

# **FARMERS' PARTICIPATION IN IRRIGATION MANAGEMENT**

**(A Case Study of Tarawali Irrigation Scheme, Ghermu, Lamjung)**

**A Dissertation Submitted to the Faculty of Humanities and Social  
Sciences Department of Sociology/ Anthropology for the  
Partial Fulfillment of Master Degree  
in *Sociology***

**By**

**Santosh Kaini**

**Roll No: 130/2063/064**

**Registered No. 5-1-33-238-97**

**Tribhuvan University**

**Prithvi Narayan Campus**

**Pokhara**

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## LETTER OF RECOMMENDATION

This is to certify that Mr. Santosh Kaini has completed this dissertation entitled, **“Farmers’ Participation in Irrigation Management: A Case Study of Tarawali Irrigation Scheme, Ghermu, Lamjung”** under my supervision. This is an original work. I, therefore, recommend this dissertation for final approval and acceptance.

.....

(Mr. Tej Prasad Subedi)

Supervisor

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## LETTER OF ACCEPTANCE

The Dissertation Entitled " **Farmers' Participation in Irrigation Management: A Case Study of Tarawali Irrigation Scheme, Ghermu Lamjung**" submitted by Santosh Kaini has been accepted as the partial fulfillment of the requirement for the Master's Degree in Sociology by the dissertation evaluation committee comprised of:

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Date: 5<sup>th</sup> April, 2013

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Santosh Kaini  
Date: April, 2013

## ABSTRACT

*The natural increase in world population is 84 million per year. In the other hand, agricultural land is decreasing due to urbanization, natural disasters, climatic variations as well as other reasons. 80 - 90% of the required increase in food production will have to be realized on existing cultivated land in coming decades. This shows that there is urgent need of irrigation management. Farmers' participation is one the crucial factors for the sustainable irrigation management. This research is focused in the farmers' participation in Tarawali Irrigation Scheme management, located in remote part (Ghermu VDC) of Lamjung district where almost all the farmers are of gurung community.*

*Interview checklist, observation and interview with key informants were used for the primary data collection. As the total number of households in the Tarawali Irrigation Scheme is 72, census survey was done in all 72 households of this irrigation scheme.*

*It was found that most of the households (46%) have land in between 0.25 ha and less than 0.5 ha. Those farmers who have fewer fields to grow crops grow vegetables in others' field that have more land. They should not give money or crops to the land owner but they just need to put manure in that field.*

*21 households have not participated in any training conducted in the Tarawali Irrigation Scheme. In contrast, more than 58% of the households have taken trainings twice or more times conducted in this scheme.*

*During the construction period of the project, they used "Jhara" system for the participation. WUA started to collect irrigation service fee with NRs. 20 per ropani per year which is quite low in monetary terms. The WUA and farmers promised that this amount will be increased in the coming years. They have provision of collecting NRs. 50 as membership fee which must be renewed every year by paying NRs. 50 to the WUA.*

*Although the tail end farmers are not satisfied with the present operation and maintenance system, they participate in canal operation and maintenance works.*

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## **ABBREVIATIONS / ACRONYMS**

B.S	=	Bikram Sambat
CBS	=	Central Bureau of Statistics
DDC	=	District Development Committee
GO	=	Government Organization
ha.	=	Hectare
HHs	=	Households
INGO	=	International Non-Governmental Organization
Km	=	Kilo Meter
Lps	=	Liter per second
NGO	=	Non-Governmental Organization
No.	=	Number
O and M	=	Operation and Maintenance
S.N.	=	Serial Number
VDC	=	Village Development Committee
WUA	=	Water Users' Association



# CHAPTER I

## INTRODUCTION

### 1.1 Background

It is obvious that world population is increasing day by day. During mid-2012, the world population was 7,058 million and natural increase in population is 84 million per year (Population Reference Bureau, 2012). On the other hand, agricultural land is decreasing due to urbanization, natural disasters, climatic variations as well as other reasons. To fulfill increased food demand, food production should be increased. 80 - 90 percent of the required increase in food production will have to be realized on existing cultivated land in coming decades (Schultz et al., 2009). This shows that there is urgent need of irrigation management.

As the state can't control and manage all the irrigation systems, there is need of farmers' participation for sustainability of irrigation schemes. Farmers' participation refers to the involvement of an individual in social groups. Participation of farmers' through water users' association has helped to overcome many problems and produced sustainable benefits (Dick et al., 1995).

Due to the lack of skills and institutions to manage common property resources, irrigation infrastructure quickly falls into a state of disrepair, and conflicts over access to water constrain smallholder farmers (ILRI, 2002). So, farmers' participation through organized institution is a must for the sustainability of irrigation management.

National Water Plan has focused on strengthening of capacity building of local level institutions in planning and project implementations by activities like implementation of irrigation management training to stakeholders. In addition, it has also focused on national capacity building of farmers by conducting regular training for farmer functionaries at different levels and implementation of capacity-building program on regional basis to include field and regular training (National Water Plan, 2005).

Agriculture sector plays a critical role in the Nepalese economy as this sector still contributes more than one third to Nepal's GDP, and more than two-third of its population depend on it for their employment and livelihood (GoN, 2012). Nepal has total irrigable land of 17, 66,000 hectares. Out of total irrigable land of Nepal, Mountainous region, Hilly region and Terai region has 3.4 percent, 20.9 percent and 75.7 percent respectively. Out of total 1, 00, 000 ha land of Lamjung district, only 36.5 percent (i.e. 61,819 ha) is agricultural land and 26, 272 ha (42.5 percent of agricultural land) is irrigable. Although agricultural works are carried out in 45,050 ha, only 13,970 ha of land get some sorts of irrigation (DDC, 2069). Irrigation management aspect is below expected level though physical infrastructural facilities are provided.

From the very beginning of the planned development in Nepal, government agencies thought that the key factor for the development and management of the irrigation scheme was only the construction of physical infrastructures. Government agencies

alone decided in every aspect of irrigation development and management without consultation with the local people. Irrigation development from 1956 to 1980 was very centralized and irrigation officials assumed all the planning, construction, operation, management and maintenance responsibilities (Regmi, 2008). There has been over-reliance on physical engineering and technical aspects of water projects to solve development and conservation issues, resulting in the condition that most of the important decisions have been made solely by technical experts (Dessalegn, 1999). This resulted in poor performance and the projects failed to meet their original objectives.

Realizing this fact, government agencies started to set target for strengthening the local people and their institutions during project preparation phase. However, the target set by the government agencies in irrigation development and management has not yet been met due to less attention to the farmers' participation in irrigation management. In most of the cases, no studies have been carried out to access whether the targeted objectives are achieved or not.

This thesis is focused on the farmers' participation in irrigation management of Tarawali Irrigation Scheme, Lamjung, Nepal. The Tarawali Irrigation Scheme is located at Ghermu VDC ward no- 5 in Lamjung district. Data collection was done during the field visit. Based on observations during the field visit, conclusions and recommendations are developed regarding the farmers' participation in irrigation management of the Tarawali Irrigation Scheme.

## **1.2 Statement of the Problem**

Before 1980, government agencies in Nepal focused only in the construction of physical infrastructures in the name of irrigation development. As irrigation management includes both the physical as well as social aspects and the social part is always almost neglected in Nepalese in the context. However, social aspect is also a key factor for the successful management of irrigation schemes.

Farmers' participation is essential in all phases of project cycle for the success of irrigation scheme. Though farmers' participation is necessary before, during and after irrigation project construction, it is found less than the required in the Nepalese context. This has created a problem in successful irrigation management. As per Irrigation Policy (2003), farmers have to contribute 3 to 15 percent of the project cost either in cash or kind during the construction phase as well as they have to manage the small to medium schemes after its completion. However, farmers in most of the irrigation schemes are not actively participating for these activities. This has resulted to the poor performance of irrigation schemes.

There are very few studies carried out on Farmers' Participation in Irrigation Management in Nepal. No any study has been carried out in case of the Tarawali Irrigation Scheme. The Tarawali Irrigation Scheme lies in Ghermu VDC, located at the Northern part of Lamjung district. Most of the studies are conducted on the urban areas while the remote areas like Ghermu are always neglected. So, it is necessary to access the farmers' participation in irrigation management in the Tarawali Irrigation Scheme, Lamjung.

### **1.3 Research Questions**

The research questions of this research are:

- How do farmers' participate in Tarawali Irrigation Scheme management?
- What is the socio-economic status of farmers' in Tarawali Irrigation Scheme?
- What is the institutional status of Water Users' Association in Tarawali Irrigation Scheme?

### **1.4 Research Objectives**

The general objective of this research is to assess the farmers' participation in Tarawali Irrigation Scheme, Lamjung.

The specific objectives are as follows:

- To access the farmers' participation in Tarawali Irrigation Scheme, Lamjung.
- To access the socio-economic status of farmers' in Tarawali Irrigation Scheme, Lamjung.
- To evaluate the institutional status of Water Users Association in Tarawali Irrigation Scheme, Lamjung.

### **1.5 Significance of the Study**

Government and non-government organizations have been spending huge amount of money on irrigation sector but the targeted objectives have not been reached yet. The targeted objectives of the irrigation schemes are not fulfilled unless and until there is active participation of the farmers. So, outcomes the research is useful for those who are working in the irrigation scheme management as this research tries to access the farmers' participation in irrigation management.

The active participation of farmers in irrigation management not only reduces the expenditure of funds but also provides sustainable agricultural production. The lessons learnt from Tarawali Irrigation Scheme can be somehow applied for the better participation of farmers in other irrigation schemes which will be a great contribution in the field of irrigation management at least in Nepalese context.

### **1.6 Limitation of the Study**

Since the study was conducted in Tarawali Irrigation Scheme of Lamjung district, the result obtained can't be generalized for all the irrigation schemes.

## **1.7 Organization of the Study**

This thesis consists of seven chapters. It is focused on the farmers' participation in irrigation management where Tarawali Irrigation Scheme, Ghermu, Lamjung is taken as case study area. The first chapter reports on general introduction, problem identification, research questions, research objectives and significance of the research. The second chapter describes on literature reviewed in research where theoretical review, historical context of irrigation development and types of irrigation schemes in Nepal are discussed. In addition, this chapter also describes the farmers' participation in irrigation schemes and conceptual framework of farmers' participation in irrigation scheme management. The third chapter deals with research methodology. It explains the research design, nature and sources of data along with tools and techniques of data collection. The fourth chapter deals with farmers' participation in Tarawali Irrigation Scheme. Likewise, chapter five describes on socio-economic status of farmers in Tarawali Irrigation Scheme. The sixth chapter explains on institutional status of Water Users' Association in Tarawali Irrigation Scheme. The last chapter is no other than summary, conclusions and recommendations.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Theoretical Review**

Structural-functionalism is one of the major theoretical perspectives in sociology. It considers society as a complex system whose parts work together to promote solidarity and stability. In irrigation schemes, the inclusiveness in the formation of

water users' association is becoming key factor for the cohesion. A well established organizational structure may not be functional. So, a well established structure is not a sufficient condition for the stability of the system but each part of the structure must function properly.

According to Gillingham (1999), structural-functionalist models identify the key organizational tasks within an irrigation system that need to be fulfilled e.g. Coward's model identifies three basic organizational tasks in irrigation system: physical maintenance of the system, allocation of water, and conflict management. Thus, structural functionalism is applicable in farmers' participation in irrigation schemes.

Modernization theory is also one of the well known theories in sociological study. This theory not only tries to identify the social variables which contribute to social progress and development of societies, but also seeks to explain the process of social evolution.

## **2.2 Historical Context of Irrigation Development in Nepal**

Historians divide the irrigation history of Nepal into three periods: Ancient Period (500 BC to 700), the Medieval Period (750 to 1750), and the Modern Period (Paudel, 2010). These periods are briefly described below:

### **Ancient Period (500 BC to 700)**

Importance of water resources has been recognized by Nepalese farmers and hence they have been constructing irrigation systems at their own initiative since long ago (Pradhan, 1988). Indigenous irrigation schemes were developed in Nepal by using river water for agricultural purposes since the time immemorial. The needs for construction of irrigation schemes were mainly due to famine and hunger. Farmers used their own resources, skills and technologies to manage irrigation schemes for agriculture at initial stage (DoI, 2009). Historical evidences show that there were disputes in irrigation water distribution with the development of irrigation schemes. For example, there was dispute between Shakya and Kolya communities in the distribution of Rohini River water in Kapilvastu, and Gautam Buddha (500 - 600 BC) played a meditative role to settle down the dispute. The traces of the irrigation infrastructure of that period have not been found so far (Poudel, 2003). However, after the development of brick manufacturing techniques in 5th century, the irrigation water control structures constructed in Lichchhabhi period (around 5th century) could be seen in Dhobi Khola and Tukucha in Kathmandu valley (Poudel, 2003). No government assistance was provided for the construction and maintenance on those irrigation schemes constructed with compulsory labor contribution. The rulers or their officials built the irrigation schemes in early days. Evidences show that irrigation development in Nepal is attached with taxation, land tenure and customary laws (Khanal, 2006).

