Water Users Group Participation in Irrigation Management in Hemja Irrigation Project, Hemja, Nepal

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

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2017

LETTER OF RECOMMENDATION

This is to certify that Ms. Anita Kunwar has completed this dissertation titled "**Water Users Group Participation in Irrigation Management in Hemja Irrigation Project, Hemja, Nepal**" under my supervision. This is an original work. I, therefore, recommend this dissertation for final approval and acceptance.

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LETTER OF APPROVAL

We hereby certify that the dissertation entitled " **Water Users Group Participation in Irrigation Management in Hemja Irrigation Project, Hemja, Nepal** " submitted by Ms. Anita Kunwar to the Department of Anthropology, Prithvi Narayan Campus, Pokhara, in the partial fulfillment of the requirements for the Degree of Master's of Arts in Anthropology has been found satisfactory in scope and quality. Therefore, we accept this thesis as a part of the mentioned degree.

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ACKNOWLEDGEMENTS

This dissertation has been prepared as the mandatory assignment to fulfil the requirement for the Master's Degree in Anthropology. Completion of this project was never been an easy task for me. I have been able to give the final sharp of this dissertation with the great help, support and encouragement from the different persons and institutions.

First of all, I would like to express my whole sincere gratitude to my respected teacher and dissertation supervisor Mr Sarad Kumar Poudel who showed great interest and provided academic guideline during the whole research work. He also provided me valuable suggestions and insightful guideless, support and encouragement though out this research work. I am very much grateful to the Department of Anthropology, Prithivi Narayan Campus and its chairperson Mr Surya Bhakta Sigdel for providing me an opportunity and a favourable environment for preparation of this dissertation. I also like to express my appreciation to the head of Department of Sociology, Dr. Bishwo Kalyan Parajuli for his precious suggestions, advices and encouragement during my project work. I am also grateful to all the members in Hemja Irrigation Project for their support.

At last I must express my sincere gratitude to all my family, friends (Sharsoti Gurung, Mira Khadaka and Shanta Bhurtel) for their unconditional love, support and encouragement.

At last I would like to thank to "Quick Computer Service and Photocopy House, Pokhara -1, Bagar" for its excellence computer service.

Date: 2073/11/08 **Anita Kunwar**

ABSTRACT

This study was carried out in Hemja Irrigation Project in Hemja, Kaski district to assess the Water Users Group participation in irrigation management. This project has been jointly managed by the government and local community whereas, in the initial period, most of the farmers were defunct. They feel that the repairing and maintenance the project should be executed by DOI offices itself because people think that they are responsible of every things (Adhikari, 2010). Due to lack of Water Users participation, farmers were not aware of using resources as well as feeling of ownership over the project. On other hand, higher percentage of women than of man is engaged in agriculture. Yet the extent of women's involvement in irrigation management is disproportionately low and still they are not involved in Water User Association, Farmers were facing so many problems and challenges to manage the irrigation project. That's why, researcher have chosen to assess the issue of people's participation in irrigation management in terms of the present situation of people's participation.

Agriculture is the main source of income, therefore effective irrigation system play the crucial roles in the study area. The discouraging economic growth of Nepal characterized by low agricultural productivity against the rapid population growth, The main objective of this study was to analysis the all aspect of Water User Group participation in Hemja Irrigation Project, to find out the criteria for water allocation and distribution among the beneficiaries and to explore the problems and challenges of the irrigation management. The primary data were gathered by following different method. Qualitative data was gathered from standard format create by researcher. Due to the nature of the research question, researcher used the survey, questionnaire techniques, and interviews tools to answer the research question. The information collected from the field was coded, tabulated and entered into the computer using the statistical package for social sciences (SPSS). Thus the finding of this research was made through descriptive, analytically, exploratory methods. Data collections play the vital role for the outcome of the study, it is very crucial to conduct research by scientific, unbiased and based on a reliability and validity (centre for review and dissemination, 2009). Therefore, research has been conducted in a rigorous and ethical manner. Moreover, secondary information also collected through sources such as office records, group meeting minutes, reports

journal, published articles. Several small farmer managed irrigation system, established decades ago through self-help and cooperation, nurtured by their remoteness and kept operation agriculture was the only possible sources of livelihood for most, are now often in disrepair. In the case of Hemja irrigation project, Hemja has fertile land but due to the lack of irrigation facility crops and vegetable production was not satisfactory before Hemja irrigation project. However, Hemja Irrigation Project has got huge impact on the people social-economic condition. Moreover, Majority of the people choose to do farming due to its growing commercial marketing in the study area. The project had increase production of cereals, vegetables and other cash crops. The finding shows that water user committee is responsible body to take decision related to the minor issues in irrigation management whereas major issues are decided in general assembly group meeting. There was not any kind of biasness among the users according to their caste/ethnicity, higher and lower caste, politic status, rich and poor. Everyone's problems, suggestion have been taken seriously. Even though there were some obstacles, but the project has been run smoothly, with users group participation. Water User Association has set up the strict rules and regulation for benefit sharing and minimise the conflict. Participation is defined as a process through which stakeholders influence and share control of development initiatives and of decisions and resources that affect them. Thus, participation requires more than just disseminating information and giving farmers government-specified roles in projects. Participation in irrigation management involves a larger role for farmers, water groups, and other stakeholders. It may range from offering information and opinions during consultations, to fully enabling farmers to act as principal decision makers in all or most project activities. There have been increasing efforts to use participation in various forms to improve the quality, effectiveness, and sustainability of irrigation systems. Therefore it is very important to understand improve participation in irrigation management. The finding of the present research shows that the project is running successfully; there is effective water users' group participation all the stages of irrigation management. However, the present study may not be sufficient to cover all dimensions of irrigation management, the finding require further investigation in large population based studies More studies should be conducted to confirm the conclusio

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ACRONYMS

DOI	District of Irrigation
Et.al	Et alii (and others)
FMIS	Farmer Management Irrigation System
HIP	Hemja Irrigation Project
HMG	His Majesty of Government
NGO	Non-Governmental Organization
No.	Number
Rs	Rupees
S.N.	Serial Number
SLC	School Leaving Certificate
VDC	Village Development Committee
WHO	World Health Organization
WUA	Water User Association

CHAPTER –I

INTRODUCTION

1.1 Background

It is obvious that the world population is increasing day by day. During mid-2012, the world population was 7,058 million and nearly 84 million populations are increasing every year. Nepal is a landlocked country with an area of 147,181 squares K.M.It is surrounded by Tibet of chine in the North and India in the South, East and West. The total population of Nepal is 26.5 million in 2011 and it is increasing at the rate of 1.35 per cent(Gautam,2012).Natural Resources are fundamental to life and are the basic of livelihood for human beings as well as animals which include land, water, air, minerals, forest, fisheries, wild flora and fauna. Together these resources provide the ecosystem services that underpin human life. These natural resources may be used by people for survival. Among these natural resources water is one of the most important and precious resources for human life, it has covers 71 percent area of the earth surface. It is renewable and vital resources for agriculture transportation, daily consumption and many other human activities.

Nepal is predominately an agrarian country. Agriculture is the largest sectors and backbone of Nepalese economy. About 83% of the population depends on agriculture and it contributes to 39.48% country's total GDP (Central Bureau of Statistics, 2011). Although agriculture is visibly dominated the national economy, its contribution is declining gradually. The contribution of agriculture sector has been fallen steadily from 70% to 43% years between 1974 to 1992.In Nepal, about 70% of the area is irrigated during the monsoon season and only 38% in winter and per monsoon seasons. Nepal was food exporting country until the early 1980s but it imports food grains at present. Nepal's economy growth rate is slow because of the low rate of agriculture development (Gautam, 2012).The identified reasons for the poor performances of agriculture

inadequate provision of irrigation production inputs, credit market and extension of appropriate technology to support production growth. Among these factors, irrigation has been identified as the key to accelerate, intensify and sustain agricultural growth. Historically, Nepal is rich for the indigenously built irrigation system. The communities in Nepal have used local resources successfully for centuries. The first public sector irrigation system Chandra Nahar was constructed in 1929 AD. Before public sector initiation in irrigation systems development, several Rajkulos were constructed through state patronage. Likewise, Nepalese written history also shows that in the ancient time both the state as well as communities have taken responsibility of irrigation management and development. The beneficiary farmers have been mobilizing the irrigation system according to the rules and regulation of the state and local socio cultural laws, norms and values. In the past full authority to the farmer in the case of government management system was not valid. In the 17th century king Ram Shah of Gorkha and Jita Mitra Malla of Bhaktapur had declared that irrigation and its management were community responsibilities (Roth et al.,2012).

With the passage of time substantial efforts have been made to formulate water resources utilization, irrigation policy, rules, regulations and laws as a whole. Department of irrigation was established about 4 decade ago which is continuously working till now. In this period 100 of canals have been constructed and 1000 hectors of land in different areas have been irrigated. According to updated master plan for irrigation development 1995, the total irrigable agricultural area in Nepal is estimated about 1760 thousand hectors. Compromising 1005 thousand hector of the existing irrigation. Out of the existing irrigated area of 1005 thousand hectors, 721 thousand hectors that is 71.8 percent is managed by the farmers and remaining 284 thousand hectors or 28.2 percent is managed by DOI (Department of Irrigation) and about 721 thousand hectors of the FMIS (Farmer Management Irrigation System). That's why, Nepal is known as "Landry irrigated by farmers managed irrigation system'' (Gautam, 2012).Consists of 582 thousands hectors under surface irrigation and 139 thousand hectors underground water. Irrigation system is a joint collective social process where a complete attention is

required. The social scientist and farmer cannot blindly make organizational rules ,it is use without careful collaboration with technical scientist, engineers and hydrologists in turn the technicians cannot specify pumping regimes without regard to impact on organizational chapels and social dynamic (Roth et al,2012). It is these essential to fully understand factors while implementing a new irrigation scheme or rehabilitating the existing irrigation system.

Moreover, people's Participation in irrigation system management implies making efficient use and best distribution of available resources. This includes sound management and mobilization of local resources, the process of diverting technical and financial inputs to agency managed irrigation system not only anointed the supposed beneficiaries but also fell short of the target. Hence the new approach in which the financial and technical know-how is transferred to local people is a most for the successful management of the irrigation system. This can only be possible with "People participation" in irrigation system management (Fisher, 2001).However, government strategies most of the time focused only construction of the physical infrastructures. They weren't consulting with the local people. During 1995 to 1980, Irrigation management was centralized (Ghimire, 2004).Even though recently government policy is focusing on the participation. It is seen that program of the government are less effective than farmers managed program. Therefore, development of irrigation system, public sector participation is also recognized by the government policy. Several projects are being implemented by the district office of irrigation to support their community managed irrigation system. However the ownership of the irrigation system remains with the community. The water user group registered with the government agency recognized officially is not supported by the government but it is run through local people. The involvement of local people, especially WUG participant in the irrigation management is the main effort of the government to take over the responsibility from the government agencies for service delivery at the local level. This program might bring the ownership feeling for the local people and conservation, protection, management and Utilization of the local resources at the local level based on the philosophy of participatory

decentralization. This study is focused on the Water Users Participation in irrigation management of Hemja Irrigation

1.2 Statement of Problem

The discouraging economic growth of Nepal characterized by low agricultural productivity against the rapid population growth, providing food to people is perhaps Nepal's most serious problem and will continue to be acute over the next two decades (Gurung et al, 2014). The main factor responsible for unsatisfactory agricultural growth has been slow and in effective development of irrigation system.

Most of the development programs mainly fail because they are designed from top down development model and seldom provided follow up on completed project (Kattel, 2006). As a result rural development programs often have not produced expected result. Likewise, development programs simultaneously are driven from the center and the role of people in designing and implementing these problems at the local level has confined only up to politician's lip-services and planners. However, in reality over reported files people are forgotten at the actual process of decisions making and planning. The government also focus on promote public sector participation in the development of the irrigation system, various projects are being implemented by the department of irrigation to support the community managed irrigation system. Water resources under the authority of government presence was the common practices in all aspect of activities in the past, but people's participation in given more emphasis for the development and management of water sector in the new polices, rules and regulation. Unfortunately, people's participation remain more rhetoric than reality, government has approved the participatory approach development activities designed for the grass root. People living in a rural area but these beneficiaries have been neglected and depraved of development benefit due to lack of appropriate linkages (Tarimo et al, 1998). So in practice the active participation approach is in dilemma. And it is felt that there is need to change the attitude of both farmers and officials to make participation in principle and reality. Experience also shows that people's participation is not a rosy path. The success of this approach depends upon various factors (Burton, n.d.). There is number of abstracts to participation. The centralized political systems aren't oriented towards people

participation. In this ways lots of obstacles which include a mentality of dependence, domination by the local elite and gender inequality are quite crucial inhibiting people's participation.

Thus, various responsible points on the nearly failure some of hill irrigation system which are constructed under DOI help not been showing their full targeted success. Due to the lack of ownership of the water user group. However, in the case of Hemja irrigation project, it was completed with help of DOI. This is associated with small scale irrigation project aiming at irrigating 330 hector of land at Hemja Kaski. This irrigation system has been managed jointly. However, in the initial period, most of the farmers are defunct. They feel that the repairing and maintenance of the irrigation system should be executed by DOI offices itself because they think that the system was constructed and completed by DOI help. Such feelings should be deleted from their mind, water user association was formed during a constriction of Kulo, irrigation canals. Due to lack of water users participation, farmers were not aware of using resources as well as feeling of ownership over the project. On other hand, higher percentage of women than man is engaged in agriculture. Yet the extent of women's involvement in irrigation management is disproportionately low and still they are not involved in Water User Association, Farmers were facing so many problems and challenges to manage the irrigation project. That's why, researcher have chosen to assess the issue of people's participation in irrigation management in terms of the present situation of people's participation.

1.3 Objective of the Study

The general objective of the study is to analyze water users group participation in Hemja Irrigation Project.

1.3.1Specific objective of the research study are as follows

- To assess the participation of Water User at various participatory stages in Hemja Irrigation Project.
- To find out the criteria for water allocation and distribution among the beneficiaries.
- To explore the problems and challenges of the irrigation management.

