Participation and Empowerment in Participatory Irrigation Management

Case Study of Chainpur and Pithuwa Irrigation Systems in Nepal

M.Sc. Thesis by Sonam Pem

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Master thesis Irrigation and Water Engineering submitted in partial fulfillment of the degree of Master of Science in International Land and Water Management at Wageningen University, the Netherlands

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Abstract

The Participatory Irrigation Management also known as the Irrigation Management Transfer was popular and proclaimed as a success throughout most of the countries both developed and developing countries. Nepal embraced the IMT programs in the 1990's along with most of the developing countries. The approach of participation through IMT was implemented throughout the country in almost all the irrigation systems. In Chitwan, two irrigation systems, Pithuwa irrigation system and Chainpur irrigation system were also the ones where the approach of PIM was implemented. Pithuwa irrigation system was initiated by the government with the involvement of farmers in 1967 while the Chainpur irrigation system was initiated by the farmers in 1963. There was already some form of participation taking place in these two communities before the official PIM approach through IMT programs. The main purpose of the study was to understand how participation was taking place before the IMT was implemented and how it is now after some years of PIM implementation. For that, I did a case study in the two community managed irrigation systems and the functionaries of the water user associations (WUA) in both the systems.

The findings from interviews, observations, meetings of the WUA and the General Assembly with farmers of diverse groups of economical, caste and social background, made me question the participatory approach of PIM through IMT programs. The objectives stated in various literatures about IMT and the participatory approaches by different authors especially focusing on the people and giving opportunities to people at different levels, a platform for negotiation, decision making and information sharing was not encountered in my study.

This thesis work also shows how the social and political aspects play important role in the different processes of participation. Further researches are recommended in both the community irrigation system with many developments and changes occurring very fast in both the systems.

Key Words: *Participatory Irrigation Management, Irrigation Management Transfer, water User Association, participation.*

Abbreviations

ADB/N:	Asian Development Bank of Nepal
AMIS:	Agency Managed Irrigation System
BS:	Bikram Sambhat
CARE/N:	Care International Nepal
CIS:	Chainpur Irrigation System
DIHM:	Department of Irrigation Hydrology and Meteorology
DOA:	Department of Agriculture
DOI:	Department of Irrigation
FIWUD:	Farmer Irrigation and Water Utilization Division
FMIS:	Farmers managed irrigation systems
ILC:	Irrigation Line of Credit
ILO:	International Labour Organization
IMP:	Irrigation Management Project
IMT:	Irrigation management transfer
ISF:	Irrigation Service Fee
ISP:	Irrigation Sector Project
MOLD:	Ministry of Local Development
PIM:	Participatory Irrigation Management
PIS:	Pithuwa Irrigation System
SNV:	Netherlands Development Organization
SPWP:	Special Publics Works Program
UML:	United Marxist-Leninist Party
UMN:	United Mission to Nepal
VDC:	Village Development Committee
WB:	World Bank
WUA:	Water User Association

Glossary

Adhiya	A form of land tenure in which a farmer shares half of his or her land with another farmer. The owner receives half of the harvest from the other farmer or some cash payment.
Birta	Land grants awarded to certain individuals by the rulers during the Rana Regime.
Bigha	The unit of measuring land in Nepal which is equal to 0.250 hectare.
Bikram Sambhat	Nepali Calendar where 57 years is added to the current year.
Guthi	The endowments of land and other properties to support religious and charitable activities.
Jagir	Land grants awarded to certain individuals by the rulers during the Rana Regime.
Jamindars	State functionary holding a land grant provided by the Shah and Rana, the Kings.
Katha	The unit of measuring land in Nepal and is equal to 1 hectare.
Muluki Ain	The law of the realm, which was based around customary practices relating to irrigation and the traditional customs of different ethnic communities.