### **Medieval Period (750 to 1750)**

In the beginning of 1000, with the transfer of technology to construct irrigation schemes from Kathmandu valley to its surrounding areas, mainly rice cultivation started in the mid and high hills of Nepal. The value of cultivable and fertile agricultural land raised the jurisdiction of farmers' organizations. "To manage the

irrigation scheme was within the work frame of farmers and community, and Government should not intervene into it" was announced by Ram Shah, king of Gorkha (Western Nepal) in 1674. The Royal canals (Raj Kulo) built by rulers in Malla Period (around 17th Century) in Kathmandu Valley are still in existence (Poudel, 2003). Argheli canal, one of the Royal canals, lies in Palpa district of Western Nepal is still in operation.

While evaluating the 18<sup>th</sup> century from irrigation point of view, it could be considered as the golden age for farmer, group and community built and managed irrigation schemes. Evidences show that rulers and their officials also supported in cash and kind to these schemes to some extent. Government motivated local communities to solve disputes themselves regarding irrigation water management (Poudel, 2003).

### **Modern Period**

As there was no planned development system in Nepal before 1957, the modern period can be divided into two periods: Period before planned development (before 1957) and period after planned development (after 1957).

The first Civil Code (Muluki Ain) of 1864 helped to strengthen the existing customs and cultures of different castes and regional communities as well as irrigation traditions (Kaini, 2011). It helped to recognize the cultural and regional diversity as well as different needs at different localities and linkage of different communities for dispute settlement in irrigation water allocation that directed towards modern irrigation development. Total 100,000 ha of Nepalese land was irrigated out of 8,000,000 ha irrigated land of the world (Poudel, 2003). This code also helped to establish revenue offices in Terai districts responsible for the construction, operation and maintenance of irrigation schemes within the district. The revenue offices mobilized both the local cultivators and villagers to repair and maintain the irrigation system (Khanal, 2006).

Direct involvement of Government in construction and management of irrigation systems can be seen from the beginning of 20th century. It can be said that modern technology in irrigation system development has been started after the construction of Chandra Canal in Saptari district with the assistance of British India Government in 1922 (DoI, 2009). Jagadishpur Canal (1,000 hectares) was constructed in 1942 in the Western Terai and later renamed as Banganga Irrigation Scheme after being expanded in 1978. Judha Canal (2,000 hectares) was built in 1946 in the Central Terai which became Manusmara Irrigation Scheme after being expanded in 1976. Both of them were made by the then Public Works Department (Pradhan, 1996).

After the political revolution in 1950, canal department was established in 1952 to run irrigation activities in an institutionalized way. Community managed irrigation systems were integrated into large scale schemes by Government agency. Before planned development, about 10,000 - 12,000 irrigation systems of different sizes were in operation and about 400,000 - 500,000 hectares of land was partially irrigated (DoI, 2009).

After entering into the era of planned development, Government utilized surface and sub surface water resources to construct small, medium and large scale irrigation

systems with the help of internal and external resources. Basic irrigation infrastructures were developed between the first and third Five-Year plan period (1956-70) and during that period bilateral assistance, mainly Indian and American grants were provided through Indian Aid Mission (Jaishy, 2002).

Large irrigation systems in the Terai Region were rapidly constructed from Government investment from 1970 onwards to achieve the irrigation development targets in national development plans. These construction works were mainly carried out by borrowing international capital in the form of loans and grants (Shah *et al.*, 2001).

Construction of physical infrastructure of canals and structures was a primary focus until 1985. After this period, improvement in management and modernization of the schemes to achieve the targeted goals were also carried out. Some management oriented projects are: the USAID-funded Irrigation Management Project (IMP) in 1985, the World Bank funded Irrigation Line of Credit (ILC) in 1988, ADB funded the Irrigation Sector Project (ISP) in 1988 and Irrigation Management Transfer Project (IMTP) in 1994. Participatory approach to irrigation development and management of irrigation systems were highly emphasized in these projects (Jaishy, 2002). Other different projects have been carried out for construction and management of irrigation projects e.g. Nepal Irrigation Sector Project (NISP), Second Irrigation Sector Project (SISP), Community Managed Irrigated Agriculture Sector Project (CMIASP), Medium Irrigation Project (MIP), Non-conventional Irrigation Technology Project (NITP), Irrigation and Water Resources Management Project (IWRMP) etc.

### **2.3 Types of Irrigation Schemes in Nepal**

As per Irrigation Policy (2003), irrigation schemes can be viewed from two aspects. They are as per:

- Management aspect
- Command area aspect

From management aspect, irrigation schemes can be further categorized as follows:

1. Farmers' Managed Irrigation System (FMIS)
  - Traditional
  - Transferred from Governmental or Non-Governmental agency
2. Government Managed Irrigation System
3. Jointly Managed (GoN and WUA) Irrigation System (JMIS)
4. Agency Managed (Local Agency and WUA) Irrigation System (AMIS)
5. Privately Managed Irrigation System (PMIS)

From command area point of view, irrigation schemes are categorized into:

1. Extra large scale irrigation system
  - having command area more than 1000 ha in Hills and 5000 ha in Terai
2. Large scale irrigation system
  - having command area between 500-1000 ha in Hills and 2000-5000 ha in Terai
3. Medium scale irrigation system
  - having command area between 25-500 ha in Hills and 200-2000 ha in Terai
4. Small scale irrigation system
  - having command area less than 25 ha in Hills and 200 ha in Terai

## **2.4 Farmers' Participation in Irrigation Schemes**

Farmers have been constructing irrigation system at their own initiatives since the time immemorial. Farmers have diverted water from river, stream, spring, pond etc. which are commonly found in farmers managed irrigation schemes. The government alone can't provide all the irrigation goods and services required to the people. So, local community is to be encouraged to play the role in this respect.

"The inclusion of farmers in the decision-making process of management of irrigation systems is now accepted as necessary to increase productivity and income among the poor in the Third World. Hence, farmer participation is not simply a call for empowerment and mobilization of a hitherto powerless group but, more fundamentally, a development strategy" (Raby, 1991).

Active participation of local people is one of the methods to build the project as they want and can manage. Sustainability of the irrigation system after its completion is enhanced if payment for operation and maintenance expenditures is collected from the users rather than being dependent on high levels of government subsidy which cannot be provided over the long run. Participation of users in managing and maintaining water facilities and operations brings many benefits. Studies from Philippines and Senegal shows that participation helps in both cost savings and increase in efficiency in irrigation (Dick et al., 1995).

"Governments are now shifting their role from direct management of irrigation systems to regulation of the water sector, provision of support services to water user associations, and capacity building among water user associations and irrigation service providers. International experience suggests that successful irrigation sector reform programs establish both a policy working group and a national secretariat that help to guide and coordinate the planning and implementation of the reform process. The process should include: (a) strategic, participatory planning, (b) research and stakeholder consultations, (c) mobilization of political support, (d) design and adoption of an appropriate policy, legal, institutional, and regulatory framework, (e) strategy to coordinate lending and technical assistance, (f) public awareness

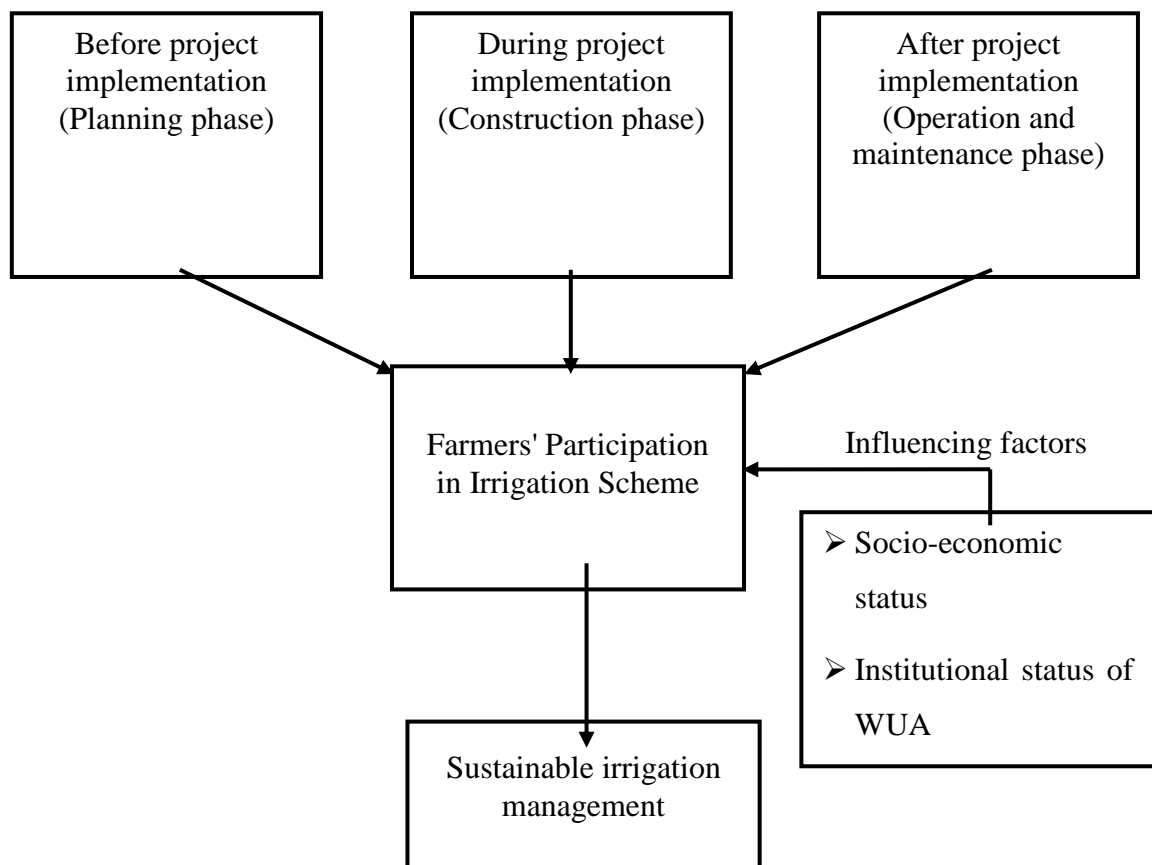
campaigns, and (g) monitoring, evaluations, and course corrections" Vermillion (2004).

As in the earlier participatory approach, the farmer's involvement in planning and implementation is poor; introduction of participatory process and technologies/ practices remains no longer sustainable and once the financial support from the project area is withdrawn farmers' follow the same age old traditional practices which led to the realization that perspectives of local people's needs to be in the center of development, research and extension efforts, if substantial impact is to be made (Singh et al., 2008).

## 2.5 Conceptual Framework

The participation of farmers in irrigation management is generally accessed before the project implementation in planning phase, during the project implementation and after the project implementation in operation and maintenance phase. The participation can either be in cash or kind. The conceptual framework of participation is shown in Figure 2.1.

**Figure 2.1: Conceptual Framework of Farmers' Participation in Irrigation Management**



In the planning phase, participation is mainly in the form kind. Cash is needed just for the project demand procedures. During and after the project implementation, participation is in the form of cash or kind. Irrigation service fee collection after the

project completion plays vital role for operation and maintenance of the system. Socio-economic status as well as institutional status of Water Users' Association is key factors for effective participation of farmers in the irrigation scheme management. Participation of the farmers is directly linked with their socio-economic status. Generally, if the farmers have low level of socio-economic status, they are more likely to contribute in the participation process as it is the way to uplift their socio-economic status. Although they will not be able to contribute in the form of cash, they can contribute in the form of kind. This can be seen in the remote areas where farmers are contributing more in the irrigation scheme management although their socio-economic is low. In the urban areas, most of the farmers neither contribute in the form of cash nor in the form of kind although their socio-economic status is above than that of the farmers living in the remote areas.

