities, which were helpful for improvement their economic condition.

5.14 Changes in the Food Grain and Vegetable Production

Irrigation is important for the increase in production of crops. It is necessary for all types of crops but some crops especially need irrigation such as paddy, maize, wheat, vegetable.

In the study area 580 hector land has been used for cultivation due to the irrigation facility after the construction of canal. Before the irrigation 206 hector land was under cultivation. It means 374 hector barren land changed into cultivated land due to the irrigation facility (table 5.4) land has irrigated by temporary pane before the construction of the canal in this area. All crops were depended upon the monsoon rainfall and the production was low before the irrigation such as paddy production came about 24 quintal per hector before the irrigation facility and it has changed into 18 quintal per hector after the irrigation (table 5.6). It shows that the food grain and vegetable production has increased as the subsistence by irrigation.

Table 5.15: Food grain sufficiency between 1987 and 2009

Food grain sufficiency	Before irrigation in Percent (1987)	After irrigation in Percent (2009)
Food sufficiency for a year	23	59
Food sufficiency for 10 month	25.3	18.3
Food sufficiency for 8 month	21.2	9.4
Food sufficiency for 6 month	11.5	6.3
Food sufficiency for below 6 month	19	7

Sources: Field Survey 2009

Fig. 5.12: Food Grain sufficiency between 1987 and 2009

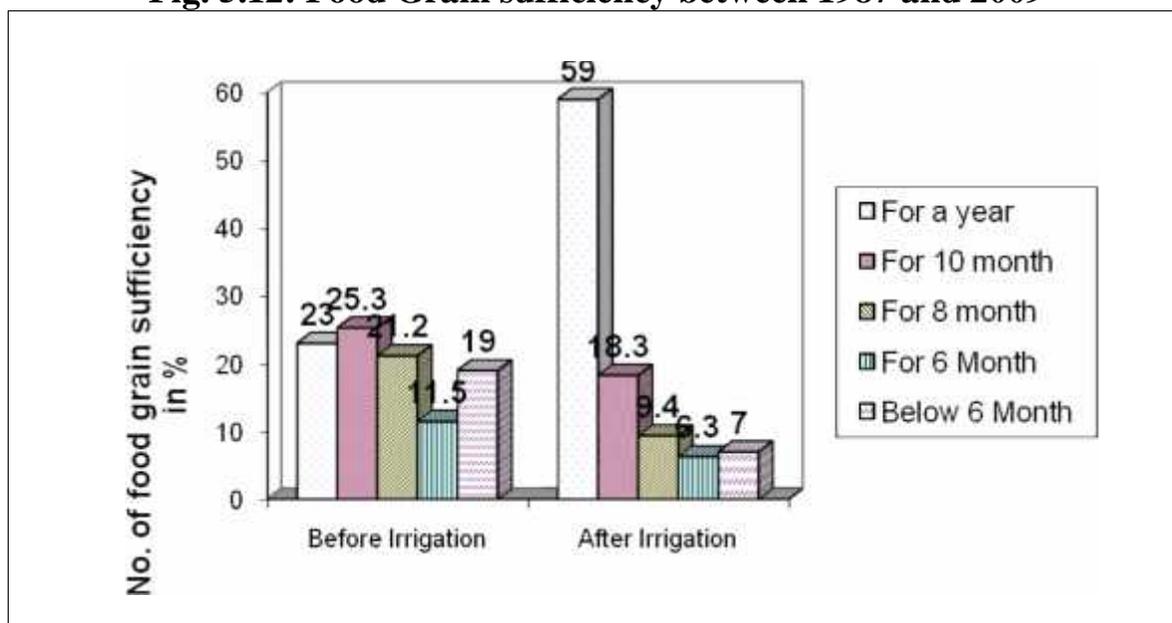


Table 5.15 shows that the food grain production has increased with the irrigation facility. Only 23 Percent of the people in the study area had sufficient food grain before the irrigation but in 2009. 59 Percent of the people have sufficient food grain to the whole years.