01.3.2 Based on the objectives of the research study the following research questions have been raised.

1. How WUG have been formed?
2. What are the problems faced by the users group in irrigation management?
3. Is there equal participation in every aspect of irrigation management based on the principle of equity and equality?
4. Can the users committee make transparency with regards to rules, regulation, benefit sharing etc?
5. What are the disputes and conflicts among the users groups in irrigation system?

1.4 Significance of the Study

Nepal has long history of irrigated agriculture, mainly through farmer managed irrigation system. Nearly 75% of the total irrigated area is under these FMIS, whereas the agency managed irrigation systems irrigate the remainder. Several studies has noticed that government managed irrigation projects are seemed to have low performance in terms of water use efficiency, crop productivity and backlog of deferred maintenance, it has been recognized that for improved management of available supply of irrigation water the participation of beneficiary farmers is crucial(Gautam,2012). Hemja irrigation project has been managed jointly by WUA and DIO which is become backbones for agriculture development in the study area. Moreover, several studies have suggested the people participatory irrigation management is more effective than the government management project. Previous research has also widely investigated economic dimension of empowerment in Hemja (Adhikari, 2011) However, the area of participatory irrigation has been untouched in the study area, and therefore the researcher have chosen this study area. Moreover, this study is useful to understand the participatory approaches and decision making process and its strengths and weaknesses. This study also will be helpful for the future researchers. The main purpose of this study is to assess the participation of Water User at various participatory stages in Hemja Irrigation Project, to find out the criteria for water allocation and distribution among the beneficiaries. Moreover, to

explore the problems and challenges of the irrigation management as well as to evaluate the existing condition of people participation in irrigation management system and the outcome of this study can be helpful to solve the problem related to irrigation management. It also will be helpful to improve effectiveness in people participation in irrigation management in the study area. Thus, this study is significant to identify the problems related to people participation in irrigation management.

1.5 Limitations of the Study

This study was carried out for the partial fulfillment of requirement for the master degree in Anthropology. Detailed research wasn't being possible due to limited time and resources. Study was only focused on Hemja Irrigation Project. Therefore, the finding of the study may not be generalized to the different irrigation project. The number of the study and sample were still small.

1.6 Definition of the key Terms of the Study

The following are the terms and terminologies that will be used in dissertation paper which are describing as follows.

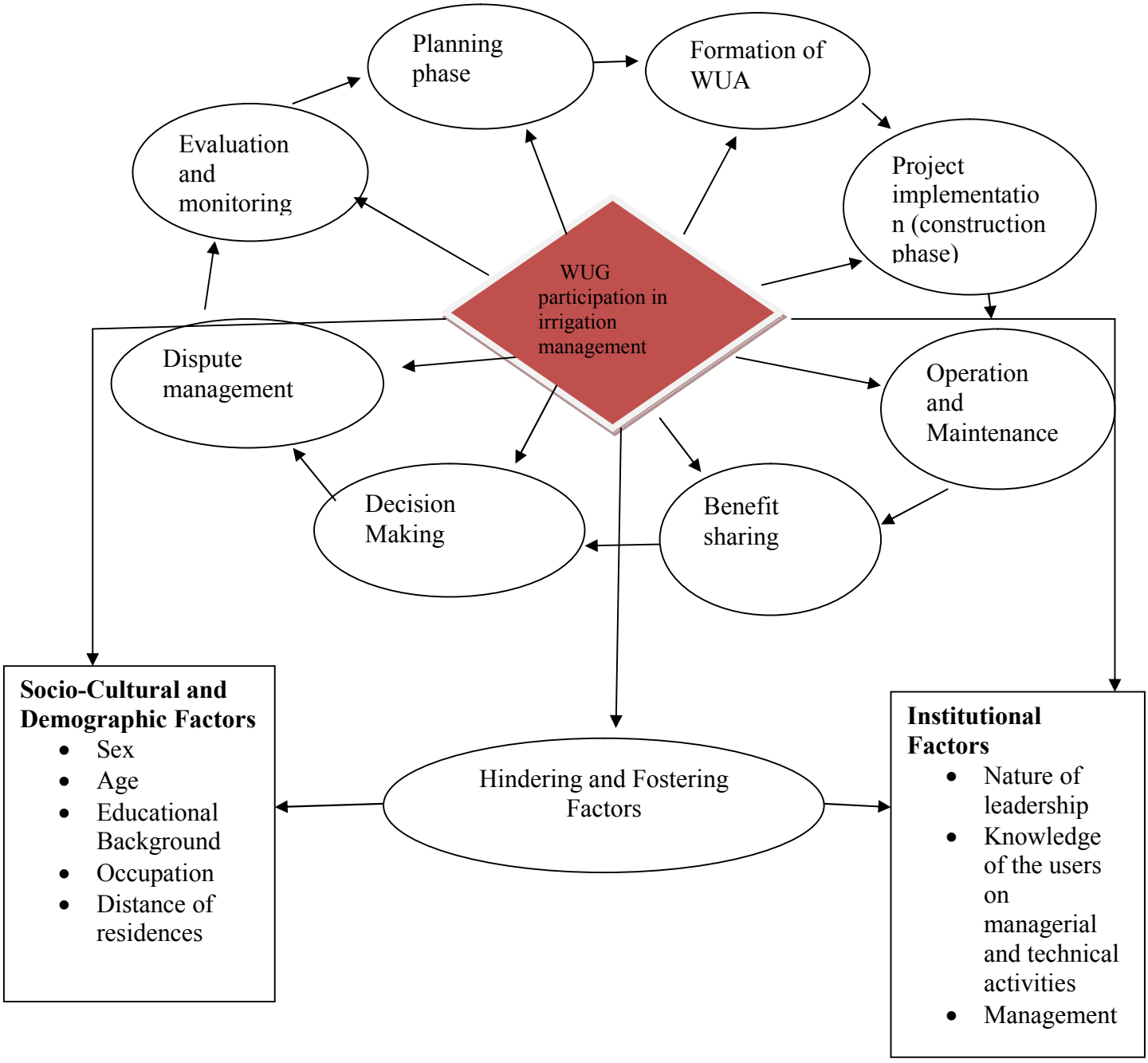
1. **Community Participation**: People of Hemja where water users group participate from planning to decision making in irrigation management.
2. **Irrigation Management**: Irrigation cannel management by local people of study area.
3. **Water Users Group:** All the individuals who are directly or indirectly benefited from the canal.
4. **Water Users Association:** All individual who are directly or indirectly benefited from the canal.
5. **Common Property Resources**: Naturally created property which is common for all community people. In this study water is the common property.

1.7 Conceptual Framework

Irrigation management involves the management of the physical resources as well as human resources to obtain the target goal. Therefore, in the irrigation management, there are various stages involved such as benefit sharing, decision making, distribution, and implementation of the decision, maintained of the irrigation project, conflict resolution, monitor and evaluation. Moreover, to manage the irrigation system certain decision should be taken, during the meeting, general assembly the active interaction between the users group is the essential component of the irrigation project. Moreover, after taking the decision from the majority of the users, it should be implemented by all the users. However, once the project is completed it won't remained is same condition forever. It may be damaged, leaked which needs to be repair and maintain according to the necessity. Similarly, in the case of that conflict resolution benefit sharing, evaluation contribution to the project should have an equal access and contribution from the users group. Several studies suggested that user's participation all the stage of irrigation Management will give the ownership feeling for the irrigation system. Users are more likely to abide by rules and regulations set for management of the system water distribution if they are part of the rule setting process and regulation. Furthermore, users have better information and access to local resources, management, operation and maintenance are need based, cost effective and timely.

Those the functions during the irrigation management may be completed by the different ways. It can be run by only from the government and non-government agency without user's participation. However, several studies argued that this type of project will not be sustainable and effective then the people participant irrigation project. Therefore, if the user group participant actively in the all stage of irrigation management as mention above, only then project can be effective and sustainable.

Figure . 1.1 Conceptual Framework



During the irrigation project, there are different factors are responsible to hinder the users participation in the irrigation management. Some of those factors are socio-demographic

factors includes age, sex, education, occupation of the users group ,location of the field in the canal, distance and size of the land hold whereas the institutional factors includes the nature of the leadership, knowledge on irrigation management. According to the preliminary literatures reviews, it has been conceptualized that effective and sustainable irrigation management depends on these factors.

CHAPTER – II
LITERATURE REVIEW

There are many scholars and researchers who have devoted their time to study irrigation issues of Nepal. Their effort to find out the irrigation problems and solution are considered valuable contribution. However, In order to have a depth understanding about the topic area researcher has gone through all the relevant literatures review process to find out the existing status and research gap in irrigation management in Nepal.

2.1 Concept Review

The concept of people participation has been evolved since the ancient period. In the time of plot, Aristotle and other Greek philosopher people's participation is public affair has been the subject of growing interest in political science. Since the day of Aristotle, the emphasis has been laid on democratic government, through sharing of office responsibilities. Aristotle was of the view that participation is the affairs of the state as a citizen was essential to the development and fulfillment of the human personality. These days participation was merely the matter of voting, holding office, attending public meetings, paying the tax and defending the state (Cohen and uphoff, 1986)

Participation was focused since the period of 1960. Now People's participation is considered as a theory which is formulated by Francis philosopher Alexis de to quenelle which was highly popular during the period of 1970. At that time United Nations organization has been emphasized participatory theory for the development of third world nation. UNO -1973 states that ‘’the government of united nation should encourage people participation in all aspect of development process’’ (Khanal, 2005).Participation is defined as a voluntary contribution of the people in one or another of the public intervention supposed to contribute to national development. But the people aren’t expected to take part in shaping the program or criticizing its contents (Arayesh et al,2016)).Participation includes people’s involvement in decision making ,implementing, benefit sharing, evaluating the program(Cohen and Uphoff,1986).

Moreover, the meaning of participation however has changed with passage of time changing the role of state. Castillo (1975) mentioned that people are motivated to participate in any programme, which serves their self-interest; people participation in any programme depending upon now one perceives the benefits. Similarly, Yadav (1980) suggested that people participation means participation in decision making, implementation of development programme, project and in sharing of benefits of development. However, Hall & Vandevender (1978) argued that the concept of often appear to be mechanisms "designed to impose control on the rural population rather than allow involvement in decision making''. Participation is a process not an event, it will proceed at different speeds for different countries and region and it's from and extent will vary form one stage of development to another.

In Nepal, government policy focused on users group(Farmers) participation at all stages of irrigation development from project implementation to operation and maintenance (Lam, 1998) it has been noticed that without local people participation irrigation management system could not be sustainable.

2.1.1 Indigenous Knowledge System and Development

Indigenous knowledge is a part of culture. It is a knowledge that is unique to a given community. Fulazzaky (2016) said that "indigenous knowledge is an information base for a society''. It is for this reason that significance of indigenous knowledge system by no means can be ignored while designing people centered development policies and strategies. This is argued that if harnessed properly, it could provide valuable input to all the sectors of local level development planning procedures and practices. Generally, the knowledge of the local people about the natural resources management is called an indigenous knowledge. The implication of indigenous knowledge system in the fields of rural development has been pursued with a greater zeal from the "Farmer's first" approach. The approach suggests that local experts aren't so many researchers as farmers themselves (Chamber, 1990).

In some other case, it is also understood as equivalent to local knowledge system. The point is that even the poor people are right and rational in their behavior. However, the

contextually of such rational behavior can be understand only by placing them the local frame for awareness and conditions of their use in day to day lives (Panday,2013)Therefore, some studies even mentioned that rural peoples knowledge is often superior then outsides (Chamber, 1986).Indigenous system may be well suited to the social, psychological and other needs of participants in these system and it helps to know how indigenous organization function how their members understand them, their capabilities and limitations are important we can pattern contemporary form of local organization according to indigenous norms, rules and responsibilities so that development undertaking will be more familiar and acceptable to local or indigenous people(Morawski,2013).Anthropological studies suggested that integration of the people's point of view and their knowledge must be placed in the center in the whole process of development from the planning to the implementation stages. Moreover,the local knowledge is used to avoid some negative connotations to indigenous like tribal or ethnic "in our context indigenous knowledge is the local people's knowledge that is unique to the given culture (Khanal, 2005).

Thus, significance of indigenous knowledge system for the proposes of planning development work have been stressed by several scholar through their down-stream based research studies (Singh et al., 2014).

2.1.4 Concept of Sustainable Development

Sustainable development puts an emphasis and change in order to improve ecological economic and social conditions for all people at all times and places. Sustainable developments were initiated by the establishment of International Biological Programme (IBP) in 1964. The idea of sustainable development originated earlier in the world conservation of nature and natural resources, the United Nations Environment (UNEP) and the World Wide Fund for nature (WWF)(Jim,1999). The strategy suggested that a society is ecologically sustainable when it conserves the life support system and bio-diversity. They laid particular stress on minimizing the depletion of non-renewable resources and to keep it within the carrying capacity of supporting ecosystem (Cai et al., 2003).Recently, many scholars have identified two major types of sustainability problems

in agriculture. One arises from over use of such input as fertilizer and irrigation water in large scale commercial agriculture. The other related to marginal lands and fragile ecosystem where small mixed farming systems are characterized by high populations of poor people who are trying to survive from day today and prosper by producing whatever they can(Francis & Van Wart, 2012).

Kates et al., (2005) suggested that sustainable development as the ability to make development sustainable ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development can be viewed as a social movement of a group of people with a common ideology who try together to achieve certain general goals in an effort to encourage the creation of a broadly based social movement in support of sustainable development. Thus several studies suggestion that active local people participation in the irrigation management will be beneficial for the future generation. Participation will lead to the sustainable development of the overall project.