In addition, farmers' participation in irrigation scheme management is also linked with the institutional status of Water Users' Association. If the Water Users' Association is active, farmers show more interest in the participation process. If the Water Users' Association is passive and there are no regular meetings of Water Users' Association, farmers do not show interest to contribute in the participation process.

The socio-economic status as well as the institutional status of the farmers influences the farmers' participation in irrigation scheme. Sustainable irrigation management is only possible if there is active participation of farmers in the irrigation scheme.

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

#### **3.1 Rational for Selection of Study Site**

Farmers' participation in irrigation schemes in different phases of project plays crucial role in the overall irrigation scheme management. The irrigation scheme could not fulfill its targeted objectives until and unless there is active participation of farmers. This research tries to assess the farmers' participation in Tarawali Irrigation Scheme. In addition, this research tries to assess the socio-economic status of farmers in Tarawali Irrigation Scheme. Moreover, it also evaluates the present status of Water Users' Association in Tarawali Irrigation Scheme.

The Tarawali Irrigation Scheme lies in the Northern part of Lamjung district. This scheme is in the Ghermu VDC which is also the boarder of Lamjung and Manang district. Most of the studies are conducted on the urban areas while the remote areas like Ghermu are always neglected. But the status of real farmers is reflected in such remote areas. Most of the farmers in this scheme are Gurungs. So, it is necessary to access the farmers' participation in irrigation management in the Tarawali Irrigation Scheme, Lamjung.

#### **3.2 Research Design**

This research is based on exploratory and descriptive research design. This research is exploratory as it attempts to explore the process of the farmers' participation in irrigation management of the study site. It is also descriptive because it tries to describe natural condition of the study site and farmers of the Tarawali Irrigation Scheme.

#### **3.3 Nature and Sources of Data**

Both the primary and secondary data were collected for this research. The primary data collection was done during the site visit. Extensive discussions were carried out with the local farmers, WUA members and officials from Irrigation Division Office. Similarly, secondary data were collected through different reports available in Irrigation Division Offices as well as related journals, books, publications, and related websites.

Reliability of this research cannot be claimed in absolute terms. However, certain measures were used to minimize possible errors like under counting, over counting and false reporting by respondents. The measures taken are: the instrument was pre-tested and necessary modification was done, questionnaire was written in simple Nepali language and researcher filled all the forms by himself or by a person who knew it very well and the forms were checked and rechecked.

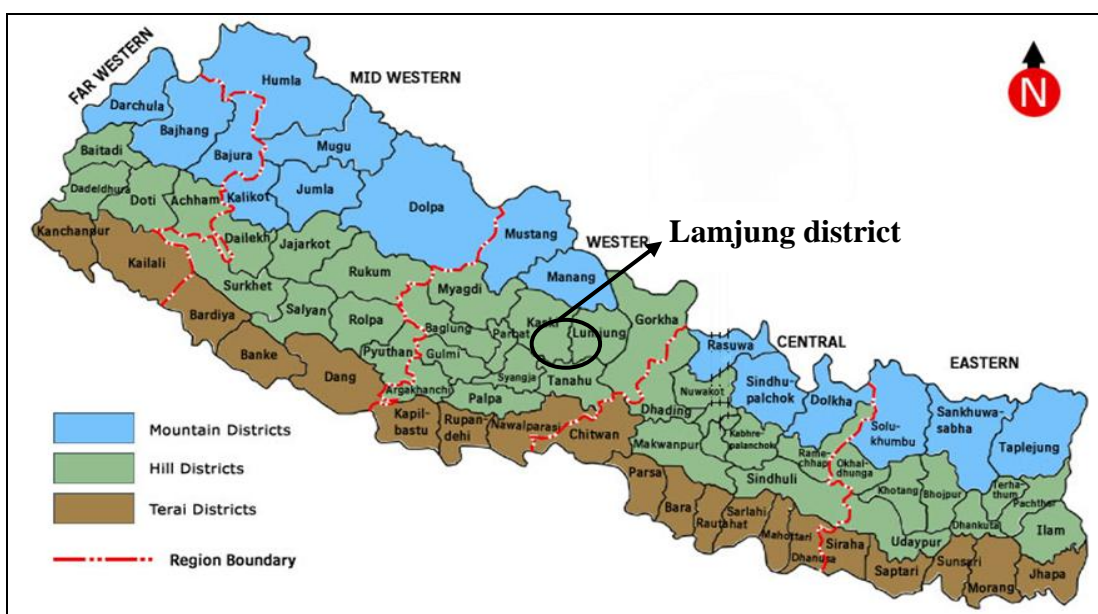
Editing of the entire data was done very carefully to maintain data accuracy. Different methods of checking reliability like text-retest method of the information obtained were carried out.

### 3.4 Study Site

#### 3.4.1 The Ghermu VDC

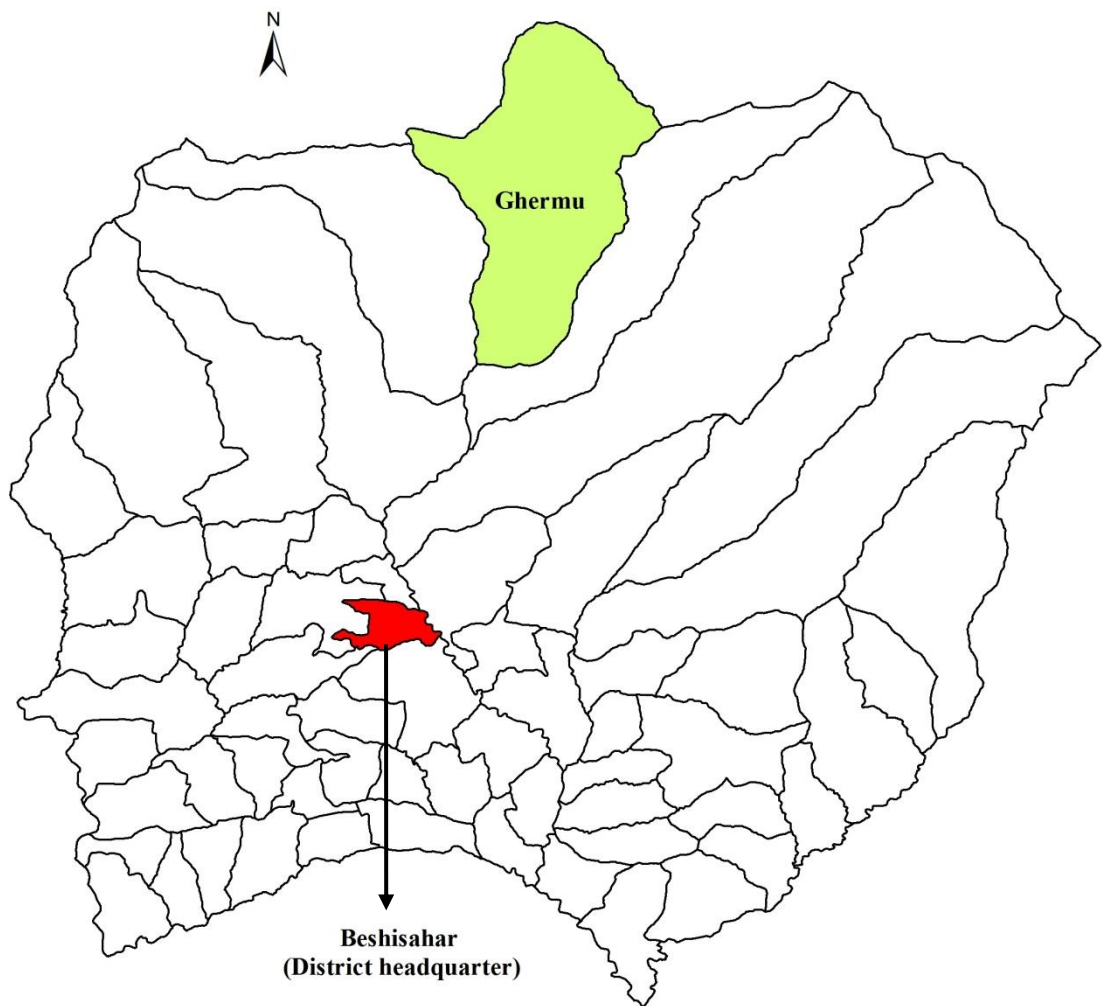
The Tarawali Irrigation Scheme is located at Ghermu VDC ward no.- 5 in Lamjung district. The Lamjung district lies in the Western region of Nepal. Location of Lamjung district in the map of Nepal is shown in figure 3.1

**Figure 3.1: Location of Lamjung District in the Map of Nepal**



The Ghermu VDC lies in the Northern part of Lamjung district which is also the boarder of Lamjung and Manang district. Geographically the scheme is confined at 28°13'15" N to 28°25'30" N and 84°24'40" E to 84°26'30" E. The project area can be reached by 42 Km black topped road from Dumre to Beshisahar and 29 Km earthen road from Beshisahar to Syanghe. From Syanghe, project area is about 1 Km far by foot trail. Location of Tarawali VDC in the map of Lamjung district is shown in Figure 3.2.

**Figure 3.2: Location of Ghermu VDC in the Map of Lamjung District**



According to Central Bureau of Statistics (2012) data, there are 42,079 households with 1, 67,724 number of population in Lamjung district. Total households in Ghermu VDC are 402 and total population is 1776. Out of them, there are 822 males and 954 females inhabited in the Ghermu VDC.

The average temperature of Lamjung district ranges from 4° C to 30° C at Khudi Bazar Station. The air temperature of the command area is suitable for cultivating summer paddy, early paddy, winter vegetable, maize, wheat, potato, summer vegetable and soybean. The average yearly rainfall of the nearest rainfall station in Khudi Bazar Station is 3271 mm.

As the Ghermu VDC lies in the Northern part of the Lamjung district, most of the land is jungle where upper part is covered by snow most of the time. The lower part is used for the agricultural purpose. The Tarawali Irrigation Scheme is also at the lower part of the Ghermu VDC.

The Ghermu VDC is inhabited by Gurungs, Brahmins, Chhetries, Magars and others. However, Gurungs are in the majority. Most of the people in the Ghermu VDC believe on Buddhism and Hinduism.

### 3.4.2 The Tarawali Irrigation Scheme

The Tarawali irrigation scheme has net command area of 25 ha. It has been providing irrigation service to 72 households. Altogether 448 numbers of people are benefited from this scheme. Out of 72 number of household, only one household is Dalit (Biswakarma) and rest of the households are Gurungs.

The Tarawali irrigation scheme is named from its source, the Tarawali khola, a perennial source. The measured discharge of the source is 280 lps on 3<sup>rd</sup> Dec 2012. There are no any other irrigation and hydropower canals nearby the intake point of the scheme. There is no any water right problem for using required water from the river. The crop water requirement for the proposed cropping pattern is 75 lps which is far less than the available discharge in the intake point.

The canal alignment starts at the right bank of the source and crosses to the left bank. The command area lies in the left bank of Tarawali khola. The canal system consists of 1.5 Km main canal, 3 nos of outlets, 10 drops, 1 escape, 1 suspended HDPE pipe crossing and 2 nos of super passages.

### 3.5 Universe and Census Survey

The nature of the population is homogeneous and small. Here are only 72 households of farmers in this irrigation scheme. As per Krejeie and Morgan (1970) reproduced with permission in B. Russell's Research Methods in Cultural Anthropology, sample size for population size of up to 150 is 108. As the total number of households in the Tarawali Irrigation Scheme is 72, census survey was done in all 72 households of this irrigation scheme.

### 3.6 Tools and Techniques

Data collection is the most important part of research for getting reliable information. The techniques/instruments of data collection that was used in this research are as shown in Table 3.1.

**Table 3.1: Tools and Techniques for Data Collection**

Techniques: ✓ Interview ✓ Participant Observation ✓ Interview with Key Informants	Schedule: ✓ Checklist ✓ Interview guide
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#### Interview Checklist

The interview checklists are both structured and unstructured type. Personal information is taken from structured questionnaire and qualitative information from

unstructured questionnaire. Interview was done with household head of each household.

### **Observation**

Participant observation is the basic sociological/anthropological tool for the data collection methods. This method is used by the researcher to set the information by observing the dress pattern, food habits, settlement, ceremonies, talking style, behavior, etc.

### **Key Informant Survey**

It is used to collect data about the history of the irrigation scheme and the participation in the irrigation management in the past and at present.

Key informants are the important source of acquiring real data. They have detail knowledge/information about the related site and about related study group. They are president of VDC, secretaries, social workers, president of WUA and local educationist.