During the period of 1987 only, 25.3 Percent people have sufficient for 10 months and it decreased to 18.3 Percent in 2009 due to the irrigation facility. Similarly the irrigation facility had increased the crop production

and higher crop production had increased food grain vegetable sufficiently. Thus in this area there has been more sufficiency of food grain.

5.15 Problems of the Study Area

In this study, farmers are facing various types of problem. The main problems are as follow:

Problems related with Irrigation Canal

-) Due to lack of branch canal all people were unable to take equal benefit from the irrigation.
-) The water in Begnas Lake was in sufficient in winter to provide irrigation facility for the command area. So, the production is very low in winter.
-) Institutional development is not well maintain due to ignore at repair and maintenance at the canal. Recently formed water users association could not take carefully for the canal repair and maintenance.
-) Lack of co-ordination of water user association and water user group, people participation and operation and management of allocation and distribution of water brought conflict for water issue.

Problem related with Agriculture

-) Junior technical services have not been provided to the farmers of the command area. So the farming technology is very poor.

-) Lack of utilization modern well equipment for the agriculture activities such as, lack of quality seeds, harvesting machine using methods of pesticide and insecticide.
-) Uncertainty in supply of Chemical fertilizer, improved seed & tools by the government agencies.
-) Lack of agricultural market to sell the agricultural production on the reasonable price.
-) Lack of market mechanism in the study area to sell the surplus foodgrain.
-) Lack of financial supports to the farmers for the investment of the agriculture.
-) Lack of crop insurance through the government and insurance companies.
-) Haphazardly development of residential area and urban centre in the agricultural field. Therefore the agricultural field has lost.
-) Lack of cold storage for preserving perishable good.

CHAPTER - VI: SUMMARY FINDINGS AND RECOMMENDATION

6.1 Summary Findings

Nepal is a landlocked mountainous country in the mid-west of the mighty Himalayan range. The total area is around 147181 Sq. km. with a population at about 23.2 millions. There is predominantly an agricultural function, where 81 percent economically active population is engaged in agriculture. Agriculture contributes more than 40 percent of total gross domestic production. The agricultural production accounts near about 70 percent at the total exported value of the country. There is 18 percent total cultivated land, where food grain, cash crops and oilseeds are main crops. However 33 percent of land area could be potentially cultivated of irrigation and soil fertility. The crops production depends on monsoon rainfall in summer season when rainfall is generally adequate. About 80 percent of the total annual rainfall occurs within from June to September. Without irrigation facility the crops production cannot gives more profit.

Nepal has 2641752 hecters agricultural land out of the total land area, where only 1765840 hecters land is possible for the irrigation. However, there are 1168144 hecters land is irrigated the last of the 10th plan. In WDR of Nepal, total land have occupied 2939800 hecters and 420976 hecters land for the agriculture purpose. But only 190924 hecters land is irrigated.

However Kaski district has occupied 201700 hectors land. But it has covered 11969 hectors land irrigated by the many irrigation project.

Lekhnath municipality has covered 7893 hectors land the elevation range from 617 to 1217 meters above the sea level in the south-eastern part of the Pokhara valley in Kaski district.

Lekhnath municipality has fertile land in the valley floor but due to the lack of irrigation facility crop & vegetable production was not satisfactory before the Begnas irrigation project. Before the irrigation project, limited area was irrigated by the method of traditional system. After the construction of canal water was supplied in the command area.

There is 1980 hectors land utilization for the food grain, vegetable crops, oilseeds etc. Lekhnath municipality has five irrigation projects which are occupied 1980 hectors land irrigated. Begnas irrigation project covered 580 hectors land out of the total irrigated land of the municipality. About 1015 households & 5001 population live in the Begnas irrigation command area. This project can be improved by developing agriculture system and can be uplifted changing livelihoods of the farmers.

The study area, it is based on Khudi Phat which lies on Lekhnath municipality no. 12, Khudi tole. The total population of this area is 860 out of which 50.6 percent are male and 49.4 percent female. In this area 35.7 percent people are dependent the age of under 14 & over 60 years. The literacy rate is 84 percent out of the total. Among than 91.7 percent male are literate and 76 percent female is literate. Female literacy rate is lower than male literacy rate.