2.2 Theoretical Overview

2.2.1 Irrigation Development in Nepal

Nepal in an agricultural country with abundant water resources. However it does not have a long history of canal irrigation system. In the past Raj Kulor were famous around the capital city which was operated by government subsidy to irrigate during the Malla Dynasty (Poudel, 2003).Before the implementation of the periodic development plan in 1956, only three canals Chandra canal in 1926, Jagadish canal in 1945 and Juddha canal in 1946 were constructed in Sapturi, Kapilbastu and Rautahot districts respectively (Shrestha, 2001). After the implementation of the planning, several irrigational projects were undertaken in different parts of Nepal. The existing irrigational facilities in Nepal are extremely inadequate. Moreover, surface irrigation is the main system used in various parts of the country as well as traditional methods of irrigations like pyres, terrace, well

and canal irrigation was also in practice (Aubriot, 2004). After the political revolution in 1950, canal department was established in 1952 to run irrigation in an industrialized way. Community management irrigation systems were integrated into large scale schemes by Government agency. Before planned development, about 400,000-500,000 hectares of land was partially irrigated. After entering into planning development, government utilized the surface and sub-surface water resources to construct small, medium and large scale irrigation system with the help of internal and external resources. Basic infrastructures were developed between the first and third Five Years 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 system in the Terai region were rapidly constructed form Government investment from 1970 onwards to achieve the irrigation development targets in national development plans. These constriction works were mainly carried out by borrowing capital (Shah & Singh, 2001). Recently in the hill region various irrigation projects have been introduced for development of canal irrigation. Through the government initiative a various types of hill irrigation projects have been completed in the western development region of Nepal. Fewa Tal irrigation project, Hemja irrigation project, Chnapchour irrigation project, Shisaght irrigation project Dedgauntar irrigation project, Chapakot irrigation project, Bhorletar irrigation project, Puranchaur irrigation project and Ramghatar irrigation project are some of the few important hill irrigation projects mentioned in the this region. Construction of physical infrastructure of canal and structure were a primary focus until 1985.After that improvement in management and modernization of the schemes to achieve the targeted goals also carried out. Some management oriented projects, the

USAID-funded irrigation management Project, The World Bank Funded irrigation line of credit, ADB funded the irrigation sector project and irrigation management transfer project were started between 1985 to1995. Moreover, Participation approach irrigation development and management of the irrigation system were highly emphasized in the projects(Jaishy,2002).Other different project has been carried out for construction and management of irrigation projects e.g. Nepal Irrigation Sector Project, second irrigation sector project, Community management irrigation agriculture sector project. Medium irrigation project, Non-conventional irrigation technology project, Irrigation and Water Resources Management Project.etc.

2.2.2 Farmer's Participation in Irrigation Management

The concepts of participatory irrigation management system originally constructed by farmers are obviously not new to Nepal. The existence of numerous Farmer Managed Irrigation System developed and managed under viable mechanisms of collective action and self –governing irrigation institutions furnish. Farmer Managed Irrigation Systems (FMIS) occupy special status in the national economy and food security system. Out of irrigated area in Nepal, almost 70% fall under farmer managed irrigation systems (Bhatta et al., 2010). They are the vibrant systems. The history of FMIS is long and they are still active institutions in Nepal. Hence, FMIS are the national heritage of Nepal. Secondly, FMIS are the symbol of democratic values. The community owning the systems manages the resources on their own. They evolve the rules and regulations on their own and implement them with consensus within the community. Hence, FMIS has a special place in irrigated agriculture in Nepal (Pradhan, 2000).

Participatory process in the development operation and maintenance of public sector irrigation system come as a new strategy aiming at a solution in order to achieve the full potential of public sector irrigation schemes. The strategy has been largely based on the philosophy of initiating and retaining characteristics of FMIS is government managed irrigation schemes i.e. common unity ownership user's organization, effective and reliable resources mobilization, decision making and conflict management.In 1988 a new working policy emphasized the participation of farmer beneficiaries at all stages of irrigation development, from project implementation to operation and maintenance. This policy was further refined is reiterated in the irrigation policy of 1992. This established a framework for a long-term irrigation sector development programme seeking user's participation. The legal basis for the implementation of irrigation policy is the water resource Act (1992) and irrigation regulation (1993). The value and need for users participation has been further reiterated in the Eighth Development Plan (1992-91) .The two action plans reducing from the irrigation policy in 1992 have been joint management and turn over while the joint management and turn over form the framework of the participatory irrigation management program of district of irrigation. Beginning in 1993, the joint management program was started a total of 33,600 hectors under DOI management, covering a total of five irrigation system. Kankai**,** Maneismara**,** Khagari Nepal West Gandak Scheme, and Banganga.The recent irrigation management transfer project provides financial and technical support to DOI in continuing expanding participatory management programs (Singh et al., 2014).

Moreover, to increase the organizational effectiveness of DOI system, farmers could be given more control Decision Making related to irrigation activities water acquisition and water allocation could become the function of local leader, This would provide more reliable water delivery, increase farmers familiarity with system rules and possibly develop a system that could be free of political identity i.e. an independent irrigation organization. The experience of Pithuwa irrigation system is relevant. It was an agency managed system where farmers took over the management of the system. As a result this system is recognized as one of the best systems in Nepal (Prandhan, 2000).While there are many positive signs of increasing farmer participation in irrigation governance and management in Nepal. Moreover, the government is also shifting their role from direct management of irrigation system to regulation of the water sector, provision of support service to Water Users Association, capacity building among the water users association and irrigation service provider (Vermillion, 2004).Furthermore, several studies suggested that participation of users in managing and maintaining water facilities and operations bring more benefit and sustainability of the project. For example studies from Philippines and Senegal shows that participation helps in both costs saving and increasing in efficiency in irrigation system. (Dick, 2014).

Pradhan (2000) has point out that state is not seen as a public trustee but rather as the paramount owner of natural resource despite the very first statement in the constitution of 1991 that spell out that the source of sovereign authority in Nepal .The act also provides a mechanism for conflict resolution through the arbitration of a prescribed committee. However who prescribe the committee is not spelled out in the act. Although the act will not affect the day to day operation of the irrigation system, the trend however, raises the question of whether some policies are moving even closer to centralized control while other are attempting to move toward more participation.

There are also contemporary examples of participatory approaches in irrigation development and management tried and implemented at different times by several governmental and non-governmental agencies other than District Irrigation Offices.These includes Farm Irrigation and Water Utilization Division of Department of agriculture, Irrigation component of Ministry of Local Government, Special Public Works Program,

Care Nepal. Furthermore, there are more than ten integrated Rural Development Programs implemented in different part of the country under the bilateral and multilateral assistance broadly on participatory approach .However, the government effort still lacks the capacity to translate many of its policies into an effective enforceable system. Moreover, many researchers have consistently found that inadequate local participation is the process of governing and management irrigation system is major source of ineffectiveness.

2.2.3 Common Property Resources Management

Common property resource are defined as property shared by a specified group of people with specified right as opposed to open access resources (open to anybody without restriction) (Fisher,2009)The concept of 'common property' refers to a distribution of property rights in resources in which a number of owners are co-equal in their right to use the resources. The prevailing system of property rights in community can be described as the set of economic and social relations defining the position of each individual with respect to the utilization of scarce resource common form of property ownership means that the community denies to the state or any individual the right to interfere with any person's experience of community owned right (Singh, 2006).

Likewise, each user wants to maximize his/her use the finite supply therefore diminished and other users are deprived. Hardin, (1986) concept of "The tragedy of common" is highly applicable for water using it as common resource which results to ruin. Ruin is the destination toward which all men rush. Each pursuing his own best interest in a society that believes in the freedom of the commons, "Freedom is any common resource brings ruin to all". However, Ostrom,(2009) suggested that there wasn't any problem of overgrazing because when local people have a long term perspective for the communal resources they are more likely to monitor each other's use of resources and develop the rules and regulation which leads to the effective management of the common pool. They suggests that local communities are able to improve resources management more effectively than distant actors because they have their own traditional knowledge, combined with existing skills and resources and deep understanding of local

context(Korten,1988). Moreover, some studies revealed water as 'fugitive' resources so it is considered as common resources. Fugitive resources are mobile and must be captured before they can be allocated to individual or groups. That's way there are group right and duties with respect to the resources so farmer organization can be thought of as an owner and manager of common property (Adhikari, 2016)

Basically there are two types of doctrine for water resource management. They are

1) Riparian doctrine: right to use water resource equally by the farmers who have their land near the bank of river. The priority is to the people who are living near the bank

2. Doctrine of prior appropriation: Priority that should be given to the people who are using water resources traditionally since many years before to till now. In order to control the ruin over water resource the priority that should be given to the people who are using it than the others can use if water is excisable for the present user and only after their permission.

Uphoff & Norman, (1986) mentioned that the four basic sets of activities decision making and planning resource mobilization and management communication and co-ordination, conflict resolution constitution the core of irrigation system. An irrigation organization is formal if these four sets of activities occur according to explicit, written and possibly legal requirement.

Thus, a farmer managed irrigation system exhibits the characteristic of common property and the irrigation organization and the institution organization by which it operates can be seen as indigenous response to the problems of the management of common property.

Previous study conducted by Karki (2001) on impact study on external assistance to farmer managed irrigation system in Nepal. In this study external intervention operation and maintenance costs have been partially realized by the construction of diversion structure and landslide protection works. However, these systems are still new. Later, they will need regular maintenance. The maintenance cost of such involved in the past,

which is beyond the capacity of the user farmer. In a majority of the systems the farmers have been using the resources from VDCs and other agencies for repair and maintenance works. This has resulted in the dependency of the farmers for maintenance work and support. Agriculture production in the rehabilitated system has not been increased significantly. Upreti (2001) conducted research on external intervention and conflict experience from farmer managed irrigation system in Nepal. The finding shows that the power alliance of the external intervening agents and local politically influenced class results in most of the cases in unfair distribution of water which was the main cause lead to the conflict among the users groups.Additionally,this alliance overlooked the local norms and values, beliefs, knowledge, interpretation of water rights and nations of property. Political intervention in irrigation management that mainly focuses on political and economic interests ignoring local dynamics is responsible for the creation and escalation of irrigation conflict and threats to sustainability. Likewise, Poudel (2001) conducted a study on farmer's laws and irrigation water rights and dispute management in the hill of Nepal. Here he has explored the relation to men, women have less chances to become a member of WUA. The majority of claimants and defendants is in such cases are traditional upper caste farmers (Brahmin and Chhetri) many underprivileged individuals may not be able to claim their rights because of the many socio economic problems they have in accessing the legal system.

Pun (2001) Study on Role of Gender in Sali Nadi irrigation management in Kathmandu, outlines discriminations against women and women headed households in sharing irrigation water. The system of water distribution, which required all height vigilance did not suit women headed household. A woman also had to look after children at home. Similarly women were not involved in many of the maintenance and rehabilitation works initiated by the formal agencies DOI, NGO. The management and the practice of overtaking others quota started after the disappearance of the traditional institutions like picha and Newaikhi which were effective in the past in regulating the distribution of water and which did not require vigilance on the part of the users. Study conducted irrigation management in Dang suggested that the whole irrigation system is managed indigenously by the Tharu community, even though the large proportion of the land is

owned by Brahamin and Chhetri. There is a mythological story in the village linking the canal to the clan of the village headman of that Sukhrwar village.Similarly, pervious study has suggested that irrigation has a huge impact on people socio economic status in Pokhara. Due to the effective irrigation system, People started to commercial faming. Therefore comparing before irrigation project people standard of living has been changed (Parajuli, 1991).According to the Adhikari (2011) the production of rice, wheat & vegetables has gone up tremendously soon after the canal irrigation. Moreover, large numbers of famers are benefited by this project. Due to the irrigation facilities, these areas became quite popular.

Thus, as we know that the irrigation plays the vital role for the production of the crops and it will bring change in people socio-economic condition. Recently, there has been increasing focused on participatory devolvement approach (Yasmi, 2004).Prior studies generally found that positive relation between participatory approach and irrigation management.Hemja irrigation project is also become backbones for agriculture development in the study area. Moreover, several studies have suggested the people participatory irrigation management is more effective than the government management project. Previous research has also widely investigated economic dimension of empowerment in Hemja (Adhikari, 2011) However, participatory irrigation has been untouched in the study area, and therefore the researcher have chosen this study area.

CHAPTER – III

RESEARCH METHODOLOGY

This chapter describes the researcher's research design, rationale of the study site, nature of the data, ethical consideration and data collection tools and techniques.

3.1 Study Site and Rationale

This study was conducted in Hemja irrigation project of Hemja, Pokhara which is situated Gandaki zone at Kaski district. The Pokhara Baglung highway passes through the center of this area. The total population of the entire district is 4, 75, 000 out of which 10992 people reside in Hemja. Agriculture is the major occupation of the people in the Hemja and total households are 2138(Village profile of Hemja, 2011). The study includes ward no 27 and some part of ward no 29.

Hemja Irrigation Project is one of the hill irrigation project implemented and invested by the HMG of Nepal which is associated with small scale irrigation project. The project agreement was made on 17th June 1983 and completed on 30th Oct.1986, it has been aiming to irrigate 330 ha land in Hemja. The main canal is 2 K.M. long with four sub-branches water is distributed by the canal from Ashadh to Chaitra. This project has been jointly managed by the government and local community. Hemja is bordered by two rivers. The Seti river follows from North to South and the Yamdi flows from West to South of Hemja. Some portion of land is being irrigated by Yamdi River. Two decades ago, this place was not so fertile but now we can find the place very green with corps and all kinds of vegetables. This is the largest area of production than other area of kaski district.

Farmer participation in irrigation management in different phases plays a crucial role in the overall irrigation management. The irrigation project could not fulfill its objective without sound participation of the local people. The project was purposely sampled

because this project is one of the successful projects of hill irrigation project under the Nepal Irrigation Sector Project (NISP).Agriculture is the main occupation in the study area. The finding of the study would be applicable for most of the hill irrigation project Moreover, divers socio economic status, women representation, ethnicity, participation and geographical representation also the rational of selecting study area.

3.2 Research Design

Research design simply called an overall research plan, provides guidelines to a researcher to get answer of the research question and the type of research design depends a nature and objective of a study (Stichler, 2016).