## **3.7 Data Analysis and Presentation**

Most of the collected data in this research were analyzed descriptively and statistical methods were also applied as per the necessity. So, different statistical as well as logical tools were used to analyze data in this study.

Data analysis and presentation is done for each objectives of the research: farmers' participation, socio-economic status and institutional status of Water Users' Association in Tarawali Irrigation Scheme. The data analysis and presentation for each specific objective is done in different chapters.

## CHAPTER IV

### FARMERS' PARTICIPATION IN TARAWALI IRRIGATION SCHEME

#### 4.1 Participation in Planning Phase

The demand for the rehabilitation of the project was done in Western Irrigation Development Division No.-1, Lamjung in 2052 B.S. As per the Working Guidelines of the Department of Irrigation-2061, farmers must deposit NRs. 50 per hectare during the submission of project demand form. As per Mr. Mukta Bahadur Gurung, former president of Ghermu Village Development Committee, he deposited his own cash money of NRs. 1750 during the submission of project demand form. As per his opinion, farmers generally do not want to give money before the project is launched. But he had known the working procedure of irrigation office. So, he deposited his own money at that time.

After the approval of the rehabilitation of the project, farmers must deposit the cash money of 0.5 percent of total estimate as Up-front Cash Deposit as per the Working Guidelines of the Department of Irrigation-2061. At this time, NRs. 1500 per hectare (NRs. 75 per ropani) was collected from each household and NRs. 1750 was paid to Mr. Mukta Bahadur Gurung which he had deposited during the demand form submission.

Most of the members of the Water Users' Association executive committee had discussed with the technicians and association organizer of irrigation office during the feasibility survey. As per the members of the Water Users' Association executive committee, due to lack of time as well as the consciousness about the project, not all the farmers generally participate in the planning period.

#### 4.2 Participation in Construction Phase

The construction of rehabilitation project was started in 2066 B.S. As per the Irrigation Regulation 2056 (First amendment 2060), farmers must contribute 3-15 percent of project cost. In the Tarawali Irrigation Scheme, 10 percent of the total project cost was shared by the farmers.

Farmers reported that the details of the work to be carried out and the total valuation of the work was described the Western Irrigation Development Division No.-1, Lamjung office in the pre-construction training. Water Users' Association executive committee decided to work for the farmers' contribution part by all farmers.

For this work, they used *Jhara*<sup>1</sup> system. It is the local term used by the community where representative from each household must be present in the work and they do

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<sup>1</sup> "Jhara" is the local term used by the community where representative from each household must be present in the work and they do not receive any money from this work.

not receive any money from this work. It was very traditional system used in this community since hundreds years ago.

The farmers' contribution part was done by each household on the basis of 1 day per ropani by *Jhara* system. It was done for the unskilled works which was kept in the farmers' contribution part. For the skilled work that was to be done by farmers under contribution part, NRs 150 per ropani was collected from each household and given to the skilled labours.

To maintain the quality of construction works, trainings to the farmers were given by the Western Irrigation Development Division No.-1, Lamjung office. One supervision chosen by the Water Users' Association was kept during the construction period and the payment to the supervisor was done by the Western Irrigation Development Division No.-1, Lamjung office.

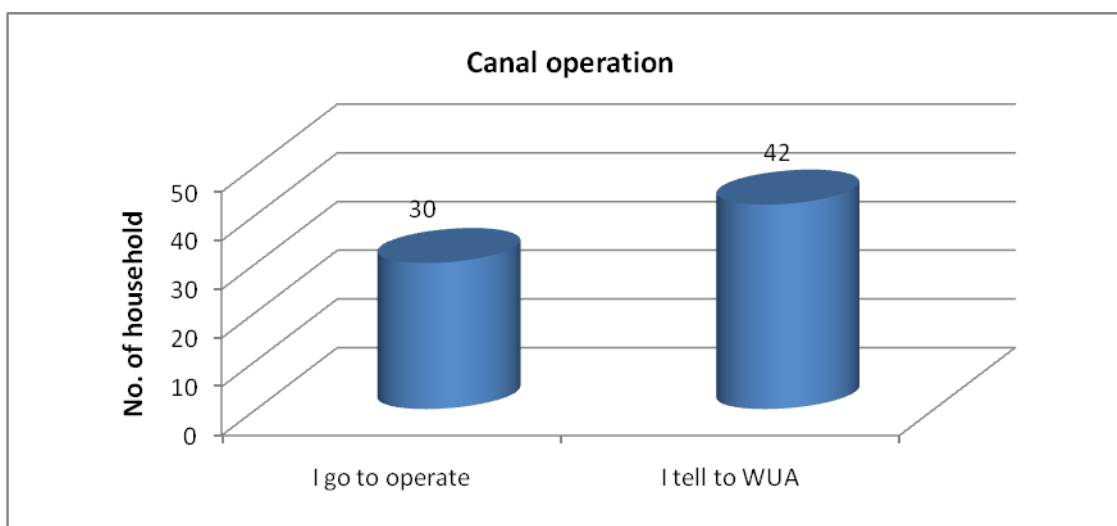
### **4.3 Participation in Canal Operation**

Canal operation is crucial factor to fulfill the desired objectives of the canal system. Although the canal is rehabilitated properly, the system can't run smoothly if the canal operation system is not good enough. The canal operation includes the gate operation in the intake, branch canals as well as operation of the outlets.

In the Tarawali Irrigation Scheme, no any watchman has been appointed for the canal operation. The canal system is only 1.5 Km long and the idle length is only 350 m. This 350 m of idle length passes through the forest area. All the females during the interaction at site reported that they do not go to operate the gate at intake. It is because the idle length of the canal passes through the forest area and the females afraid of wild animals like tiger and deer to go alone. As the 14 households out of total households are headed by females, they do not participate in this work.

Many of the members of Water Users' Association executive committee go for canal operation works. During the data collection, only 30 households reported that they go to operate the gates themselves. In contrast, majority of farmers reported that they do not go to operate the gates themselves but they tell to Water Users' Association. This is shown in Figure 4.1

**Figure 4.1: Participation in canal operation**



Source: Field Survey 2013.

This shows that females are afraid to go to the intake site as the canal passes through the jungle area and most of the farmers think that the canal operation work goes to the Water Users' Association. All the farmers reported that it is better to put the canal watchguard *Dhalpa*<sup>2</sup> for the canal operation works. The salary for the *Dhalpa* will be paid by the Water Users' Association from the fund collected from irrigation service fee collection.

#### 4.4 Participation in Canal Maintenance

Canal maintenance is necessary to deliver the necessary water and distribute it equitably. Regarding the canal maintenance in Tarawali Irrigation Scheme, they have provision of canal maintenance twice a year. Firstly, the maintenance work is carried out at the month of Jestha for the paddy plantation. Secondly, it is done at the month of Bhadra when the rainy period is finished. Mainly silt; debris etc deposited in the canal is removed in such maintenance activities.

*Jhara* system is used for the canal maintenance. Representative from each household come for canal maintenance. Generally, one day is enough for such canal maintenance works as the canal system is small. So, each of the household come one day for canal maintenance.

All the farmers reported that they go for canal maintenance activity. All the farmers have the belief that all households come for canal maintenance works. There is provision of NRs. 100 fine to the absentee household although NRs. 100 is less than the wage of a labour per day (NRs. 320/day). However, no any household is absent in canal maintenance work done by *Jhara* system.

This shows that farmers having large and small land have equal contribution on canal maintenance works and each household come for canal maintenance work up to now.

<sup>2</sup> *Dhalpa* is local term used for a person who takes care of canal as a supervisor.

## **4.5 Operation and Maintenance Service Fee collection**

As the government can not operate and maintain all the irrigation systems, it is outmost necessary that Water Users' Association should be capable to operate and maintain it. For this purpose, Water Users' Association must collect irrigation service fee from the farmers so that it can be used for the operation and maintenance of the canal system.

Regarding the Tarawali Irrigation Scheme, Water Users' Association in the general assembly has decided to collect NRs. 20 per ropani per year from all the farmers. There is 500 ropani of land in this Tarawali Irrigation Scheme. This shows that NRs. 10,000 is being collected yearly for operation and maintenance purpose.

All of the households mentioned that they have given NRs. 20 per ropani per year for this purpose. The Water Users' Association reported that they will use money to put canal watchguard (*Dhalpa*) in the rainy season. As this is the first attempt to collect the money for operation and maintenance purpose, Water Users' Association started with NRs. 20 per ropani per year which is quite low in monetary terms. The Water Users' Association as well as the farmers promised that this amount will be increased in the coming years.

## **4.6 Water Users' Association Fund**

The Water Users' Association should not only be able for the operation and maintenance of the canal but it should also be able for the minor construction works regarding the maintenance of the canal. For this, it is always better that Water Users' Association has sufficient fund.

To raise the Water Users' Association fund, they have provision of collecting NRs. 50 as membership fee. The membership must be renewed every year by paying NRs. 50 to the Water Users' Association. Apart from this, they have money collected from operation and maintenance fee.

At present, Water Users' Association of Tarawali Irrigation Scheme has total bank balance of NRs. 84,000. Water Users' Association reported that they have kept this money in cooperative which gives 9 percent of interest to them.

It means that Water Users' Association of Tarawali Irrigation Scheme is collecting fund from the farmers which is almost sufficient to run the canal system and Water Users' Association itself.

## **4.7 Regular Maintenance**

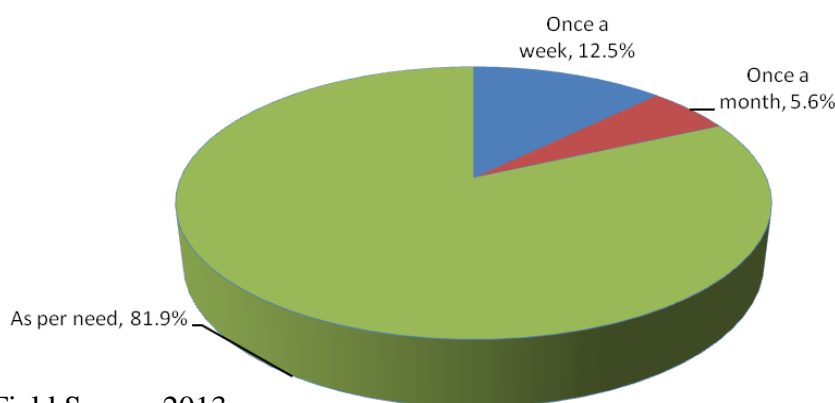
Regular maintenance keeps the canal system up to date. It helps canal system work smoothly. It tries to prevent canal system from damage. The regular maintenance includes clearing small amount of debris, silt and tree leaves from the canal which obstruct or tries to obstruct the canal flow.

It is found that there is no regular maintenance system in case of Tarawali Irrigation Scheme. Each farmer was asked how often do you visit the canal system? 12.5 percent of the household reported that they visit the canal system once a week. It includes those male farmers who go to the forest along the canal system. Most of the members of Water Users' Association executive committee also go to visit the canal system once a week. 5.6 percent of the households visit the canal system once a month.

In contrast, 81.9 percent of household go to visit the canal system as per need. This includes when the *Jhara* is called and when they really need water in their field. The canal system visit by farmers is shown in figure 4.2.

This shows that although farmers willing to participate in canal maintenance works they are not fully aware of the importance of the regular maintenance.

**Figure 4.2: Canal Visit by Farmers**

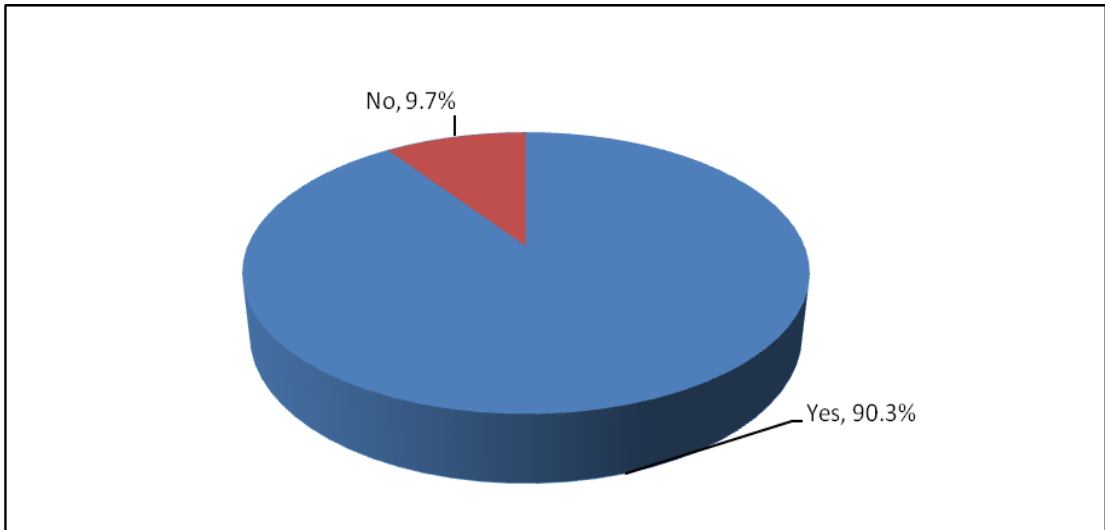


Source: Field Survey 2013.