In the study area 92.5 percent population is engaged in agriculture. Only 7.5 percent people are employed in non agricultural activities such as business, service and other functions. However 52.6 percent people are aboriginal in this area. Likewise, there are 30 percent people migrated due to the lack of education and other 27 percent people migrated in search of job opportunity in the new places and many surrounding VDCs.

Before the irrigation project the cultivated area was 206 hectars and single cropping system is prevailed. Vegetable crops has nil before the irrigation project. Only 10 percent agricultural land has seasonal irrigation facility. In rainy season by temporary "Kulo" which start from outlet of wetland area.

Paddy accounted for 33.8 percent of the total food grain production and the share of maize production is 22.54 percent in the total production.

The productivity of crops was very low before the construction of irrigation project such as paddy 36 quintal, maize 32, wheat 14, mustard 4 quintal.

After the irrigation 181.56 percent of cultivated land was increased in the study area. Paddy production area has increased by 159.71 percent and its area has reached 168 hectars to 497 hectars after the irrigation. Other crop production has been tending towards increasing after the irrigation. After the irrigation facility 374 hectars land has seen increased for the cultivation.

The total production of crop is increased by 90.88 percent after the irrigation facility. The productivity of crops is increased after irrigation

facility. The cropping intensity has also changed between after and before irrigation facility. The cropping intensity has increased by 66.3 percent after the irrigation. The intensity of paddy production has also increased 85.7 percent and vegetable crops production has increased by 120 percent. However the paddy field people have replaced the area under maize to paddy cultivation.

After the construction of irrigation channel, paddy used to produce both in dry and wet land during the rainy season. After the irrigation facility people are adopting double and triple cropping system in the study area.

Chemical fertilizer has increased after the irrigation. It used 60kg per hectars before the irrigation but 5.10 percent has increased after the irrigation in the study area. For vegetable has increased 185.72 percent and reaches 100 kg per hectars after the irrigation facility. The use of chemical fertilizer has increased after the irrigation facility.

Irrigation has also changed the economic condition of the people by increasing production of crops which raise the living standard of people. Irrigation has changed the functional structure of the people. It helps to develop the commercial farming. People have huge invested in the cash crops/vegetable crops after the irrigation. Business activities and animal & poultry farming have also increased in the study area. Many farmers have produced vegetable after the irrigation facility. Many farmers have sufficient food grain and vegetable after the construction of the canal. Farmers have adopted commercial farming after the irrigation facility.

6.2 Recommendation

Begnas irrigation has brought changes in the community of its command area. However, there are different types of problems in this area which are affecting the production of crops. Following recommendation has been made for improvement and further research.

A. Recommendation related with Canal

-) There should be availability of skilled manpower and sufficient tools for the maintenance and operation works.
-) Public participation is necessary for maintenance and operation of main and branch canals.
-) There should be tree plantation along the side of canal.
-) It is necessary to supply regular water for crop production from main canal to all command area.
-) Institutional linkage with various agencies like government, different NGO/INGOs, and private organization is very important for the development of irrigation project.
-) Systematic planning of labour contribution to maintenance and operation of canal.
-) Water user groups should be active for the maintenance of the canal.

B. Recommendation related with Agriculture Sector

-) Distribution of chemical fertilizer improved seed and tools should be distributed in certain time and place with equal quality.

-) New technology should be applied in agriculture fields such as bio-culture, poly-culture, multiple cropping system, rotation system and diversification.
-) To link it with transportation network is necessary to developed agro-technology.
-) There should be arrangement for scale & distribution.
-) Credit from government for agro-production to the farmers is necessary.
-) Co-operative should be formulated for the selling agricultural production.
-) The farmers should be encouraged to for the organic vegetable production.
-) There must be facility to training to the farmers to improved agro-technology.
-) There should be encouraged to the farmers for the fisheries in the wet land area should be conserved agricultural land for the future.
-) There should be controlled haphazardly development of residential area in the agricultural land.