This research is based on exploratory and descriptive research design. Exploratory research design helped to find out specific objective of research which helped to clarify concept, establishing priorities, find out variables and information gathering on practical experiences and carrying out research setting. Moreover, it also describes the characteristics of the governance among the Water Users Group, WUA and stakeholders and beneficiaries. The major emphasis in this study is to analyze and explore the existing condition of participatory irrigation management. It also focused to assess the participation of people in Hemja irrigation Project and to explore the problem and challenges of the irrigation management. These designs were used to describe community participation in irrigation management their role in promotion of sustainable irrigation system

3.3 Nature and Sources of Data

Effective data collection technique plays the vital role for the outcome of the study. Research should be done by scientific, unbiased and based on a reliability and validity. Therefore, research has been done in a rigorous and ethical manner.The primary data was collected by researcher following different tools and techniques. Qualitative data were gathered from standard format created by researcher. Due to the nature of the research question researcher used the survey, questionnaire and interviews to answer the research question. Sample households of beneficiaries were selected through the focused group

discussion with WUA, Users and District Irrigation Office person. Moreover, secondary information also collected through sources such as office records, group meeting minutes, reports journal, published articles.

3.8 Ethical Consideration

Research ethic plays the crucial role especially when we are conducting Primary research, whereas secondary research doesn't seem to be focus on ethic but still is essential to have good ideas about ethical consideration It is a code of practice followed by the researcher to ensure the protection of individual involve in study. Secondary research doesn't invite human response but the researcher is ethically bound to disclosed and acknowledge the primary research (Hay et al, 2006) Ethic relate to such principle as doing good and avoiding harm protecting human right and treating everyone equally. Any research involving the people participation doing good should consider as a manner that show the human dignity, respect, safety and right for the research participation (World Health Organization,2013).

This study was conducted within all the ethical limitation; it was mainly focused on the primary research whereas secondary sources also used to make a final conclusion

3.4 Sampling Design

The command area of the HIP is concentrated in ward no 27 and same part of ward no.29 of Hemja Pokhara.The nature of the population is heterogeneous. According to Village Profile of Hemja (2011) total numbers of the households are 1088.Out of 1088 only 594 households were benefited from this project. The total number of households was considered as universe for the study the name list of such finite household member was taken from Hemja Irrigation project office, Hemja Pokhara.

a. Size of Sample

25 % sample size was taken from the total universe for determining the sample size by using Solvin (1960) formula.

b. Sample Technique

Household sampling was carried out by means of Systematic Random Sampling with this sampling design the sample and interval between the samples was decided by using following formula. eg. $K\frac{N}{n}$. The study covered a sample of 148 households. The total beneficiaries households in the study area were 594.Out of 594 household, 148 (25%) households were sampled as informants based on Systematic Random Sampling.

3.5 Unit of Analysis

The unit of analysis was at households' level. The head of the household was regarded as key person.

3.6 Data Collection Techniques/Instruments

In order to gather reliable information, it is very important, techniques used for data collection be precise and accurate. The instruments adopted in the study to gather relevant data that are guided by the research objectives, questions and type of data required for the study. Fieldwork of this study was carried out from July 21 to 5th September 2016 at Hemja, Pokhara, 27 and 29, Kaski district; this is the largest area of production than other areas of Kaski district for vegetable and potato cultivation. Hemja is a main vegetable producer and supplier among Pokhara fringes.

3.6.1 Household Survey

First of all, during the fieldwork household survey was conducted which helped in rapport building with the water users group and it also helped to find out the respondents attitude towards the irrigation system. Moreover all the essential information was collected by using following tools and techniques

3.6.2 Observation

During fieldwork household survey, focus group discussion activities of the participants were observed. Similarly, the researcher has observed the meeting of executive committee and assembly of WUG according to their schedule and it helped to obtain accurate, right information.

3.6.3 Focus Groups Discussion

The major contents of group discussion is the objectives of the study while using this data collection technique, the following members, executive member of WUA, local mobilizes, Word chairperson, elderly men and women, social workers, school teachers etc. were invited for the group discussion.

3.6.4 Key Informants Interview

Interview is one of the important methods of collecting data in social research. Key Informants are the main source of acquiring real data. As a representative key informants Selected from different fields such as, WUA, Mother's group, School Teacher Principal, Local mobilize, representative from district irrigation office.

3.6.5 Interview Schedule

The semi structured questionnaires has been developed. It has included both open ended and close ended questions. Individual and group interview were conducted with the selected respondents.

3.7 Reliability and validity

Validity is the major component of the scientific research method; basically it is concerned about the meaningfulness of the research components. Whereas reliability is a consistent over time and an accurate representation of the total population under study is referred to as reliability as well as when the result of the study can be reproduced under a similar methodology that's means the research instrument is considered to be reliable.

Therefore, in order to better ensure the extent of accuracy and validity of the information and data. The proposed tools and instruments were tested before conduct the actual field work.

3.9 Method of Data Analysis and Presentation

Collected data were analyzed both qualitatively and quantitatively as per their nature. The information collected from the field was coded, tabulated and entered into the computer using the statistical package for social sciences (SPSS). Simple descriptive statistic was used to analyze the data and necessary tables and graphs was prepared and inserted under suitable reading. Some case studies also included thesis report, similarly suitable photo graphs was inserted for better illustration. The analyses of primary and secondary data were presented through tables, pie chart, bar diagram.

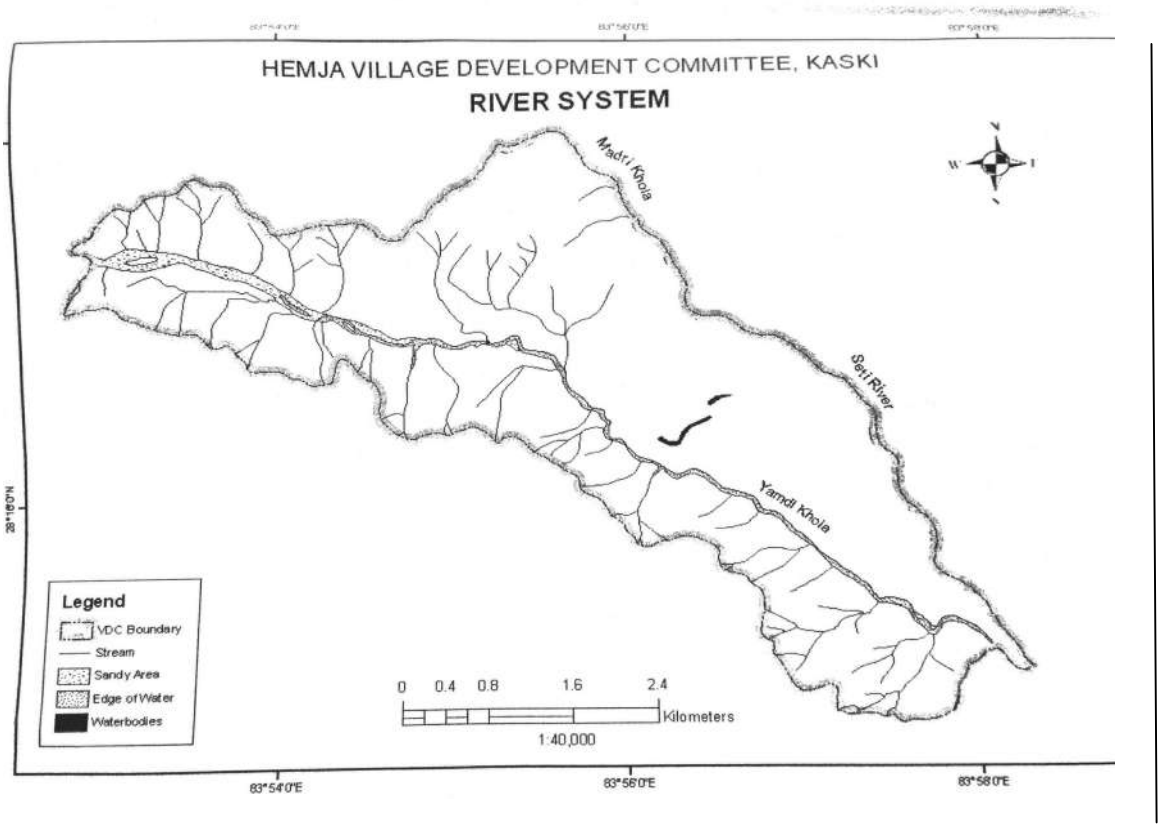
CHAPTER IV
STUDY AREA AND THE POPULATION

The chapter, outline the general introduction of the study area (climate, natural resources, main sources of income, overall introduce of Hemja Irrigation Project) and demography and socio-cultural status (sex, gender, family size, education, occupation, castes and ethnicity) of the people.

4.1 General Introduction of the Study Area

The research site Hemja VDC, recently included in pokhara sub metropolis. Which is situated on the northwest main city Pokhara Sub-metropolis of Gandaki Zone at Kaski district in Western Region of Nepal .It is located in the middle part of the Kaski and has been bordered by the hill ranges of varying heights with 28°24'-28°30' latitude and 83° 87'-83°97'longitude in the middle of the Kaski district. Moreover, the study area is surrounded in the south west by Kaskikot and Sarankot in the north-east by Puranchaur and Lamachaur and north-west by the Lahachouck and Dhital. The research site is plain which is known as Hemja Bensi and it has fertile land on the bank of Yamdi River. The study area has experienced rapid development of vegetables farming since 1993 after construction of the Hemja Irrigation Project and Pokhara-Baglung high-ways. The highway passes through the centre of this site and connects the village with the rest part of the country. Before implementation of HIP, most of the area was meadow, barren and pastures land, only small size of land was irrigated in the summer season by the Chaurasi Kulo (indigenous canal) where people grew maize, millet and low quality local paddy (Anga) and jhauri in native. This area has become more fertile and cultivated land due to the provision of irrigation facilities by the HIP where farmers grow the various type of summer and winter crop at present(Village Profile of Hemja,2011).Production of vegetable has been increased with the construction of Pokhara Baglung Highway, Hemja Irrigation Project and Pokhara Agricultural Product Market. Additionally, high demand of vegetable in Pokhara city also improvement in the traditional method of vegetable farming.

Figure 4.1 Map of Hemja



Source: Village Profile of Hemja (2011)

Farming such as tomato cultivation in plastic tunnel and establishment of Governmental Organizations and Non-Governmental Organizations and their involvement in the area, have also contributed to its rapid development. Due to the facility of well irrigation system, both women and men farmers in the study area have benefited a lot from the vegetables and paddy production. Good irrigation system has made farmers easy to grow vegetables in all seasons. Due to the irrigation facility, most of the Bari land has been changed into Khet land. According to ex-vice chairperson of Hemja, every farmer produce potato and therefore, Nepal Agricultural Research Council (NARC) has renamed Hemja as 'Potato village'. Every year, they are celebrating 'Potato festival'.

The majority of the respondents were Brahmins followed by Chhetris and Ethnic group and Dalits respectively. Ethnic and Dalits women were found to be the most deprived

group in the area. All the enumerated caste groups speak Nepali language and all the respondents reported them as Hindu. Majority of the respondents were found literate. The main source of livelihood in study area is agriculture. Vast majority of the women reported them as full time farmers (Adhikari, 2016).The Hemja irrigation small and marginal farmers have made a sub-branch from branch 2 for irrigation through their own and Water Users Association participants and initiation. Some cost of the production is provided by DOI. The length of this sub-branch is approximately, 1.2 Km. which provides irrigation for 20 ha. Land as pointed by the WUA officials. One Progressive farmer has been used own pipe through the main canal to the cultivated land. It has brought happiness and prosperity to the farmers of command area.

The HIP is under the programme of the Hill Irrigation Project funded by Asian Development Bank (ADB).It was started in 1982 and completed in 1989.The source of the water for irrigation canal is Yamdi Khola. The estimated cost of the project construction was Rs.92, 5500 Whereas the competed cost of project was higher than the estimated which was Rs. 1, 46, 74,000.Similarly the project was targeted to irrigate 320 ha of land. But, net irrigated land was only 235ha.Thus; this project wasn't able to meet the demand in the study area. Although, the length of the main canal from head work is 2.0km.in which about 800m is covered by concrete slabs. The length of project branch canal and WUA made branch canal is 6.7km. and 3.2km respectively (Village Profile of Hemja,2011).