#### **4.8 Satisfaction Level with Present Operation and Maintenance System**

Proper operation and maintenance system plays crucial role in the management of the irrigation scheme. 90.3 percent of the households reported that they are satisfied with the present operation and maintenance system of the Tarawali Irrigation Scheme. On the contrary, 9.7 percent of the households claimed that they are not satisfied with the present operation and maintenance system of the scheme. The later households have their land at the tail end of the command area. The graphical representation is shown in figure 4.3.

**Figure 4.3: Satisfaction of Farmers with Present O/M System**



Source: Field Survey 2013.

This figure 4.3 shows that most of the tail end farmers are not satisfied with the present operation and maintenance system of the Tarawali Irrigation Scheme. Although the tail end farmers are not fully satisfied with the present operation and maintenance system, they participate in each and every canal operation and maintenance works.

*Jhara* system for participation is found very effective in Tarawali Irrigation Scheme. Females do not go to operate the gate alone at intake as the idle length of the canal passes through the forest area and the females afraid from wild animals. Water Users' Association started to collect irrigation service fee with NRs. 20 per ropani per year which is quite low in monetary terms. The Water Users' Association and farmers promised that this amount will be increased in the coming years. They have provision of collecting NRs. 50 as membership fee. The membership must be renewed every year by paying NRs. 50 to the Water Users' Association. The tail end farmers are not fully satisfied with the present operation and maintenance system of the Tarawali Irrigation Scheme. Although the tail end farmers are not satisfied with the present operation and maintenance system, they participate in each and every canal operation and maintenance works.

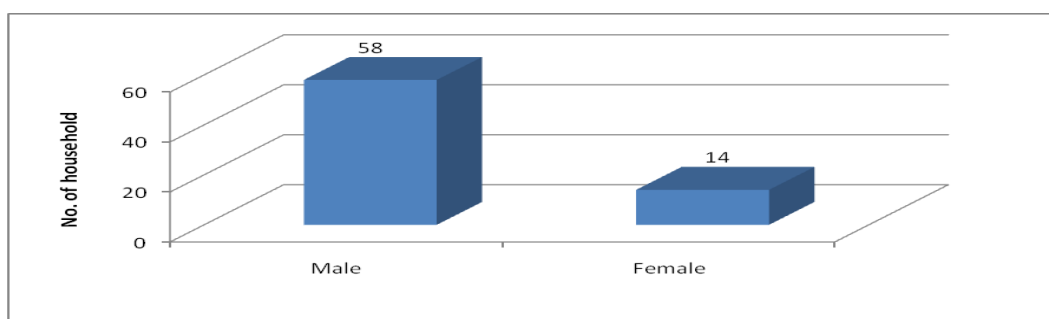
## CHAPTER V

### SOCIO-ECONOMIC STATUS OF FARMERS

#### 5.1 Household and Population

There are 72 households benefitted from the Tarawali Irrigation Scheme. As per the National population and housing census (2011), Ghermu VDC has total households of 402. The Tarawali Irrigation Scheme provides irrigation service to about 18 percent of households of Ghermu VDC. Out of total 72 households of this scheme, 58 households are headed by males and rest 14 households are headed by females. This shows that almost 20 percent of the households are headed by females. It is due to the fact that the females are widow. The graphical representation of head of household is shown in Figure 5.1.

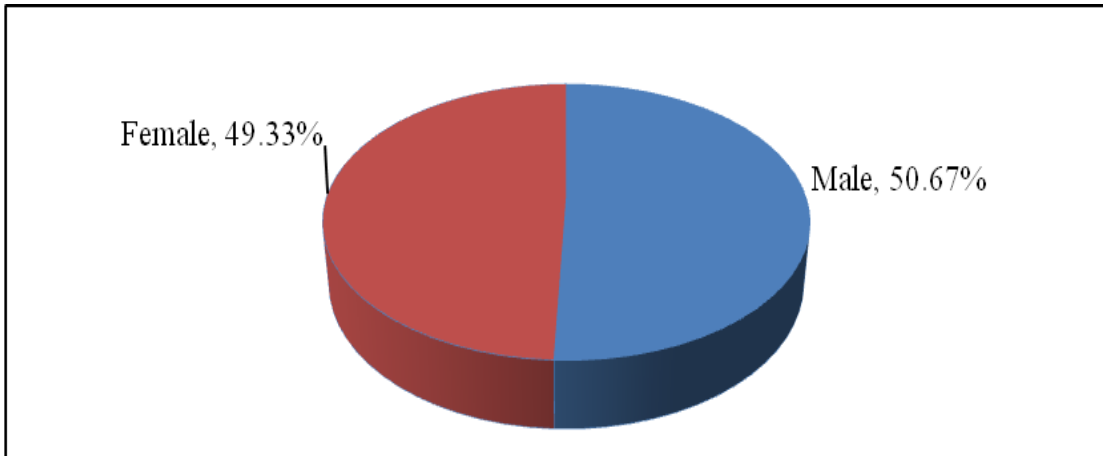
**Figure 5.1: Head of the Household**



Source: Field Survey 2013.

The number of population benefitted from this scheme is 448 which include 227 males and 221 females. As per the National population and housing census (2011), Ghermu VDC has total population of 1776 including 822 males and 954 females and the average population per household is 4.4. In contrast, the average population per household in Tarawali Irrigation Scheme is 6.2. Figure 5.2 shows that percentages of males and females in the Tarawali Irrigation Scheme are 50.67 percent and 49.33 percent respectively.

**Figure 5.2: Sex Composition**



Source: Field Survey 2013.

## **5.2 Ethnicity**

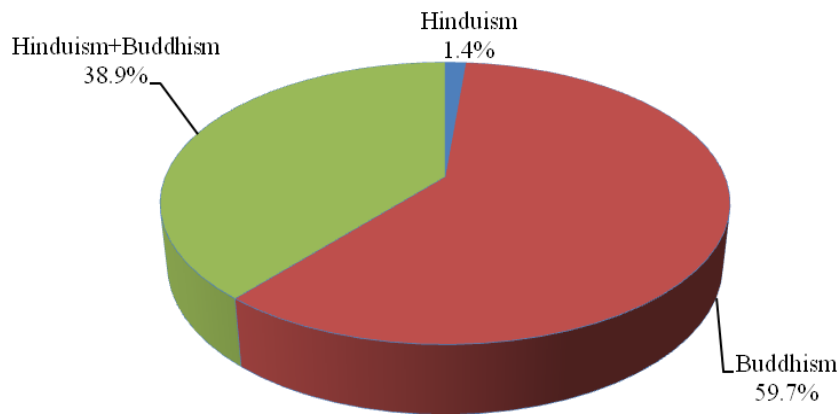
The Tarawali Irrigation Scheme is dominated by Gurung community. Out of 72 households in this scheme, 71 households are Janajatis (Gurungs) and only one household is dalit (Bishowkarma). This proves that 98.6 percent of the households are from gurung family and only 1.4 percent of the households are from Dalit family.

## **5.3 Religion**

As the Tarawali Irrigation Scheme is dominated by Gurungs, most of the households (43 households) believe on Buddhism. However, 28 households of Gurungs family believe on both Hinduism and Buddhism. The Bishowkarma family believes on Hinduism.

Although they believe on different religion, they mentioned that they used to celebrate the festivals of both Hinduism and Buddhism which is helping them to be united in social works in the community. Figure 5.3 shows the majority (59.7%) of the households believes on Buddhism, least (1.4%) of the households believe on Hinduism and 38.9 percent of the households believe on both Hinduism and Buddhism as expressed by farmers during the data collection.

**Figure 5.3: Pie Chart on Religious Belief**



Source: Field Survey 2013.

## 5.4 Education

The educational status was measured in terms of illiterate, literate, below SLC and above SLC. The literate refers to those people who can at least do the signature but do not have any certificate of education from schools. The population and percentage of educational status is shown in table 5.1.

**Table 5.1: Educational Status of People of Tarawali Irrigation Scheme**

S.N.	Description	Population	Percentage	Remarks
1	Illiterate	71	15.85	
2	Literate	152	33.93	
3	Below SLC	147	32.81	
4	SLC and above	78	17.41	
	Total	448	100	

Source: Field Survey 2013.

Table 5.1 shows that out of 448 number of population, 15.85 percent are illiterate, 33.93 percent are literate. 32.81 percent of population has education level below SLC while 17.41 percent of population has education level of SLC and above.

**Table 5.2: Educational Status of Household Head of Tarawali Irrigation Scheme**

S.N.	Description	Population	Percentage	Remarks
1	Illiterate	13	18.05	
2	Literate	38	52.78	
3	Below SLC	12	16.67	
4	SLC and above	9	12.50	
Total		72	100	

Source: Field Survey 2013.

Table 5.2 shows that out of 72 household heads, 18.05 percent are illiterate, 52.78 percent are literate. 16.67 percent of household head has education level below SLC while 12.50 percent of household head has education level of SLC and above. Table 5.1 and table 5.2 shows that there is increase in literacy rate in the new generations.

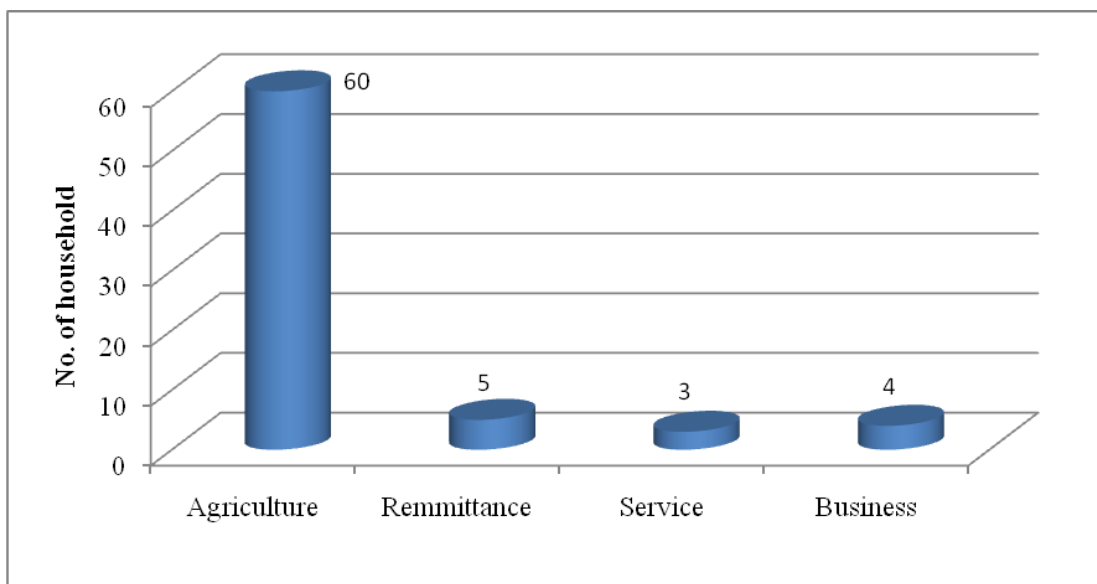
## **5.5 Occupation**

The main occupation of people of this area is agriculture. Figure 5.4 shows that 60 households have reported agriculture as their main occupation. The main occupation of other 5, 3 and 4 households is remittance, service and business respectively. This shows that more than 83 percent of the households are depending on the agriculture as it is the main occupation. The significance of irrigation in the Tarawali Irrigation Scheme can be justified from this data.

In contrast, only about 4 percent of the households are engaged in service as their main occupation. As the Tarawali Irrigation Scheme lies in the remote part of the Lamjung district, very few households have access to service. This is clearly described from the above data.