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Appendix – A

Total no. of household and selected sample household in the study area:

1	31	61	91	121	151	181	211	241	271	301
2	32	62	92	122	152	182	212	242	272	302
3	33	63	93	123	153	183	213	243	273	303
4	34	64	94	124	154	184	214	244	274	304
5	35	65	95	125	155	185	215	245	275	305
6	36	66	96	126	156	186	216	246	276	
7	37	67	97	127	157	187	217	247	277	
8	38	68	98	128	158	188	218	248	278	
9	39	69	99	129	159	189	219	249	279	
10	40	70	100	130	160	190	220	250	280	
11	41	71	101	131	161	191	221	251	281	
12	42	72	102	132	162	192	222	252	282	
13	43	73	103	133	163	193	223	253	283	
14	44	74	104	134	164	194	224	254	284	
15	45	75	105	135	165	195	225	255	285	
16	46	76	106	136	166	196	226	256	286	
17	47	77	107	137	167	197	227	257	287	
18	48	78	108	138	168	198	228	258	288	
19	49	79	109	139	169	199	229	259	289	
20	50	80	110	140	170	200	230	260	290	
21	51	81	111	141	171	201	231	261	291	
22	52	82	112	142	172	202	232	262	292	
23	53	83	113	143	173	203	233	263	293	
24	54	84	114	144	174	204	234	264	294	
25	55	85	115	145	175	205	235	265	295	
26	56	86	116	146	176	206	236	266	296	
27	57	87	117	147	177	207	237	267	297	
28	58	88	118	148	178	208	238	268	298	
29	59	89	119	149	179	209	239	269	299	
30	60	90	120	150	180	210	240	270	300	

Note: Bold sample universe

Normal total universe

APPENDIX -B

The Impact of Begnas Irrigation Project on its Command area of Lekhnath Municipality, Kaski

Questionnaire

This survey is conducted within Cannal command area in Lekhnath Municipality for the partial fulfillment of MA 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)

SN	Occupation	No. of persons		Total
		Male	Female	
1	Agriculture			
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?

Ans. 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. Agriculture production before and after the Begnas irrigation project.

Crops	Before irrigation	After irrigation
Paddy		
wheat		
maize		
mustard		
pulse		
vegetable (kg)		
others		

18. Use of fertilizer to produce the agriculture crops.

Crops	Before irrigation		After irrigation	
	Area (Ropani)	Chemical, fertilizer (kg)	Area in Ropani	Chemical fertilizer (kg)
Paddy				
wheat				
maize				
mustard				
pulse				
vegetable				
others				

19. Food grain sufficiently at last year.

	paddy	maize	wheat	mustard	pulse	vegetable	other
Sufficient							
Deficit							

20. If you have deficit, how long did the food deficit.

..... month.

21. Selling price of surplus food (per quintal or muri)

Crop	paddy	maize	wheat	pulses	mustard	vegetable	other
Price Rs.							

22. How much expenditure was there in your family last year? (A part from agriculture)

Heading	Fooding	cloth	fuel	Health & education	festival	entertainment	other
expenditure Rs.							

23. Expenditure in agriculture per Ropani at last year (Rs.)

Crop →	paddy	wheat	maize	mustard	pulse	vegetable	other	total
labour								
fertilizer								
seeds								
others								
total								

24. If you have saving the money, where do you invest your money or goods?

(a) to buy land (b) to gain in interest

- (c) to business (d) to keep in bank (e) to buy ornament
 (f) to lend money (g) others

25. Annual cropping pattern

Winter crops	Area Ropani	Production in quintal	Summer crops	Area Ropani	Production in quintal
After Irrigation					

26. Problems related with Begnas irrigation.

- a) Lack of regular irrigation.
- b) Capacity of canal has not sufficient.
- c) Branch canal has not constructed.
- d) The volume water has not sufficient.
- e) Water was not equally distributed by irrigation project.
- f) Others.

27. Problem related with the agriculture sector

- a) Chemical fertilizer, seeds, agriculture tools have not use.
- b) JT and JTA service has not facilitated.
- c) Chemical fertilizer, seeds and agriculture foods have not sufficiently provided.
- d) Lack of irrigation

e) Lack of capital and labour

f) lack of agriculture market

g) others.

28. Do you have any comments and suggestion to Begnas irrigation project?

.....
.....

Thank you