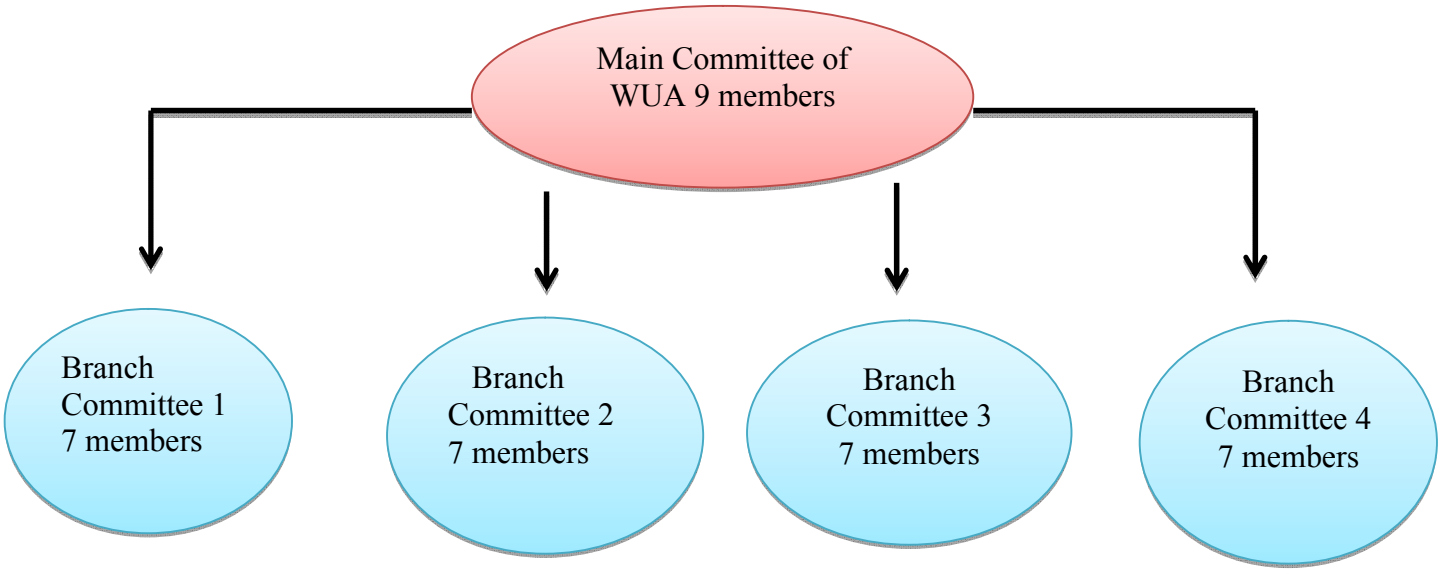
The total length of the project irrigation system is 9.9km.The discharge capacity of the irrigation system is 1.50 cubic per second. The Project office located in the Ward No 27, locally call tallo Hemja.To make sure the effective distribution of water five outlets are provided at each branch canal from which the farm canals are connected. The detailed distribution and description of the canal system is given in the Table4.1

Table 4.1 Distribution of canal system in HIP

S.N	Canal No.	Length(km)	Discharge Capacity(Cubic/Sec)	Command area project target(Ha)	Date of Construction
1.	Main Canal from HW	2.0	1.50	320	1982/87
2.	Branch -1	1.0	0.15	30	1982/87
3.	Branch-2	2.2	0.55	110	1982/87
4.	Branch-3	1.5	0.30	60	1982/87
5.	Branch-4	0.5	0.15	30	1982/87
6.	Branch-4(B)	1.5	0.35	70	1982/87
7.	Sub Branch	1.2	-	20	1993/96

Source: District Irrigation Office, Pokhara, 2015

Figure 4.2. Structural formation of WUA under HIP



Source: Field Survey, 2016

The effective distribution of water in canal, Committee has appointed three supervisors and two guards (watch men). The Water User Association was first registered in 1992 and now it is existed as a formal organization. The WUA's main committee has nine members and each branch committees has seven members .These committee has been formed with mutual understanding of DIO and WUG. The Hemja irrigation project is managed by the joint venture of Kaski DIO and WUA.

4.1.1 Climate

Climate has a huge effect on our day today life (Culture, heritage, lifestyle, economy).The Climate of the Hemja is moderate. The climate prevailed here in suitable for human health with monsoon rainfall pattern. The average temperature of the study area is between (6-10)°C in January and (20-32)°C in June/July(Village Profile of Hemja,2011).

4.1.2 Natural Resources

Hemja is rich in natural resources, as there are various natural resources are found such as water, fertile soil, stone, forest etc. The Seti and Yamdi River have made the Hemja more attractive. However, there is still lack of scientific research related to manage natural resources in this study area.

The Stream, Mulpani, Dandure khola, Jaisikuna, Swarakhola provide the drinking water through the connection of pipe line. The Seti and Yamdi rivers are the permanent sources of water. However; water of the Seti River is still not being used yet whereas Yamdi River is the main source of irrigation which has been used through the Annapurna canal in the study area. The total target of irrigation area of Hemja irrigation project is 320 ha.land whereas only 235 ha land has been irrigated which service about 594 households. Therefore, it can be observed that the HIP project wasn't able to meet the demand to the consumers.

4.2 Socio-Demographic Structure

The Hemja has total population of 10992 of which 5473are male and 5519 are female. The number of total household is 2138. Which shows an average family size of 4.9 person per household (Village Profile of Hemja, 2011). Out of 10992 population 5519 females and 5473 men found in the study area. It shows that female population is the higher than the male. Furthermore, study shows that the more women were involving in the farming compare to men. However, the finding shows that lack of female participation in the overall irrigation project.

4.2.1 Occupational

Occupation aspect plays a vital role in the irrigation management. Those people who are farmers more like to participate in the irrigation management than others. The following table shows the number of household by their occupation.

Table 4.2 Occupation profile of Hemja Based on Households

S.N	Occupations	Frequency	Percept
1	Farming	1085	50.74
2	Govt. Service	428	20
3	Labour	373	17.44
4	Buniness	201	9.4
5	Industries	28	1.30
5	Other	23	1.07
	Total	2,138	100.00

Source: Village Profile of Hemja VDC,2011

The finding of this study shows that 50.74% household were depending in the agriculture, as their more sources of income whereas 20% people were involved in the government services. However, only few people were engaging in labour (17.44%) and business (9.4%).Thus, it can be noticed majority of the people is depending in

agriculture. Therefore, effective irrigation system is the essential need for the study area which has got the huge impact on people lifestyles.

The economy of the study area is based on agriculture. It has already mentioned that 50.74% people depend in the agriculture. Therefore, agriculture is the primary economic foundation and includes crop farming and animal husbandry. People are growing different type of winter and summer crops such as paddy, wheat, maize and millet are the main food grain and vegetables and fruits are the cash crops. Most of agriculture method used to be tradition, nowadays people are trying to adopt the modern method, especially in vegetables farming.

4.2.2 Caste and Ethnicity

Nepal is a country with different caste and ethnic group. It is a unique identity of this country. The respondents of this study are found to be forming a good mixture of various caste Different attitude and practices can be observed among the different caste group. Therefore, the caste and ethnicity are also the significant variable in this aspect. The caste/ethnicity composition has been shown in the table.

Table 4.3 Caste/Ethnicity of the respondents

S.N.	Caste/ethnicity	Frequency	Percent
1	Chhetri	94	63.5
2	Brahmin	40	27.0
3	Dalits	8	5.4
5	Janajatis	4	2.7
6	others	2	1.4
7	Total	148	100.0

Source: Field Survey, 2016

From the above table (4.2), it can be seen that 63.5 % of the respondents were Chhetri which is the largest in the size compare with other group. Likewise, Brahmin holds 27% whereas very few respondents were belong to the Dalits, Janjati.

4.2.3 Age group of the Respondents

The age composition of the respondent is essential to find out the position of socio-economically and culturally active people in the study area. The role of the active people of the society is also the very important factor part of the irrigation management and participation as well. In this study 148 respondents were divided into six age groups.

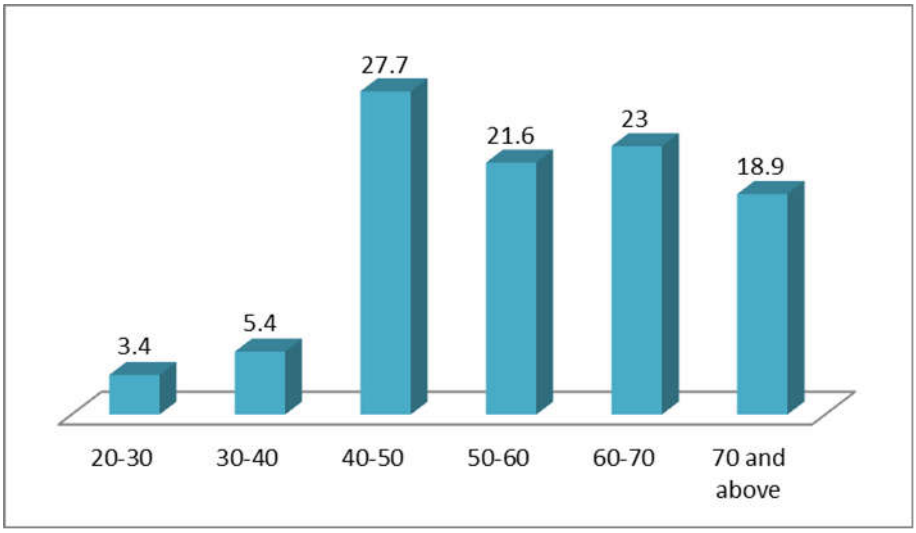


Figure 4.3 Age group of the respondents

Source: Field Survey, 2016

Here, the above table shows that the larger number of water user group are between 40-50 years and above 50 whereas only a little number of people who were under 40 involved in this study. During data collection process researcher had noticed that respondents who were under 40, less like to involved in the irrigation management.

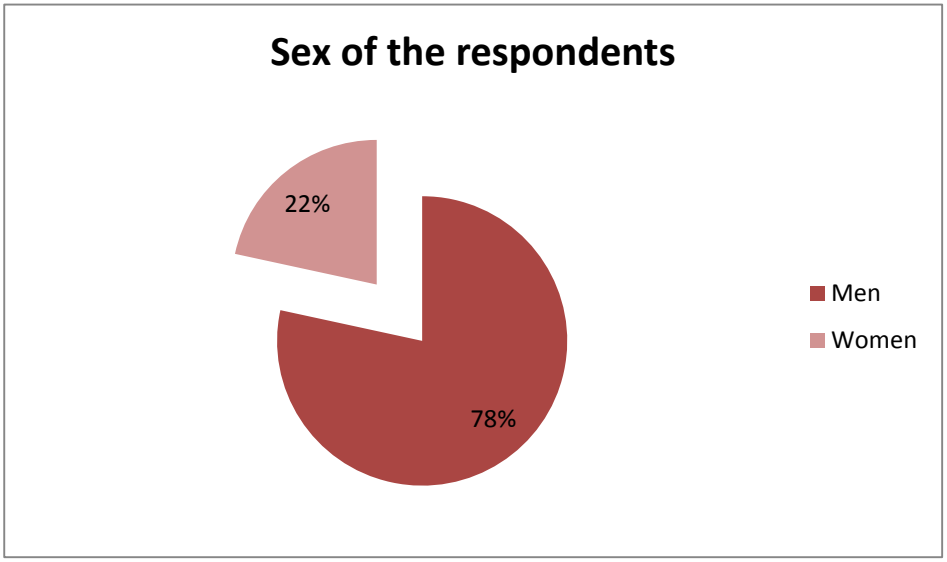


Figure 4.4 Sex of the respondents

Source: Field Survey, 2016

Out of 148 respondents, 116 were male whereas only 32 were female. Hence males were more than three fourth of the total respondents (78.4%) whereas female were less than one fourth of the total respondents (21.6%). The above table indicated the male dominate **in** the study area. During the data collection process, the researcher found in the absence of male only female are found to be activated in the irrigation management process.

4.2.4 Educational Background of the Users Group

Education is the most important factors that determine the capacity of the person to handling the different kinds of tasks. In general, people with higher educational background seem to have more ideas than others. However, in the context of the Nepal, people are having more academic qualification are less like to be involved in the farming sectors. So that researcher was trying to find out whether there is any difference between the literate and illiterate person contribution to the irrigation management process.

Table 4.4. Educational Background of the Users Groups

S.N.	Education	Frequency	Percent
1	Illiterate	13	8.8
2	Literate	56	37.8
3	Under SLC	40	27.0
4	SLC passed	15	10.1
5	+2 /Intermediate	8	5.4
6	Bachelor and above	16	10.8
7	Total	148	100.0

Source: Field Survey, 2016

The table 4.7 shows users group participant variation according to their educational level. It can be clearly seen that nearly 75 % of participants weren't completed SLC whereas only 25% people with above SLC were participants to the HIP. In fact the data also reflected that the trends of Nepalese educated persons are more likely to shift away from the agricultural activities.

4.2.6 Family Size

Family size is another important variable which affect the socio-economic condition of the family. In the past we used to hear the Proverb ''More hand more income' It can clearly understand that the larger the families member more opportunities can be captured.

Table 4.5 Family Size

S.N.	Family	Frequency	Percent
1	Up to 4	32	21.6
2	5-7	79	53.4
3	More than 7	37	25.0
	Total	148	100

Source: Field Survey, 2016

The above table reflected that 53.4% of household have their family member between 5 to 7 whereas 25% households have more than 7. Only 21.6% households have up to 4 members in their family. In the operation activities on Hemja irrigation project family size has been found as a strong determiner. Larger the family size effectiveness involvement and small family size less effective involvement of people in different activities.

CHAPTER V

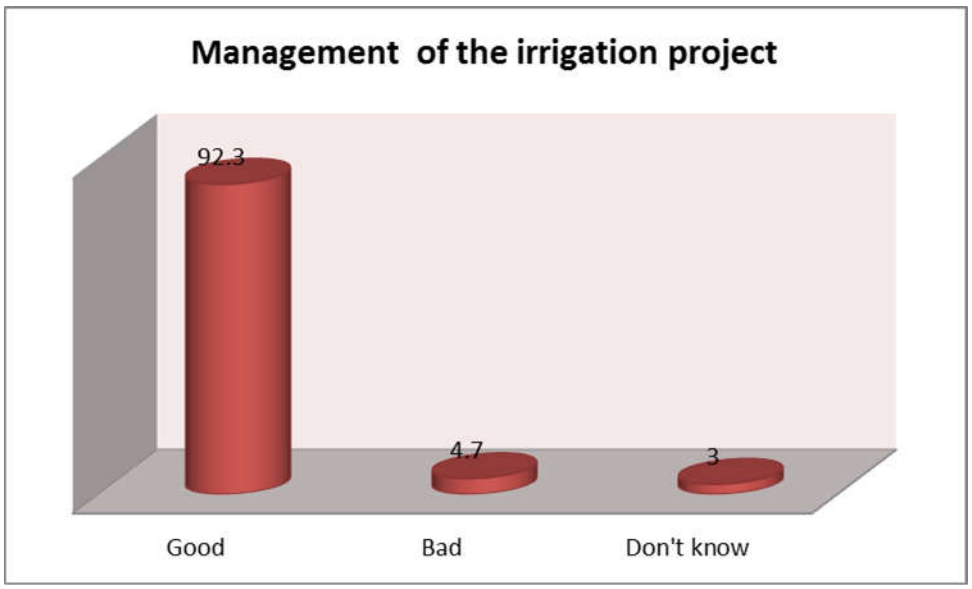
WATER USERS PARTICIPATION IN ALLOCATION AND DISTRIBUTION

This chapter has been devoted to analyze the relevant research questions and the certain objectives. The main aims of the chapter are to assess the participation of Water Users at various participatory stages in Hemja Irrigation Project .And also tries to find out the criteria for water allocation and distribution among the beneficiaries.