About 7 percent of the households depend on remittance as their main occupation. Approximately 6 percent of the households are engaged in the business as their main occupation. The Tarawali Irrigation Scheme lies on the trekking route from Beshishar to Chame. This 6 percent of the households have hotel and restaurants to serve the tourists as well as the local people. As the Beshisahar to Chame road is just opened for the public vehicles, people reported that there is decreasing trend in tourist movement in the Tarawali Irrigation Scheme area as tourists directly go to Chame by public vehicles.

**Figure 5.4 : Main Occupation of People Under Study Area**



Source: Field Survey 2013.

## 5.6 Type of House

Most of the households have house made up of stone masonry with mud mortar. About 79 percent of the total households (57 households) have such type of houses. In contrast, only about 7 percent of the total households (5 households) have RCC type of house. Almost 14 percent of the total households (10 households) are built with stone masonry in cement mortar. Table 5.3 shows the types of house of farmers of the Tarawali Irrigation Scheme.

**Table 5.3 : Type of House**

S. N.	Description	No. of households	Percentage	Remarks
1	RCC	5	6.94	
2	Stone masonry with cement mortar	10	13.89	
3	Stone masonry with mud mortar	57	79.17	
Total		72	100	

Source: Field Survey 2013.

## **5.7 Land Holding**

There is large variation in the land holding among the households. The land holding type was divided into 5 categories. This includes land holding < 0.25 ha, 0.25 ha to < 0.50 ha, 0.50 ha to < 0.75 ha, 0.75 ha to < 1.0 ha and > 1.0 ha. The land holding of the households is shown in the Table 5.4.

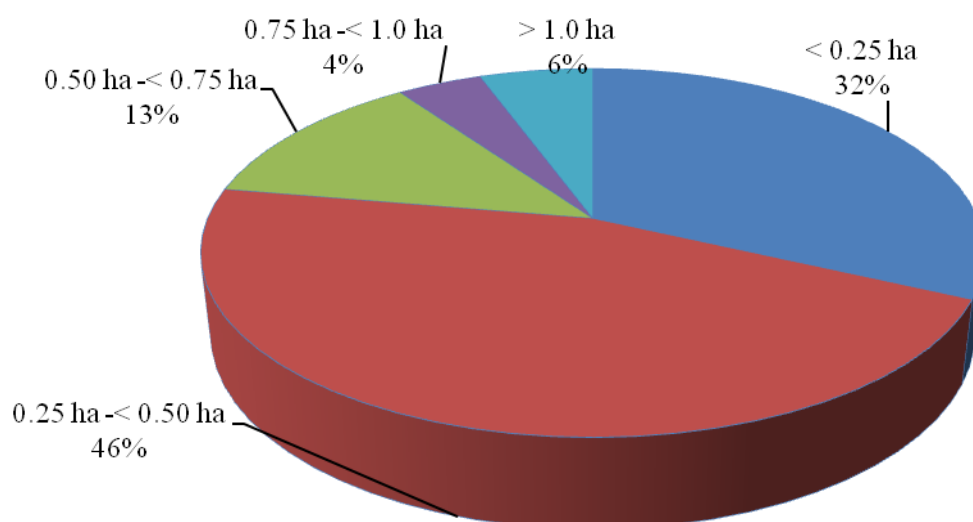
**Table 5.4: Land Holding**

S. N.	Land holding	No. of household	Percentage	Remarks
1	< 0.25 ha	23	32	
2	0.25 ha to < 0.50 ha	33	46	
3	0.50 ha to < 0.75 ha	9	13	
4	0.75 ha to < 1.0 ha	3	4	
5	> 1.0 ha	4	6	
Total		72	100	

Source: Field Survey 2013.

The graphical representation of the land holding of the households within the command area of Tarawali Irrigation Scheme is shown in Figure 5.5.

**Figure 5 5: Land Holding of Farmers**



Source: Field Survey 2013.

This figure 5.5 shows that most of the households (46%) have land in between 0.25 ha (5 ropani) and less than 0.5 ha (10 ropani). In contrast, only 4 percent of household have land in between 0.75 ha (15 ropani) to less than 1.0 ha (20 ropani). 32 percent of households have land less than 0.25 ha (5 ropani) and 13 percent of them have land in between 0.5 ha (10 ropani) and 0.75 ha (15 ropani). There are only 6 percent of households who have land greater than 1.0 ha (20 ropani).

## **5.8 Food Sufficiency**

As most of the farmers have command area less than 0.5 ha as mentioned above, very few households have food sufficiency round the year. Table 5.5 shows that 4 households (6% of total household) have food sufficiency for 4 months only. 54 households (75% of total household) have food sufficiency for 8 months only and 14 households (19% of total household) have food sufficiency round the year. This shows that most of the farmers have food sufficiency for 8 months only.

**Table 5.5: Food Sufficiency of Farmers**

S. N.	Food sufficiency	No. of Household	Percentage	Remarks
1	4 months	4	6	
2	8 months	54	75	
3	12 months	14	19	
Total		72	100	

Source: Field Survey 2013.

## 5.9 Farming Practice

All the farmers work in their field. Generally farmers grow rice (paddy), vegetable and maize in their fields. Mr. Aaeta Bahadur B.K. from dalit group has least land among the farmers. He has only 0.05 ha (1 ropani) of land within the command area. He has grown cauli-flower and onion in his land. Researcher with Mr. Aaeta Bahadur B.K. in Aaeta Bahadur's own land is shown in figure 5.6.

**Figure 5.6: Researcher with Mr. Aaeta Bahadur B.K. in Aaeta Bahadur's own land**



Source: Field Survey 2013.

Those farmers who have fewer fields to grow crops used to grow vegetables in others' field that have more land. They should not give money or crops to the land owner but they just need to put manure in the field where they are growing the crops. Mr. Aaeta Bahadur B.K. has grown potato in the field of Mr. Shankar Ghale who has 0.15 ha of land (3ropani). Photographs of Aaeta Bahadur B. K. growing potatoes in Shankar Ghale's field is shown in figure 5.7.

Figure 5.7 shows just an example of how farmers help each other. It was also found that about 5 households who have fewer fields within the command area grow potatoes and vegetables in others' field. This system has not only increased the cropping intensity in the command area but also has increased the brotherhood in the Tarawali Irrigation Scheme.

**Figure 5.7: Aeta Bahadur B.K. Growing Potatoes in Shankar Ghale's Field**



Source: Field Survey 2013

It was found that 9 households give their field to others to grow potatoes and vegetables. Mr. Shankar Ghale is one of them who give his land to grow vegetables to others. He has given his land to Aeta Bahadur B.K. to grow potatoes and Mana Maya B.K. to grow vegetables. Mr. Shankar Ghale has grown potatoes and vegetables in his own land. He not only uses the potatoes for his own household purpose but also sells the potatoes in the nearby market. Most of the time, people come to his land to buy potatoes. As the land of the Tarawali Irrigation Scheme is fertile, the production is above his expectation. This is also due to proper irrigation facility as well as his contribution on the field to take care of potatoes. He also produces other vegetables like tomato; cabbage and cauli-flower. Photographs of researcher with Mr. Shankar Ghale in his (Ghale's) own potato field is shown in figure 5.8.

**Figure 5.8: Researcher with Mr. Shankar Ghale in his (Ghale's) Own Potato Field**



Source: Field Survey 2013.

Farmers who do not have any land within the command area of the scheme also can grow potatoes and vegetables in the land of farmer who have more land. Mana Maya B.K. who does not have any field within the command area, is also growing vegetables (Reddish and onion) in others' field. She does not need to give money or crops to the land owner but just need to put manure in the field where she is growing the crops. This system makes the land fertile where the landowner grows another crops after she harvests the vegetable. Mr. Shankar Ghale has given his land to Mana Maya B.K. to grow vegetable. Mana Maya B.K. is growing vegetables in Shankar Ghale's field but she should not give it to his. The vegetables will be her own. Photograph of researcher with Mana Maya B.K. growing her own vegetables in Shankar Ghale's land is shown in figure 5.9.

**Figure 5.9: Mana Maya B.K. Working in Reddish Field Along with the Researcher**



Source: Field Survey 2013.

However, only vegetables and potatoes can be grown in such fields. If it is done in paddy field, half of the product must be given to the land owner.

There are 3 tenant farmers who have been hiring other's land for certain time and have been growing crops. Since they have very less land, they are working in other's land. In the same manner, there are also 3 farmers who have given their land to others on rent.

This system of growing vegetables in others land has increased the cropping intensity in the Tarawali Irrigation Scheme. The cropping intensity denotes the area of the land used in farming. The more the farmers used the land in farming, the more the

cropping intensity is. This system also increases the cooperation among the farmers and develops the social stability in the society. This is also reflected in the society as there is no conflict among the farmers yet. The area covered by farming during the field survey is around 90 percent of the command area. This is shown in figure 5.10.

**Figure 5.10 : Area Covered by Farming During Field Survey**



## **5.10 Yearly Income**

The yearly income of each household was also taken during the field visit. There are only 2 households having yearly income less than NRs. 25,000. More than 65 percent of the household (47 households) have yearly income greater than NRs. 1, 00,000. 7 households have yearly income in between NRs. 25,000 and NRs. 50,000 while 13 households have yearly income in between NRs. 50,000 and NRs. 75,000. Similarly, 3 households have yearly income in between NRs. 75,000 and NRs. 1, 00,000.

Although the land holding of farmers is relatively less, the yearly income of most of farmers is greater than NRs. 1,00,000. This is due to the secondary source of income such as remittance, pension, business etc. The yearly income range and number of household is shown in Table 5.6.

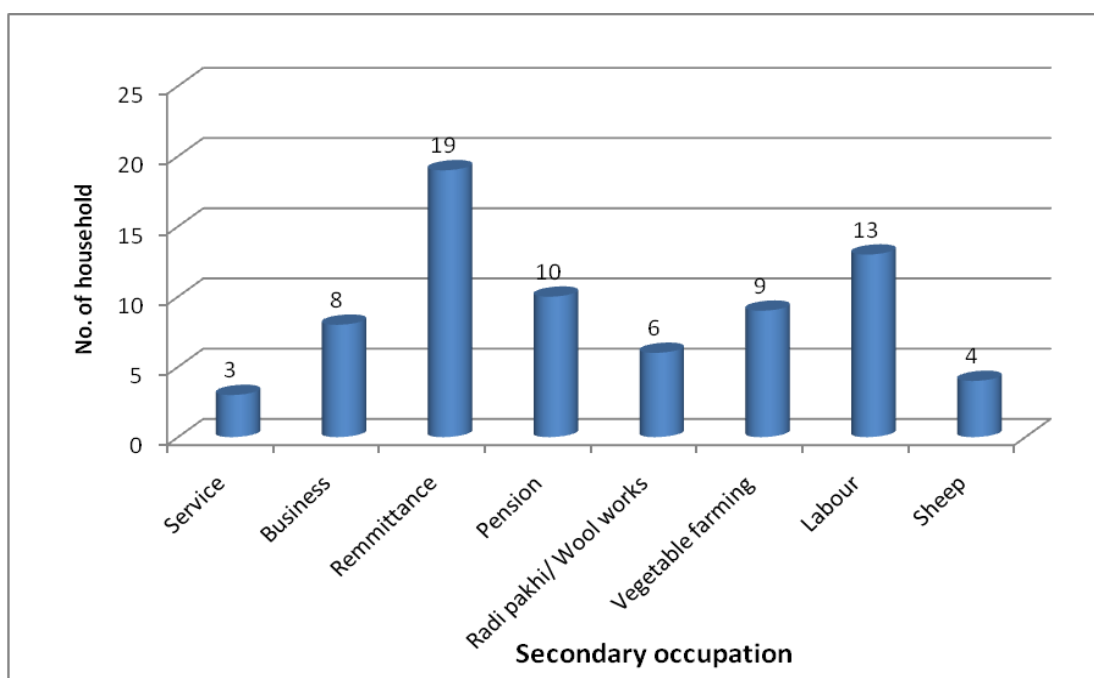
**Table 5.6: Yearly Income of Households**

S. N.	Yearly income (NRs.)	No. of household	Remarks
1	Less than 25000	2	
2	25000 to less than 50000	7	
3	50000 to less than 75000	13	
4	75000 to less than 100000	3	
5	Greater than 100000	47	
Total		72	

Source: Field Survey 2013.

Among the secondary occupations, the remittance is in the first rank (19 households) in the secondary occupation while least (3 households) of the households are engaged in service. 9 households are engaged in the professional vegetable farming. Chame, the district headquarter of Manang district and Beshisahar are the market places for vegetables. The number of households and secondary occupation is shown in Figure 5.11.