5.1 Water Users Group Participation in Management

Hemja Irrigation Project was managed by the joint venture with DOI and Water Users Group. Some researchers have suggested that community perform certain functions better than outside agencies. Moreover, study suggested that both farmer and agencies management projects better when they feel a mutual responsibility for a common objective. (Groenfeldt, 1988) Successful irrigation and drainage projects require participation by all stakeholders in planning,implementation, opreation and maintainance to create a sense of ownership of and consequent commitment to the project. This requires that project planning allows time for beneficiaries to participate in planning and influence decisions affecting their future. Policies that promote participation in irrigation projects are likely to have satisfactory outcomes(Asian Development Bank,2012).Having clear and specific procedures for policy implementation and establishing effective enforcement mechanisms is fundamentally important. Good governance in the context of transparency and accountability within community organizations, project implementing agencies, and line department staff. In the case of the Hemja Irrigation Project, even though, there are some socio culture factors which has affected the users participation over the project, project is manageing smoothly by the local community.Initially, project was run traditionally by local WUG, the canal was purposed to irrigate paddy in rainy season only.Local people are responsible for tracking some small budget from the VDC and managed overall irrigation system. However after Hemja Irrigation Project, the irrigation system is managed manitored and operated by the users group,government and

NGO agecies as well.The WUA is the responsible body to over all irrigation project.Response toward the development of irrigation project after joint venture management between the WUG and District irrigation office is includes as follows. Researcher had asked that whether the management of irrigation project become good or bad then the responses are as follows.



Source: Field Survey, 2016

Figure 5.1 Management of the irrigation project.

According the above figure 92.3% answered that the management of irrigation become good and 4.7% respondents blamed that project become worse than before. Because they are not satisfied with benefit sharing and distribution of the project. Whereas only 3% people are unknown, they don't have any idea what is going on the irrigation project.

Case Study 1

Pārbati Karki is 50 years and has one son and three daughters. She is an illiterate woman. Her husband is jobless and works with her as a farmer. This household has not other sources of income except farming. They have only 5 Ropanies of land. The Karki couple has faced many difficulties in rearing their five children. She is one of the members in WUA. She said the group of people nominated me as a member of WUA. I don't know the right and duties of my in WUA. I don't have time to go to meeting, men know better than women. However, she said that Hemja irrigation project is very important for their live. It has huge impact on their socio economic condition. They were able to earn form vegetables farming, with the help of that money, the couple managed for clothing, medicine and schooling for their children. Thus it can be clearly noticed that women are aware about the important of irrigation project. But they don't want to participate in the project.

5.2 Water Users Group Participation in Decision Making Process

Communities meeting held regularly once a month, if the members of community feel necessary, so it can be held more than once. When meeting called, the secretary or chairperson of the WUA will inform all the members. Usually meeting called on Saturday morning. The General Assembly is also conducted every year for the change and agreement of the rules by the users. Generally, decision to implementation irrigation operational plan is being made by Water Users Association. There was one women representative in the Water Users Association committee. Moreover, WUA has an authority to make decision related the irrigation management and operational process. Therefore, it is very essential to have representative from all interest group. Similarly, the General Assembly is also conducted every year for the change and agreement of the rules by the users. The tenure of the members of the WUA is for four years as in the constitution but the same person can be elected again for the second or even third time.

During an interview it came to know that only few respondents did not know who the members of the WUA were which makes it relevant to question the efficiency of the decision making, negotiation and information sharing in the management of the irrigation system.

Table 5.1 Participation in the decision making process

S.N	Decision Making	Frequency	Percent
1	Yes	85	57.4
2	No	50	33.8
3	No response	13	8.8
	Total	148	100.0

Source: Field Survey, 2016

Above table reflected that there were more the 50 percent people involved in the decision making process and 33.8 percent respondents weren't participating .Whereas 8.8 percent people wasn't aware about the HIP. However, from the table, it is evident that majority of the people participant in the decision making process. However, if people aren't participant in the decision making process. There may be the various reason such as political, economic, social-cultural, geographical, lack of awareness. In brief, it can be said that the people either don't realize that the need of their participation or feel that their participation meaningless because the authorities person didn't hear their voice.

5.3 Participation in Fund Generating and Mobilizing Activities

HIP is run jointly by the WUG and DOI, Community has sat up the rules and regulation the run the project smoothly. The WUG had to pay the irrigation fee according to the size of the irrigated land. The cost can be collected annual minimum 200 to up to 1600 per household. Financial resources are crucial to run the any project, in term of participation, if the users group are contributing to the project it will give them an ownership feel for the project.

Table 5.2 The Basis of collection of financial resources from stakeholders

S.N.	Financial Resources	Frequency	Percept
1	Basis on equity	127	85.8
2	Basis on equality	11	7.4
3	Wish of the stakeholders	4	2.7
4	No responses	6	4.1
5	Total	148	100.0

Source: Field Survey, 2016

The Above table shows that out of 148 respondents 85.8 % respondents said each household have to pay the irrigation project on the basis of equity 11%, 4% mentioned that on the basis of equality. Whereas only 4% answered according to the stakeholders wishes.

5.4 Participation in Implementation and Maintenance Phase

In any development undertaking, implementation of the proposed plans, programs and polices holds the key to success. Constructing the irrigation canal in the village is a challenging task for the local people. Therefore, without the active participation of the local people, it would more complicated and less sustainable. The chairman, who was the keys informant of this study and other keys informants, felt that all the local people tried their best during the implementation phase and system maintains as well.

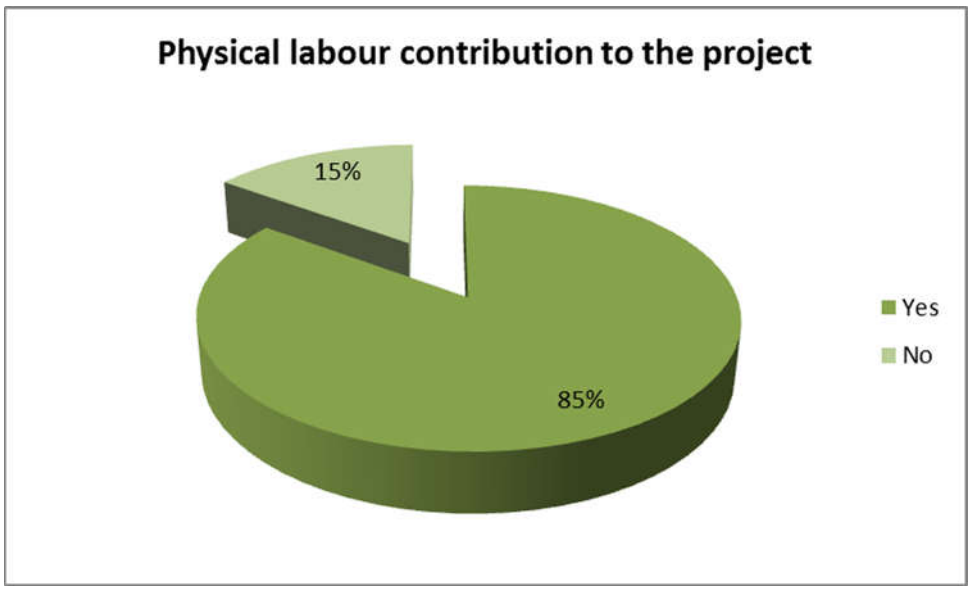


Figure 5.2 Physical labour contributions to the project.

Source: Field Survey, 2016

As demonstrated in the above chart that 85% respondents were participated in the project construction and maintained phase whereas some 15% of them said they were not physically involve in the construction phase, due to their busy lifestyle. To avoid the conflict between the users group, WUA has sat up rules for those whoever is not involving the construction and maintained phase; they have to pay certain amount of fee.

5.5 Participation in the Distribution (benefit sharing)

During the field work researcher found that that water allocated to the branch is based on the area of the land. Thus, the bigger the land, the more water there is. The farmers pay the irrigation fee according to the size of the irrigated land owned by farmers. During the monsoon, there is enough water for irrigation whereas in the winter, there is rotation system and the farmers have to wait for their turn to irrigate their field.

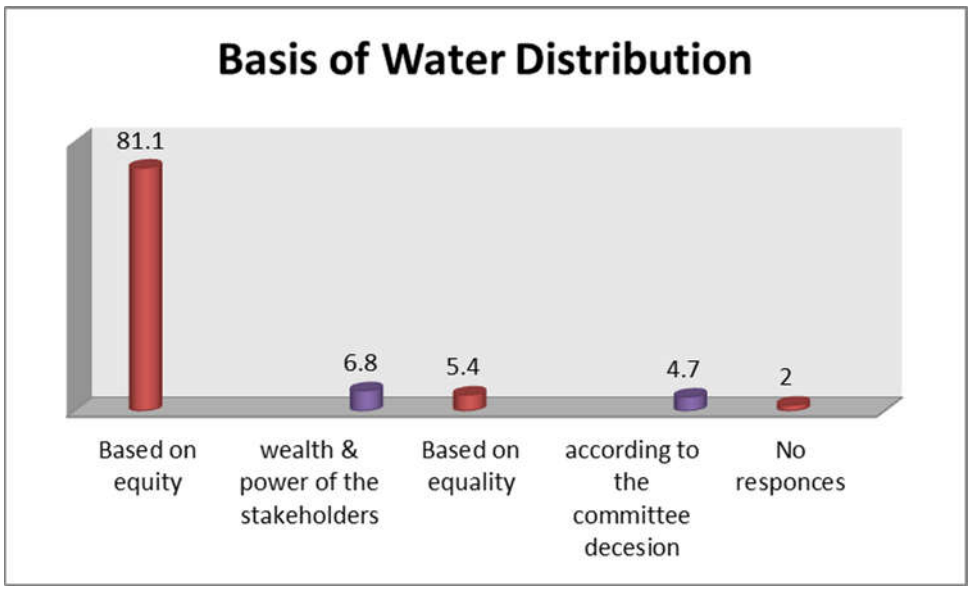


Figure 5.3 Basis of Water Distribution

Source: Field Survey, 2016

The above figure indicated that out of 148 respondents 81.1 percent said that benefit is distributing on the based on equity. But 6.8 percent mentioned according to the wealth and power, 5.4 percent think that on the based equality. Similarly, very few respondents said that all decision is made by the committee. During interview researcher has come to know that those person who were not aware about the irrigation management system, they have their own reason for not being familiar with the system. Some of them don't have time to go meeting, general assembly and they hold the very little land for irrigation. That's why they don't really care about the project.

However, the majority of the user group are satisfied by the distribution system. 83.1percent respondents out of 148 respondents were satisfied about the benefit distribution system, they even mentioned that the project is running very well. After this irrigation project we are benefited from several ways. Whereas only 16.2 percent people felt that the distribution system is not fair. During the interview process very few people mention that they don't get enough water for irrigation.

5.6 Participation in the Implementation Phase

Criteria of forming WUA

In most of the cases, WUAs are established owing to external agency / donor's compulsion. Such push usually has short life. Neither the irrigation departments nor the farmers are clear about their roles and objectives. Unless 'win-win' situation is clearly visible to both, the WUAs will not be able to deliver their objective. WUAs established through top-down or forced approach does not become sustainable. Both 'top down' and 'bottom up' approaches are required in establishing and effective functioning of the WUAs There are no clear/ transparent incentives for both the irrigation bureaucracy and farmers to genuinely promote and make the WUAs successful. However, in the case of the study area, according to field survey it found that the community have very clear and transparent rules, regulation and criteria to form the committee and operate the overall system.

Table 5.3 Criteria of forming Water User Association

S.N.	Criteria	Frequency	Percent
1	From general assembly	134	90.8
2	Selection process	14	9.2
	Total	148	100.0

Source: Field Survey, 2016

According to present research, out of 148 respondents 90.8 percent mentioned that WUA is formed from the general assembly whereas only 9.2 percent responses that it used to form with the different section criteria. The main water users association and four branch committee has been formed by the mutual understanding of DOI and beneficiary farmers.

Case Study :2

Chairperson of Hemja Irrigation Project, Mr Krishna Bahadur Thapa told me that Hemja Irrigation Project is the backbone for the farmers. In the initial period, it was difficult work to manage the project, we were not getting enough support from the government for the farmer empowerment, only received little fund. Now things are changing. Government, NGO/INGO provide the training, awareness programme for the users empowerment. Farmers are benefited several ways from this project. He also mentions that they have women and ethnic group represtantive in the water user association. Unfortunately, there is lack of women participation over the project management. Whereas women economic condition is improving due to the commercial farming, 45 year Sita Kunwar reported that after construction of irrigation project; my living condition has improved as I made about Rs. 400 thousand last Year from vegetables farming. I am no more relying on my husband salary.' with the earning, she also sell cereal crops product. With the help of vegetable farming, her family built cemented two-storied house and also bought 2 Ropanis of land in Hemja we feels proud of being vegetable farmer.

CHAPTER VI

PROBLEMS AND CHALLENGES

This section covered research finding related to the main challenges and problems of the irrigation project in the study area.

6.1 Main Challenges and Problems in the Study Area

Farmer's participation in irrigation project plays the vital role in the irrigation management. Hemja irrigation project is managed by government, non-government agencies and the local community. Overall project is running smoothly. As we know that Nepal is a poor country but is rich in water resources. Unfortunately the utilization of water resources is extremely limited. Nepal is an agrarian country but it has been able to irrigate merely38% of its total cultivable land. Given the limited capacity of both the private and the public sectors to take new initiatives and the scarcity of resources, and despite the efforts being made to develop water resources, one can rightly assume that it will be difficult to narrow the gap between the growing demand and available supply of water. Due to the gap between growing demand and the available supply, disputes are inevitable over water rights, especially over the use of water for irrigation and other domestic purposes. As such, it has been deemed necessary to make an initial study of the issues and problems relating to the overall development of irrigation systems in Nepal.