**Figure 5.11: Secondary Occupation of Households**



Source: Field Survey 2013.

Although they believe on different religion, they mentioned that they celebrate the festivals of both Hinduism and Buddhism which is helping them to be united in social works in the community. Those farmers who have less land to grow crops grow vegetables in others' field that have more land. They should not give money or crops to the land owner but they just need to put manure in the field where they are growing the crops. This system has increased cropping intensity in the Tarawali Irrigation Scheme. The main occupation of people of this area is agriculture. The remittance is in the first rank (26% of households) in the secondary occupation while least (4% of households) of the households are engaged in service. As this is the remote place, people have less access to service.

## CHAPTER VI

### WATER USERS' ASSOCIATION IN TARAWALI IRRIGATION SCHEME

#### 6.1 Establishment of WUA

There was no registered Water Users' Association before 2066 B.S. Only Construction committees were formed as and when required. Such construction committees were functional less after the immediate construction work was completed.

The Water Users' Association of Tarawali Irrigation Scheme was registered in 2066/10/17 at Western Irrigation Development Division No.-1, Lamjung. The registration number is 34-2066/67.

#### 6.2 Inclusiveness in WUA

There are all together 11 members in executive committee of Water Users' Association. They are as follows:

**Table 6.1: WUA Executive Committee**

S.N.	Designation	Name	Sex	Age	Remarks
1	President	Ghana Shyam Ghale	Male	41	
2	Vice - President	Dilmaya Gurung	Female	55	
3	Treasurer	Ram Ghale	Male	41	
4	Secretary	Thaman Bahadur Ghale	Male	43	
5	Member	Chisan Gurung	Male	69	
6	Member	Tulrashi Gurung	Female	43	
7	Member	Nirkashi Ghale	Female	48	
8	Member	Purna Ghale	Male	49	
9	Member	Yokumari Ghale	Female	50	
10	Member	Mautkhushi Gurung	Male	40	
11	Member	Yoj Bahadur Gurung	Male	40	

Table 6.1 shows that there are four females in the executive committee. Representation of females in executive committee is 36.36 percent which is above the prevailing norms. Irrigation regulation, 2056 (First amendment 2060) has provision that representation of females in the executive committee must be 33 percent as far as possible.

In contrast, there was no representation of Dalit in the executive committee although there is one and only household of Dalit family among the farmers. However,

Biswakarma family reported that the Gurung community never misbehaves them as untouchables.

The age group of the members of executive committee lies between 40 years to 69 years. Farmers of this age group are quite familiar with the agricultural practices. About 55 percent of members (6 out of 11) in the executive committee are of age 40 years to 45 years and farmers of this age group are quite active in social works as well.

This shows that the executive committee is of inclusive nature with up to some extent as the female representation is 36.36 percent. However, there was no representation of from Dalit.

### **6.3 General Assembly**

It was mentioned in the constitution of Water Users' Association that the general assembly will be held at least once in a year. The general assembly was held five times up to now since the Water Users' Association was made.

The first general assembly was held in 2066/01/03. The decisions made at that time were on the formation of executive committee of Water Users' Association, upfront cash deposit (0.5 percent of project cost) and the farmers' participation. All the farmers were agreed for the farmers' participation as per the government rules (10% of the project cost).

The second and third general assemblies were held on 2067/12/13 and 2068/01/01 respectively. The fourth general assembly was held in 2069/01/11. The main decisions of these general assemblies were to agree up on the income and expenditure of Water Users' Association during the year. The fifth general assembly was held in 2069/08/29. The decisions made were to agree on annual income and expenditure of Water Users' Association, renewal of Water Users' Association and return of upfront cash deposit from the Western Irrigation Development Division No.-1, Lamjung.

Thus, the general assembly has been held at least once in a year as mentioned in the constitution of Water Users' Association. In addition, general assembly has been held even more than once in a year as per requirement. The presence of farmers' in general assembly ranges from 78 percent to 100 percent.

### **6.4 Meetings**

It was mentioned in the constitution of Water Users' Association that the meetings will be held as and when required. The meeting was held eight times (excluding general assembly) up to now since the Water Users' Association was made.

Four meetings were held in between 2067/01/15 to 2067/12/05. Furthermore, next four meetings were held in between 2068/01/14 to 2068/12/25. This shows that the meetings are held during the construction phase of the canal system.

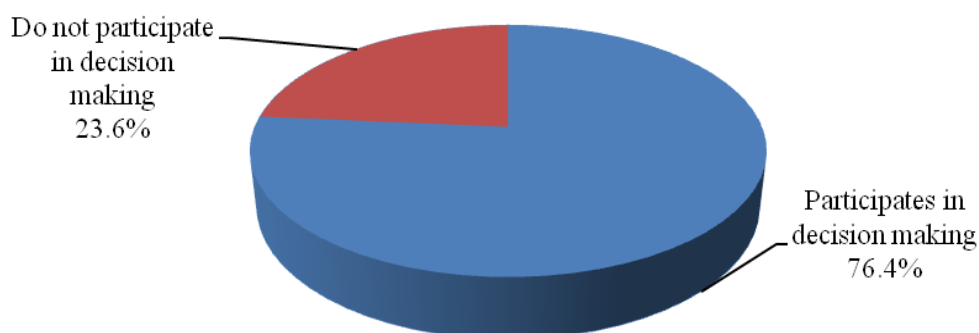
The main decisions on such meetings were regarding the farmers' participation/ contribution in the scheme. The executive committee members discussed a lot on how and when the contribution part can be worked out. And the decision of the meeting was spread to all the farmers.

## 6.5 Decision Making

The decision making is being carried out both in Water Users' Association's meeting as well as in general assembly. The annual income and expenditure of Water Users' Association was discussed in general assembly where most of the farmers participate. The Water Users' Association's meetings generally decide on when and how the farmers' participation works are carried out with the consultation of office staffs.

Out of total households, 76.4 percent of the households have the feeling that they used to participate in decision makings while 23.6 percent households realized that they do not participate in decision makings. The graphical representation of participation in decision making is shown in Figure 6.1.

**Figure 6.1: Participation in Decision Making**



Source: Field Survey 2013.

There are 35 households reported that the decisions carried out by Water Users' Association executive committee. In contrast, 37 households mentioned that the decisions are carried out by general assembly. No of the household claimed that the decisions are solely made by the Water Users' Association president.

It seems that most of the farmers participate in the decision making and no any decision is made by Water Users' Association president only.

## 6.6 Public Hearings

The public hearing program is done along with the general assembly once in a year. All the households (100%) claimed that there is provision of public hearing once in a year which is not happening in most of the irrigation schemes in Nepal.

## 6.7 Conflict Management

Almost all the farmers reported that there is no known conflict among the farmers in this scheme. Sometimes there is possibility of water theft in the upstream portion during the rice (paddy) plantation and tail end farmers request the upstream portion farmers not to over irrigate the fields. This problem has been solved in between/among the farmers up to now. Hence, there is no major conflict in this scheme.

## 6.8 Trainings to Farmers

Different trainings have been given to the farmers by Western Irrigation Development Division No.-1, Lamjung and District Agricultural Development Office, Lamjung. These trainings were conducted before, during and after the implementation of the rehabilitation of the scheme.

Western Irrigation Development Division No.-1, Lamjung conducted training on technical, financial, management aspects of the scheme. The pre-construction training was given just before the starting of construction of the scheme. Farmers' contribution and details of the project works etc were mentioned in this training. In addition, information regarding the details of work, estimate and quality was given during the construction trainings. Training on operation and maintenance, irrigation service fee collection, income generations were conducted at the end of the construction phase. Figure 6.2 shows that farmers are preparing annual seasonal work plan during the training conducted by Western Irrigation Development Division No.-1, Lamjung.

**Figure 6.2: Farmers Preparing Annual Seasonal Work Plan During the Training**

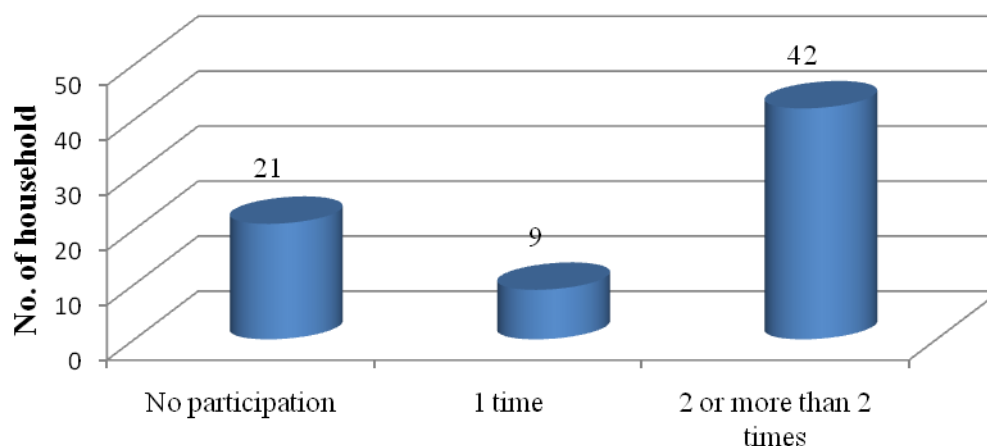


Source: Western Irrigation Development Division No.-1, Lamjung 2012.

Furthermore, District Agricultural Development Office, Lamjung also conducted different training on type of crops to be grown, the appropriate time and amount of manure to be applied to raise the yield and cropping intensity. From the reporting of

the farmers, it was realized that there was quite good cooperation between irrigation division office and agricultural development office in this scheme.

**Figure 6.3: Participation in Trainings from Household**



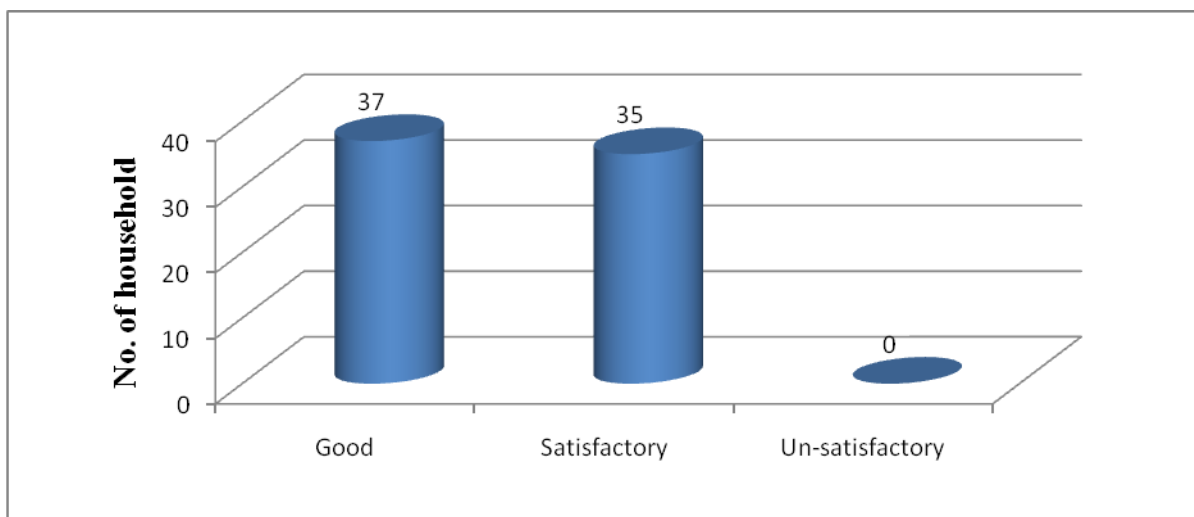
Source: Field Survey 2013.

Figure 6.3 shows that 21 households have not participated in any training conducted in the Tarawali Irrigation Scheme. In contrast, more than 58 percent of the households (42 households) have taken trainings twice or more times conducted in this scheme. 9 households have participated in one training only.

## 6.9 WUA Performance

The performance of Water Users' Association executive committee was evaluated from the opinion of each household. The performance was classified into good, satisfactory and un-satisfactory. Majority of the households reported that the performance of present Water Users' Association executive committee is good. 37 households out of 72 households reported the performance of Water Users' Association executive committee as good. In contrast, 35 households reported that the performance of present Water Users' Association executive committee is just satisfactory. No any households reported that the performance of present Water Users' Association executive committee is un-satisfactory. This is shown in figure 6.4.

**Figure 6.4 : WUA Performance Judged by Households**



Source: Field Survey 2013.

This shows that the performance of present Water Users' Association executive committee is good.

The inclusiveness of females in executive committee is above the prevailing government norms. In contrast, there was no representation of Dalit in the executive committee although there is one and only household of Dalit family among the farmers. However, Biswakarma family reported that the Gurung community never misbehaves them as untouchables. Most of the farmers participate in the decision making and no any decision is made by Water Users' Association president only. 21 households have not participated in any training conducted in the Tarawali Irrigation Scheme. In contrast, more than 58 percent of the households have taken trainings twice or more times conducted in this scheme. 9 households have participated in one training only. 37 households reported the performance of Water Users' Association executive committee as good. In contrast, 35 households reported that the performance of present Water Users' Association executive committee is just satisfactory. No any households reported that the performance of present Water Users' Association executive committee is un-satisfactory.

## 7.1 Summary

Farmers' participation in irrigation schemes in different phases of project plays crucial role in the overall irrigation scheme management. To access the farmers' socio-economic status, to evaluate the institutional status of Water Users Association and to

access the farmers' participation in Tarawali Irrigation Scheme, Lamjung are the specific objectives of this research.

Both the primary and secondary data were collected for this research. The primary data collection was done during the site visit. Census survey was done in all 72 households of this irrigation scheme. Interview checklists, participant observation and key informant survey were carried out during the field survey.

The major findings of this research are as follows.

- They use *Jhara* system for the participation. During the construction phase, the farmers' contribution part was done by each household on the basis of 1 day per ropani by *Jhara* system. For the skilled work that was to be done by farmers under contribution part, NRs 150 per ropani was collected from each household and given to the skilled labours.
- Trainings were given to the farmers during the construction period by the Western Irrigation Development Division No.-1, Lamjung office.
- Females do not go to operate the gate alone at intake as the idle length of the canal passes through the forest area and they are afraid of wild animals there.
- They have provision of canal maintenance twice a year by *Jhara* system. There is provision of NRs. 100 fine to the absentee household.
- Water Users' Association in the general assembly has decided to collect NRs. 20 per ropani per year. As this is the first attempt to collect the money for operation and maintenance purpose, Water Users' Association started with NRs. 20 per ropani per year which is quite low in monetary terms and will be increased in the coming years. They have provision of collecting NRs. 50 as membership fee which must be renewed every year by paying NRs. 50.
- The tail end farmers are not fully satisfied with the present operation and maintenance system of the Tarawali Irrigation Scheme. Although they are not satisfied with the present operation and maintenance system, they participate in each and every canal operation and maintenance works.
- Although they believe on different religion, they celebrate the festivals of both Hinduism and Buddhism which is helping them to be united in social works in the community.
- 46 percent of the households have land in between 0.25 ha and less than 0.5 ha. In contrast, only 4 percent of household have land in between 0.75 ha to less than 1.0

ha. 54 households have food sufficiency for 8 months only and 14 households have food sufficiency round the year.

- Those farmers who have fewer fields to grow crops grow vegetables in others' field that have more land. They should not give money or crops to the land owner but they just need to put manure in the field where they are growing the crops.
- The main occupation of people of this area is agriculture. The remittance is in the first rank (19 households) in the secondary occupation while least (3 households) of the households are engaged in service.
- Representation of females in executive committee is 36.36 percent. In contrast, there was no representation of Dalit in the executive committee.
- The general assembly and meetings were held as per provision in the constitution of Water Users' Association.
- It seems that most of the farmers participate in the decision making and no any decision is made by Water Users' Association president only. All the households claimed that there is provision of public hearing once in a year.
- 21 households have not participated in any training conducted in the Tarawali Irrigation Scheme. In contrast, 42 households have taken trainings twice or more times. 9 households have participated in one training only.
- 37 households and 35 households reported the performance of Water Users' Association executive committee as good and satisfactory respectively. No any households reported that the performance of present Water Users' Association executive committee is un-satisfactory.

## **7.2 Conclusion**

*Jhara* system for participation is found very effective in Tarawali Irrigation Scheme. Water Users' Association has started to collect irrigation service fee with NRs. 20 per ropani per year which is quite low in monetary terms which can be increased later. The provision of collecting NRs. 50 as membership fee and its annual renewal increases the fund Water Users' Association. Although the tail end farmers are not fully satisfied with the present operation and maintenance system of the Tarawali Irrigation Scheme, they participate in each and every canal operation and maintenance works.

Although they believe on different religion, they mentioned that they celebrate the festivals of both Hinduism and Buddhism which is helping them to be united in social works in the community. Those farmers who have less land to grow crops grow vegetables in others' field that have more land. This system has increased cropping

intensity in the Tarawali Irrigation Scheme. The main occupation of people of this area is agriculture. The remittance is in the first rank while least of the households are engaged in service. As this is the remote place, people have less access to service.

The inclusiveness of females in executive committee is above the prevailing government norms while there was no representation of Dalit in the executive committee. Most of the farmers participate in the decision making and no any decision is made by Water Users' Association president only. Most of the trainings are repeatedly given for the same farmers while other farmers have not participated in any of the trainings conducted in the Tarawali Irrigation Scheme. All the households of Tarawali Irrigation Scheme are satisfied with the present Water Users' Association.

### **7.3 Recommendation**

- The system of growing vegetables in others' field who have relatively more land can be used in other irrigation schemes to increase cropping intensity.
- It is better to include of Dalit family in the executive committee, although there is one and only one household of Dalit family among the farmers.
- The *Jhara* system is one the best methods for active participation of farmers that can be applied to other irrigation schemes depending up on the social settings.
- It is better to include different farmers in different trainings rather than giving different training to the same farmers.
- Collecting membership fee and its annual renewal helps to update the data on land holding of farmers as well as increases the fund. So, it can be used to other irrigation schemes.
- Starting of irrigation service fee collection can be done from low rate (eg. NRs. 20/ropani as in Tarawali Irrigation Schemes) which develops habit to pay irrigation service fee for the farmers and the rate can be increased later.

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# ANNEXES

## ANNEX – I

### Interview Schedule for Household Survey

1. Introduction

Full Name of Respondent: .....

Age (completed year): ..... Sex: .....

VDC/Ward No.: ..... Village: .....

2. Head of the Household

Name: ..... Age (completed year): ..... Sex: .....

Occupation: ..... Religion: .....

1. Family composition

S. N.	Member's name	Relation to head	Sex (M/F)	Age	Educational status	Occupation
1						
2						
3						
4						
5						
6						

1 Type of house.

a. RCC

b. Stone/cement mortar

c. Stone/mud mortar

d. Others

2 How much land do you have?

Type	Total land	Within CA	Cultivated own self	Rented in	Rented out
Khet					
Bari					

3 What do you grow on your land?

S. N.	Major crops	Cropping month (sowing-harvest)	Yield before project (muri/ropani)	Yield after project (muri/ropani)
1				
2				
3				

4 Is the agricultural production sufficient to meet the annual food required for the family? Yes/ No

5 If no, what are the major sources of income which help you to manage family in the food deficit months?

(a)

(b)

(c)

6 What is the total income of the family per annum?

NRs.	Below 25,000	25,000 to 50,000	50,000 to 75,000	75,000 to 1,00,000	Greater than 1,00,000
Before project					
After project					

7 What type of animals do you have?

Livestocks	Buffalo	Cow	Ox	Goat	Pig
Before project					
After project					

8 Have you participated in irrigation/agricultural trainings? Yes/ No

If yes,

S. N.	Organizer	Name of training	Date	Venue
1				
2				
3				

9 Do you participate in decision making? Yes/ No

10 How the decision is done?

a. By president                      b. By WUA                      c. By general assembly

11 How often the general assembly takes place?

a. once in 2 years                      b. Once a year                      c. Twice a year

12 How the conflicts settled down?

a. By president                      b. By WUA  
c. By general assembly                      d. Others

13 Does this system have Public Audit System? Yes/ No

14 How is the performance of present WUA? Good/Satisfactory/Poor

15 Is there provision of canal watchman (Dhalpa)? Yes/No

If yes, how many? ..... How they are paid ?.....

16 Is the amount of irrigation water sufficient for your land?

Status	Before project rehab.	During project rehab.	After project rehab. to date	In future (expectation)
Insufficient				
Almost sufficient				
Sufficient				

17 Is there any possibility of water theft?

Status	Before project rehab.	During project rehab.	After project rehab. to date	In future (expectation)
Yes/No				
If Yes, which month?				

18 How there is possibility of water theft? .....  
 .....  
 What should be done to control that? .....  
 .....

19 Should following offices give financial support to this system? Yes/No If yes,

Offices	DoI	VDC	DDC	DADO
How often?				
How much?				

20 Do you trust WUA to find out external source? Yes/No

21 Is the WUA fund used to institutional development of WUA? Yes/No

22 Do you think the WUA only can manage the system? Yes/No

23 Do you participate in canal maintenance? Yes/ No

24 If yes, how did you participate in canal maintenance?

S. N.	Before project rehab. (When?)	During project rehab.	After project rehab. to date	In future (expectation)
Cash (NRs.)				
a. Kind				
b. How?				
c. Equivalent NRs.				
Others				

25 Did you pay the membership fee? Yes/ No If yes, how much? NRs.....

26 Is it necessary to pay irrigation service fee for O/M purpose? Yes/ No

27 Do you pay any irrigation service fee?

Status	Before project rehab.	During project rehab.	After project rehab. to date	In future (expectation)
Yes/No				
If Yes, (NRs.)				

If not, why?

a. You do not want to pay    b. Nobody told you to pay    c. Others.....

28 Do you contribute for main canal operation? Yes/No If yes, how?

a. You go to operate gate yourself.    b. You say it to WUA

c. Others.....

If not, why?

a. Its function of WUA

b. Others.....

29 How do you want to contribute for O/M?

a. By cash

b. By kind

c. Others

30 How the amount of contribution is fixed?

a. As per household

b. As per land

c. As per economic benefit from land

d. Others....

31 Do all users participate in contribution? Yes/ No

32 How often do you visit the canal system?

a. Everyday

b. Once a week

c. Once a month

d. When you need water

33 Does canal require regular maintenance? Yes/No

34 How the regular maintenance is done?

a. Any farmer who visits the system

b. All farmers

c. Not in practice

35 How the emergency maintenance is being done? .....

36 Is it better to collect fund for emergency maintenance? Yes/No

37 Are you satisfied with O/M system?

Status	Before project rehab.	During project rehab.	After project rehab. to date	In future (expectation)
Yes/No				
If No, what should be done?				

## **ANNEX – II**

### **Checklist for Interview with Key Informants (WUA Committee)**

- 1 History of village settlement in the study area.
- 2 History of Tarawali Irrigation Scheme Management.
- 3 What is the socio-economic status of WUA committee?
- 4 Institutional status of WUA in Tarawali Irrigation Scheme.
  - Before the project
  - During the project
  - After the project
- 5 Farmers' participation in Irrigation management.
  - Before the project
  - During the project
  - After the project
- 6 Conflict management in Irrigation management
  - Before the project
  - During the project
  - After the project
- 7 How WUA is getting external sources?
- 8 Suggestion for Irrigation Service Fee collection.
- 9 Suggestions for effective operation and management of Tarawali Irrigation Scheme.

## **ANNEX – III**

### **Checklist for Interview for Case Study (Low participation)**

- 1 History of the farmer/family.
- 2 Socio-economic status of farmer/family.
  - Before the project
  - During the project
  - After the project
- 3 Role of farmer/family in WUA committee.
  - Before the project.
  - During the project.
  - After the project.
- 4 Role of farmer/family in participation in Irrigation management
  - Before the project.
  - During the project.
  - After the project.
- 5 Role of farmer/family for Irrigation Service Fee collection.
- 6 Suggestions for effective operation and management of Tarawali Irrigation Scheme.

**ANNEX – IV**  
**Checklist for Interview for case study (High participation)**

1. History of the farmer/family.
2. Socio-economic status of farmer/family.
  - Before the project.
  - During the project.
  - After the project.
3. Role of farmer/family in WUA committee.
  - Before the project.
  - During the project.
  - After the project.
4. Role of farmer/family in participation in Irrigation management
  - Before the project.
  - During the project.
  - After the project.
5. Role of farmer/family for Irrigation Service Fee collection.
6. Suggestions for effective operation and management of Tarawali Irrigation Scheme.

**ANNEX – V**  
**Photographs from the Field**



Researcher during the data collection



Researcher during the data collection



Researcher with farmers during the field visit



Farmers working in the field