Before construction of the Hemja irrigation project, it was in the state of anarchy because neither the irrigation agency nor the farmers had provided attention in making the system work. The farmers at the head end of the canals and those who were influential were controlling the system and the farmers at the tail end could not irrigate. There were conflicts and disagreements between the farmers in the study area.

Table 6.1 The Reason for Dissatisfaction of the Users Group

S.N.	Reason for dissatisfaction	Frequency	Percent
1	Lack of water	89	60.1
2	Lack of proper rules and regulation	23	15.5
3	Self interest	1	0.7
4	No response	6	4.1
5	All of above	29	19.6
6	Total	148	100

Source: Field Survey, 2016

Table 6.1 shows that 60 % respondents said that due to lack of water resource they are dissatisfied, whereas only 23 % answered that Irrigation project were not setting up proper rules and regulation, similarly 29% reported mixed reason for their dissatisfaction over the irrigation project.

Despite these problems, there are some more challenges were faced by local people as explored by the researcher during the field work. A diverse socio-economic background (caste, ethnicity, income and education level) of the users group is the one of the challenges faced by the HIP. Water users have different needs and perspective towards the irrigation project. Similarly, water scarcity has become a big challenge in irrigation water management. And the climate change also has impact on the irrigation systems in water availability, timing, cropping pattern and productivity. Furthermore, climate change causing water scarcity has become one of the major concerns of Hemja irrigation project sustainability. Disputes in FMIS generally arise due to water use activities, resource mobilization and the dominance of influential member over resource of poor farmers.Other major causes of disputes include the shifting of an upstream intake closer to a downstream one, claiming the share of water, allowing water to leakage from a diversion weir of an upstream system. There was user's reluctance to participate in

maintenance and repair activities, inequitable water delivery between head end and tail end farmers, and the case of prior rights.

According to the WUA, Cash is collecting annually from the water users, it is mostly based on the size of land holding, but In case of emergency repairs and maintenance, collecting extra fund for the users group is always the challenging job for the WUA. Even though the literacy rate of the local people has been improving, the project still has lack of technical and managerial skill person to operation and maintains of the overall project and there is lack of awareness among the respondents. The irrigation policy 2003 required that 33% women representation from dalits, disadvantage and ethnic group. However, the finding of the present research reveals that the only 22% women participated in the irrigation management process. The chairperson of HIP, Mr.Krishna Bahadur Thapa said that WUA was formed base on the government policies. Even though we have female representative in the WUA, they won't attend the meeting and raise the voice, issues related to irrigation.

6.2 Conflict and Participation

Conflict is direct and conscious struggle between individuals and groups for the same goal .Conflict may be arise due to the various reasons such as based on political ideology, caste/ethnicity, gender, authority .religion and status etc. Success of WUA members would depend on the participation of all the beneficiaries with the objective to distribute the delivered water. The members within the Association conceive their interests to be conflicting, particularly between the upstream users who often appropriate larger share of water and the downstream users are deprived of their allocations. As such the WUA have to play a negotiation role resolving conflicts and making efforts to share the irrigation water equitably among the upstream and downstream farmers in various distributaries and the project as a whole (Isely et al., 2007).

The researcher attempted to investigate the effect of conflict on participation. HIP has set up the rules to minimise conflicts among the users groups, if the users who misconduct, they will be punished by different ways according the nature of the case.

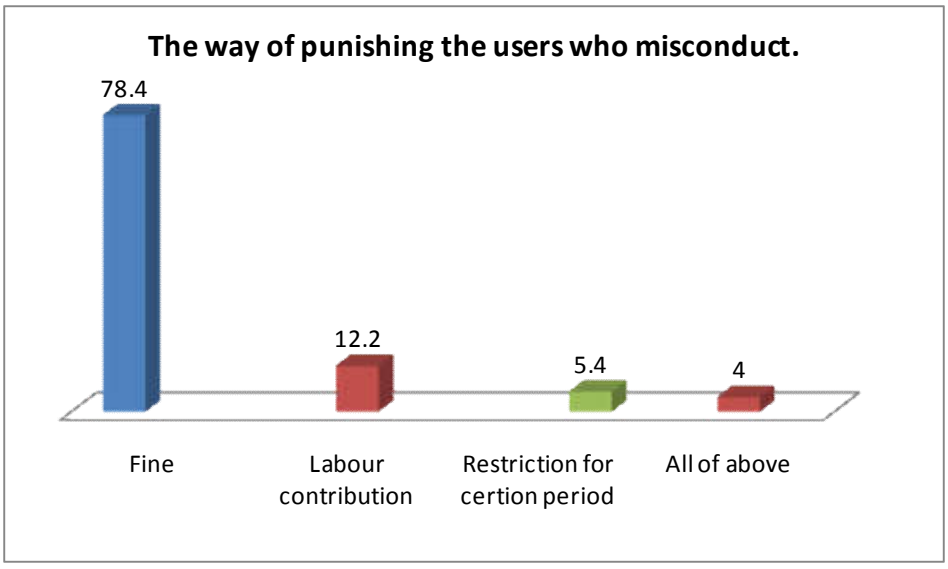


Figure 6.1 The way of punishing the Users who Misconduct

Source: Field Survey, 2016

Conflict can happened anywhere, if there is not fair management system, therefore researcher tried to investigate that what was the rules set up WUA, if there is problem related to benefit sharing, labour contribution and misconduct to the system, whether there have clear and equal rules for everyone or not. Among the respondents 78.4 percent answered that they pay fee, 12.2 percent told labour contribution while 5.4 mentioned that restriction water uses for certain period. However, only few respondents gave the mixed answered.

6.2.1 Provision of watch Man

The HIP has three supervisors, two watch men who are the responsible person for effective distribution and control of the water in canal. Water is delivering as a rotational ways. According to the field survey most of the people (77%) said the salary for watch man is collected by the consumers and 30% answered from government whereas only 2.7% respondents weren't aware about the system.

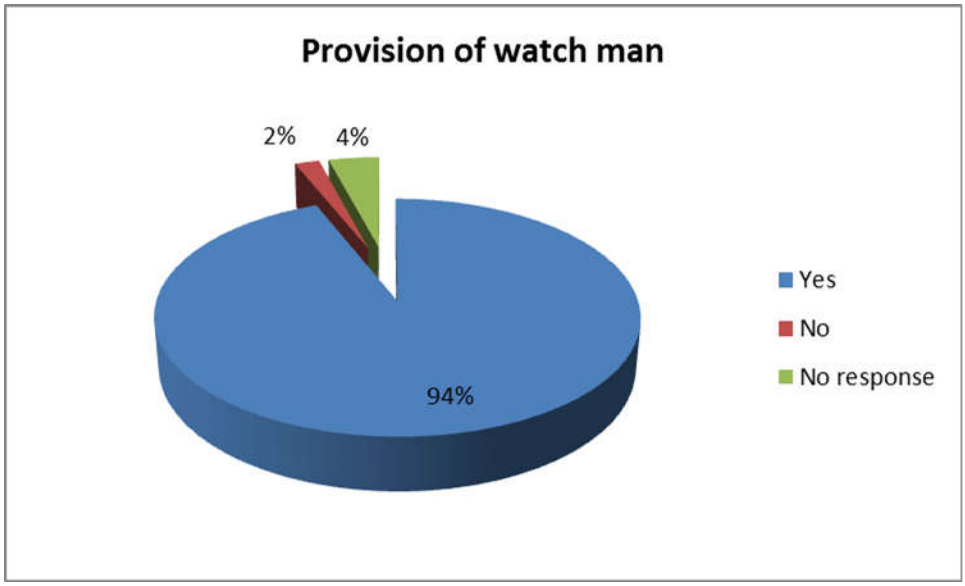


Figure 6.2 Provision of Watch Man

Source: Field Survey, 2016.

Similarly, Researcher attempts to investigate that whether the consumers were satisfied the provision of the watch man or not. According to the figure, 94 percent respondents answered that they are satisfied from watch man provision, 2 percent are dissatisfied with system while 4 percent respondents weren't respondent for the question. Basically, in the success of WUA, the benefit to the farmers in downstream is substantial, while benefits to the upstream farmers are perceived as nominal, as they, in any case are getting the desired amount of irrigation water. Consequently, the upstream farmers have little incentive to join WUA. Such as, the very nature of activity that WUAs are supposed to cooperate towards is at tangent to the accepted principle of cooperative – voluntary participation. Only if the concern for community is made the prime benefit, with individual benefit flowing through community benefit, the upstream farmers can be convinced to. According to the farmers and the members of the WUA interviews, in the rainy season there were no problems as there was enough water to irrigate all the fields. The farmers would get a piece of paper which would tell them the time for irrigating their land. According to them, the watchman played an important role during pick time (paddy, vegetables planting season).Due to high demand of the water resources.

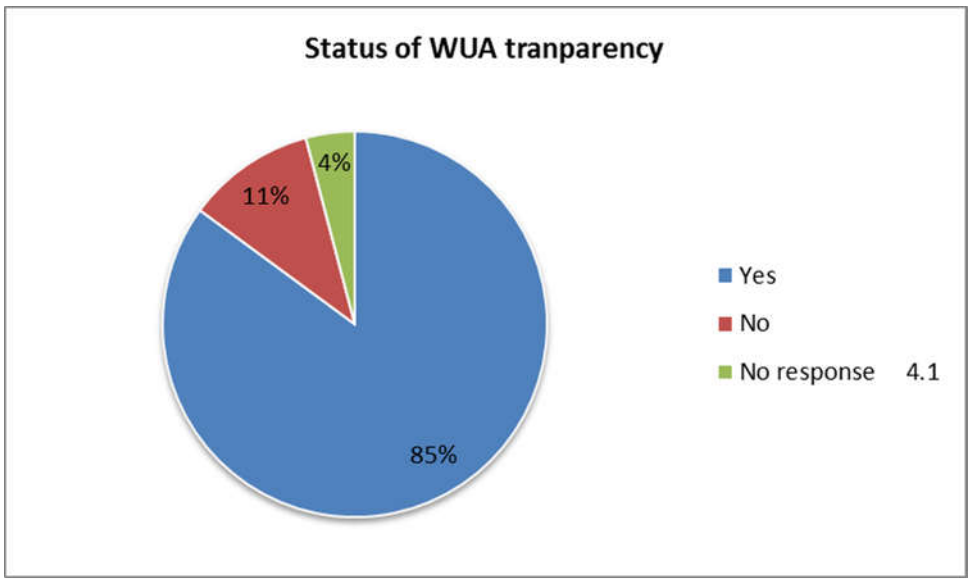


Figure 6.3 The Water Users Association Transparency on Overall System and Budgeting

Source: Field Survey, 2016

The data shows the transparency level into the WUA is in good condition. Majority of the respondents gave positive responses during the field work. Out of 148 respondents 85.1 percent said that project is running well with high level of transparency on overall system and the 10.8 percent respondents perceive that to improve the transparency status in WUA. They weren't happy with WUA, whereas 4.1% respondents weren't aware about the WUA.

Before construction of the Hemja irrigation project, it was in the state of anarchy because neither the irrigation agency nor the farmers had provided attention in making the system work. The farmers at the head end of the canals and those who were influential were controlling the system and the farmers at the tail end could not irrigate. There were conflicts and disagreements between the farmers in the study area. The existed conflicts which were regarding the unequal labour and benefit contribution. Due to the lack of water resources only head framers were benefited. After construction of the irrigation project, most of the existing problems had been solved by the WUA. According to the

present research only 8.8 percent of people are illiterate and nearly 16 percent people have qualification more than SLC. Several kind of training has been received by the people in the study area. Thus local people are able to learn different kind of management skills, as well as they can run the different kind of income generate activities private business and so on. Similarly, comparing previous project sufficient water resources is available for drinking and irrigation purpose. Even though there is not enough water during pick time (paddy, vegetables plantings and winter).WUA made very clear and equal rotational distribution system.

The study area becomes quite famous in vegetable farming. The Canal served many people and change economic condition of local people. The cropping pattern is the field is totally changed. Farmers start vegetables farming commercially and changed from milet, paddy to potato, cauliflower, broccoli, carrot and cucumbers etc. This has changed people socio economic status. Likewise, awareness among the user group of important of community development, welfare activities, potentialities of people participation is seem to be high. People are benefited in a various ways from this project. Therefore, they are willing to involve and contribute the irrigation project.

Since there is confusion among the farmers regarding the technical aspects of irrigation management, farmer should be trained from the government level or local level as well. Moreover, maintaining and repairing overall project only by farmer initiative is challenging task for the local people, government should work very closely with the local people by provides, more technical export to prove the awareness among the local people.

CHAPTER VII
SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 Summary

The purpose of this chapter is to summarise the whole study, point out the main findings of the research. In term of its contributions to the key issues related water user participation in irrigation management. Moreover, conclusion and the research's recommendation for further study are also made on the basis of the research findings.

The researcher had undergone in preliminary research through many literatures related to research question to answer the research question, such as journals, articles, books, thesis and reports. The researcher found that there is various reasons which have affect people participation in related research question. Participation is not momenta phenomena; it is a continuous process which doesn't end with completion of the development programme. This study 'Water users Group' participation in Irrigation management was carried out in the Hemja Irrigation Project of Hemja Pokhara.The study has assessed the participation of Water Users group at various participatory stages in Hemja Irrigation Project, to find out the criteria for water allocation and distribution among the beneficiaries and to explore the problems and challenges of the irrigation management. To fulfil those objectives Hemja, Pokhara word 27 and some part of ward 29 were selected as the research area. There were 594 beneficiary households in the command area. Among them 148 households were selected as the sample unit through the systematic random sampling (Village Profile Hemja, 2011).

The conceptual framework has been developed by researcher to find out the various stages of water users group participation and affecting factor in participation in Hemja Irrigation Project. Both primary and secondary data were collected as required by the objective of the study. Some research tools such as questionnaires, keys informant interview, observation were used to collect the primary data whereas secondary data were collected from relevant literatures, reports, recorded from HIP offices. Moreover,

qualitative data were analysed on the based on descriptive design. The information collected from the field was coded, tabulated and entered into the computer using the statistical package for social sciences (SPSS).Basically, this is an academic study which aims to discover some new facts regarding the community participation in communal and collective activities and has helped in formulating various policies regarding local people possibilities, challenges faced during the process of decision making and discriminatory practices in the community. From the field study and the literatures reviews it is concluded that the theory of '*Tragedy of Commons'* is not applicable always and everywhere. The water is the scarce during the pick season, especially seed sawing, paddy, vegetables planting. Due to the limited resources, people are using the rotation basis to have the equal access to the water resource. However, the theory applicable in some case, because some people want use more resource and always want to break the rules.

The research area, Hemja Irrigation Project is located in Hemja, Pokhara, and Kaski district. This is the only one irrigation project which was run by local community and district of irrigation office in this study area. Chhetri, Brahmin both castes are found as the majority. Agriculture is the main occupation of the people. Most of the young generation has gone to the foreign countries for employment and study. Hemja irrigation project has formed the Water Users Association which has made all the operational plan and constitution with the help of the District irrigation office. They have made rules for protection, management, regular supervisor, benefit sharing and maintenance. High level of participation of water users group found all phase of project implementation whereas the researchers found that project was run by majority of male member than female, according the survey report it came to know that female only took part in the irrigation management if there weren't man in the house, Moreover, during interview, some women said that "it is not women job, men have to do because they know better than us.". The patriarchy society and illiterates rate might the reason which is affecting women participation in the irrigation management. Therefore it has clearly seen that women need empowerment.

Major Findings

- There is one formal constitutions and rules, regulations exits which govern Water Users Association as well as community people. The rules and regulars are practicing very imperial ways, which raise the faith of WUA towards community.
- The result shows that provision of benefit sharing is fair and effective, all the user get equal chance to use the water. Moreover, everyone followed the rules set by WAU.
- The meeting and assembly are the main forum of the discussion of community irrigation management activities. 57.4 percent of the respondents actively participant in the decision making process.
- Majority of the respondents (85%) said that the overall irrigation system, benefit distribution and budgeting and very clear and transparency.
- 92.3 percent were satisfied with their irrigation project and remaining 4.7 percent expressed that they were dissatisfied. While 3 percent were unknown about the system.
- The respondents with lower educational background were more likely to involve in irrigation management than the people with higher educational background.
- Among the total respondents, the majority of women are unfamiliar, unknown about the value and principle, rules and regulation about WUA.
- All men respondents were found to be always implementing the decisions of WUA, but it accounted for 78.4 percent in the case of women.
- There is very good relationship between the WUG and District irrigation office. HIP get some budget from DIO for the maintenance and implementation the irrigation project.
- Conflict resolution and disagreement management practice in the WUG is practicing very effectively. If some people are breaking the rules and regulation, they are punished by WUA.
- There is a commercial vegetable farm is established after the completion of the irrigation project. The study area becomes quite famous in vegetable farming. The canal served many people and change economic condition of local people. The

cropping pattern is the field is totally changed. Farmers start vegetables farming commercially and changed from millet, paddy to potato, cauliflower, broccoli, carrot and cucumbers etc.

- Out of 148 respondents 89 % people are dissatisfied with the Irrigation project due to the scare water resources 23 % answered that they had wait long time for their turn and majority of the people don't follow the rules set by WUA. While 29% gave the mixed responses.

7.2 Conclusions

Irrigation is a key factor for improving agricultural production in Nepal, to increase the production of staples to meet the growing gap between production and the needs of the expanding population and for diversification and intensification of agriculture to help increase expanding population and reduce specially a rural poverty. Irrigation therefore, has played a key role to Nepal poverty reduction strategy. The farmer's managed irrigation system is one of the successful systems in present context (Kattel, 2002). Several small farmer managed irrigation system, established decades ago through self-help and cooperation, nurtured by their remoteness and kept operation agriculture was the only possible sources of livelihood for most, are now often in disrepair. Hemja has fertile land but due to the lack of irrigation facility crops and vegetable production was not satisfactory before Hemja irrigation project. However, it has got huge impact on the people social-economic condition. Moreover, majority of the people choose to do farming due to its growing commercial marketing in the study area.

The finding present research shows that user committee is responsible body to take decision in minor issues, whereas as major issues are decided in general assembly group meeting. There was not any kind of biasness among the user according to their caste/ethnicity, higher and lower caste, politic status, rich and poor. Everyone's problems, suggestion have been taken seriously. Even though there were some obstacle, but the project has been run smoothly with activate participation of the users group. Water User Association has set up the strict rules and regulation for benefit sharing and minimise the conflict. Moreover, the irrigation project became a backbone in the study area, it have huge impact on people social economic condition. Most of the time women were not participated in the decision making process, However, the WUA, have some require

percept of the post for the ladies. As well as it has been notice that comparing the past women participation in the irrigation has been slightly increasing. Majority of the respondents were reported that they were participated during the labour, financial contribution and benefit sharing as well. User's active interaction in the meeting was found to be affected by duration of the land holdings. Older users were more actively taking part in the interaction than the new one. Majority of the respondents were aware about the important of the irrigation project for their live. Even though there are some culture factors affecting the participation such as age, education, sex, social status and occupation, overall the Hemja irrigation project is the one of the successful hill irrigation project. Due to efficient participatory governance, Hardin tragedy of common theory is not application to this project.

Moreover, local people and government play the vital roles in achieving goal of development programme. However, there roles is differ from one to another. In the community development process, the main role of the local people to identify the problems, development needs and formulate plans and programme, collect the local resources and execute the plan by themselves whereas Government should provide the stimulus for self-reliance to the local people to provide financial support for promoting development activities. Furthermore, local people role in development should be pro-active and government's role must be facilitative by provide training, awareness programme, empowerment especially focus on women empowerment.Participatry development approach become one of the successful approach, especially in rural development. During this research, researcher had widely reviews the literature related to the research question. However, some of the results obtained are inconclusive or even contradictory. Consequently, many researchers have concluded that more research is needed in this area.

7.3 Recommendations

It has already mentioned that the Hemja irrigation project is running successfully with effective water users' group participation all the stages of irrigation management. However, the present may not sufficient to cover all dimensions of irrigation management, the finding require further investigation in large population based studies. Therefore research has made some crucial recommendation to the further research to be focus on and more studies should be conducted to confirm the conclusion.

- All the stakeholders should be aware of their right and duty; therefore people awareness programs should be launched.
- All the users should be encouraged to raise the issues and they should be actively participant in the discussion and solve the related problem (conflict).
- Women participation in the irrigation management should be encouraged by the local people, government level and related agencies.
- Some users weren't following WUA rules and regulation, which create conflict between the user groups. Therefore, the users group should convince them and encouraged them to actively participation in the irrigation management.
- As we know that irrigation is the back born of our country. Therefore building the effective infrastructures and network by empowering local people is essential. Government should make plans and policies for various development activities. To develop the local communities more technical and financial support need to increase. Main emphasis should be paid toward making ownership feeling of the local people.

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APPENDIX I

Interview Schedule

Date: Sample No:

1. General Introduction:

1.1 Name of the household head: _____ 1.2 Occupation: _____

1.3 Name of the respondent: _____ 1.4. Caste/Ethnicity: _____

_____

1.5 Religion: _____ 1.6 Educations_____

1.7 Age: _____ 1.8:Ward No._____

2. Family size based on age and sex

Age Group	Male	Female	Total
Below 14			
15 to 59			
60 and above			

3. Education

Level	**Male**	**Female**	**Total**
Illiterate			
literate			
Under SLC			
SLC passed			
+2/ intermediate			
Bachelor and above			
Total			

Q.4 Occupation

Occupation	Male	Female	Total
Agriculture			
Teaching			
Trade/business			
Govt service			
Others			
Total			

Q. 5 Land Owned by the Users group

Land	Household	Population	Total
1-2 hal			
2-4 hal			
More than 4 hal			
Total			

S.N.	Questions	Answers	Skip
6.	When did this project start? …… …		
7.	How did contribute to the project ?	1. Labour contribution 2. Financially 3. Fund collection 4. All of above	
8.	Are you using irrigation water continuously?	1.Yes_____ 2.No ⟶	10
9.	If yes, For what purpose you use water ?	a. Drinking b. Washing c. Irrigation d. All of above	
10.	Do you know the total cost of this irrigation project?	1. Yes b. No	12

11.	If yes, how much? …….		
12	How do you collect or raise the fund for this project ?	1.Collect from users group 2.Government 3.NGO/INGO 4.All of above	
13.	The basis of the collection of financial resource from stakeholders?	1. Based on equity 2. Based on equality 3. Wish of the stakeholders	
14.	Are you capable for contributing financially to the project?	a. Yes b. No ⟶	16
15.	If yes , how do you contribute ? ……		
16.	Did you do labour (physical) contribution for the project ?	a. Yes b. No ⟶	18
17.	If yes , what time?	1.System maintenance phase 2.Both phases	
18.	Did you get involve in decision making process?	a. Yes b. No ⟶	20
19.	If yes, what type of decision ?	1. Construction 2. Maintenance and repairing 3. Fund collection 4. All of above	
20.	How much do you have to pay annual ? ……		
21.		1.Yes	

	The rate to be paid is affordable?	2.No	23
22.	If not, why.? ……..……		
23.	How is the benefit sharing process?	1.Based on equity 2.Based on equality 3.Wealth and power of the stakeholders 4.According to committee's decision	
24.	Are you satisfied by the distribution system?	1.Yes 2.No	
25.	Do you have watch man to control the water distribution?	a. Yes b. No	
26.	If yes then how did you arrange /Manage? ……..……		
27.	What are the criteria for forming WUA?	1.From general assembly 2.Selection process 3. All of above	
28.	Does committee forming process remain unbiased?	a. Yes b. No →	30
29.	If yes how? …….…….		
30	If not, how? …….……		
31.	Does water users group fulfilling their role and responsibility?	1.Yes 2.No	
32.	If yes, then how, give the reason ? …….……		

33.	If not,how ? ……		
34.	Do you think the WUA's work is transparent ?	1Yes 2.No	
35.	Do you think this project is going in a right way?	1. Yes 2. No	
36.	If yes, how give some reason ? ……. .		
37.	If not why? ……..……		
38.	How did you allocate water during dry season? ……..		
39.	Who is the responsible person for water distribution? ……..		
40.	What are the possible problems and challenges to continue the irrigation project?	1Netural disaster 2.Conflict 3.self interest 4.All of above	
41.	The reason for dissatisfaction on users?	1.Lack of water 2.Lack of proper following of regulations 3.Self-interest 4.All of above	
42.	The way of punishment the users who misconduct?	1.Fine 2.Restriction on water use for certain period 3.Labor contribution 4.All of above	
43.	Please give your opinion that what can you able to maintain sustainability on this project?		

	……...
44.	What will be the role for the community and the government to develop this project …….

Appendix II

Questionnaire for Key informants

Checklist

A. Schedule for interview (Key informants)

1. What is the level of people's participation in irrigation management Hemja VDC?
2. Do participants have equal/equitable status in participants?
3. Do you have equal access to benefit sharing?
4. What may be the problems and challenges are faced by the water users group?
5. Do you have any more to say about people's participation in Hemja irrigation management?

B. Checklist for the focus group discussion

1. People participation in Hemja irrigation management in the Hemja VDC.
2. Level of benefit sharing and decision making.
3. Factors affecting participation.

C. Checklist for Observation

1. Water users group participation in the assembly, water users association based on caste/ethnicity and sex.
2. Photos of the canals, participants during their labour contribution, meeting, Assembly.
3. Criteria of forming the water users association.

Appendix III

Name list of Key Informants

A. Name List of Key Information

1. Mr. Dharma Raj Bastola, Ex Chair Person, HIP
2. Mr. Chitra Bahadur Karki, Secretory, HIP
3. Mrs. Mina Kunwar, Advisor, HIP
4. Mr. Bal Bahadur Thapa, Treasurer of HIP
5. Mr.Ganga Bahadur Thapa, Vice Chairperson,HIP
6. Mr. Krishna Bahadur Thapa Chair Person,HIP
7. Mr Dabal Bahadur Kunwar, Teacher of higher secondary school
8. Mrs Janhabi Tripathi, Principal of Primary School

B. Name List of Participants of Focus Group Discussion

1. Mr.Dharma Raj Bastola,Ex. Chair person of HIP
2. Mr.Chitra Bahadur Karki,Secretory of HIP
3. Mrs. Mina Kunwar, Adviser,HIP
4. Mr. Bal Bahadur Thapa, Treasurer of HIP
5. Mr.Ganga Bahadur Thapa,Vice chair Person,HIP
6. Mr. Tek Bahadur Kunwar,Member, HIP
7. Mr Ganga Bahadur Kunwar, Adviser, HIP
8. Mrs Bhagbati Bachgai, Member of mother's group
9. Mrs Puspa Shrestha, Member,HIP
10. Mrs. Bhagbati Kunwar, Member of Mother's Group.
11. Mr.Khim Bahadur Thapa.Adviser,HIP
12. Mr. Krishna Bahadur Kunwar,HIP

Appendix VI

Name List of Users Committee

Chairperson:	Mr. Krishna Bahadur Thapa
Vice chairperson:	Mrs Puspa Shrestha
Secretory:	Mr Bhana Shyam Timsina
Treasurer:	Mrs. Bhagbati Bajgai
Members :	Mr Chitranath Poudel
	Mr. Tek Bahadur Thapa
	Mr. Rajendra Thapa
	Mr. Kham Bahadur Thapa
	Mr. Dhan Bahadur Thapa
Advisors :	Mr. Dan Bahadur Thapa
	Mr. Dharma Raj Bastola
	Mr. Ganga Bahadur Thapa
	Mr.Jit Bahadur Karki
	Mr.Dabal Bahadur Kunwar
	Mr. Nil kantha Poudel

Appendix V

Photo Gallery

During the water user association forming (2015)

Construction and repairing of the canals (2004)

Vegetable farming

Vegetable farming

Water Users Group Participation in Irrigation Management in Hemja Irrigation Project, Hemja, Nepal

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

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2017