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Chapter 1. Introduction

1.1 What is Participatory Irrigation Management

Management of water resources in the field of agriculture has been a development priority since the 1950's. The period between 1950's to 1970's is identified to be an era of intensive irrigation infrastructure development, where the focus was primarily on 'constructing' irrigation systems (Vermillion, 1999). *"Irrigation development was synonymous to construction"* and *"irrigation management was an after-thought"* quotes Vermillion (1999, p.184). However this period of intensive construction of irrigation systems is also known for an equally widespread deterioration and failure of irrigation systems/schemes which resulted eventually into the focus on irrigation management, through *"increased rehabilitation, introduction of new technologies and management techniques, training, introduction of irrigation service fees and farmer participation"* (Vermillion, 1999, p.184). Thus, the 1970's to 1980's was according to him the "*era of irrigation improvement*" (Vermillion, 1999, p.184). However, there was little or no improvement and bad performance of the irrigation systems because of the poor management due to under financing of the systems. This brought about the *"era of reform"* (Vermillion, 1999, p.184) when the institutional and policy reforms started from 1980's to the present day. The reform was to transfer and handover the irrigation management from the government to the users or to the water user associations (WUA).

The gap between the demand and supply of water for irrigation was enormous with the increased pressure on the available water. According to Vermillion (1999), it was due to the government economic shortages and the inability to collect sufficient revenues from the collection of irrigation fees, that an increasing number of governments around the world adopted the programs of transferring the management and responsibility of the irrigation to the water users association (WUA).

Like Vermillion, different authors have argued about various reasons for adopting this approach of transferring the management and responsibility to WUA depending on the different situations of different countries. According to Vella (2004), most of the authors agree that the approach is not only beneficial but necessary for the agriculture progress and improving the standard of living of the farmers besides the reduction of the costs of the government. Zwaarteveen (1998) points out that the main reason for PIM approach as a development practise was the scarcity of the funds and water. According to Zwaarteveen, the consensus that the savings of water and money can be brought about by firstly treating water as an economic good and secondly through the decentralisation of the management of the irrigation system which were the reasons why the PIM approach through the IMT processes were adopted in various countries.

PIM was found as an attractive approach according to the study by WBI, (2003) cited in Vella (2004, p.299) for the "*efficient use of the limited water resources*". Thus, the paradigm of PIM has been recognised in both the developed as well as the developing world as an important component in the irrigation sectors and management. According to Groenfeldt (2003, p.1), PIM is an approach to irrigation emphasising the Dublin principle of subsidiarity that states *"Do as much as you can locally and, reserve government support for those levels of the irrigation system that cannot be managed effectively through local resources alone".* The term, Participatory Irrigation Management (PIM) used synonymously with the term, Irrigation Management Transfer (IMT), is as Khanal (2003, p.1) stated a "*worldwide phenomenon*". According to him, the aims of this approach is to achieve a better service delivery through the involvement of the users, to reduce the public expenditure and finally to enhance the empowerment of the farmer groups. Farmers' participation and control has become a centre stage in the policies of irrigation development. The paradigm of participation was enthusiastically adopted in the water sector particularly in irrigation. One of the major reasons for embracing this approach as can be seen above was to reduce the government's cost.

Although it was argued that the declared motives of adopting the PIM approach as the reduction of the governments' cost, I take a standpoint and I agree with Dick (1997) that the impact of participation should be evaluated not just in terms of reduction of the government costs, but also in terms of the improvement of the farmers control over water which are great enough to balance the cost of farmers participation and also in improving of the physical structure. I strongly agree with Groenfeldt (2003) that there is more to this approach than reduction of the government's cost. This approach according to Groenfeldt (2003, p.1) is an approach that "*focuses on people*" which is also the focus of my study.
In theory, effective and meaningful participation was supposed to be providing opportunities for collective action, dialog between users, empowerment at all levels of the community thus, enhancing better management of irrigation system. I believe that the practical nuances are a lot more complex as there are many factors like power, the already existing social division between and within the community which creates a barrier for an "effective participation". These are the complexities that I study through my research in the two communities. My study indicates that participation does improve efficiency of the irrigation systems and also to some point reduce the expenditure of the government; however, there are certain limitations and constraints. For an irrigation system to function, through the approach of participation, underlying factors especially the social and the political aspects which in the long run, if not taken care of may have adverse effects has to be considered and recognised. This can be clearly illustrated by an example in Indonesia where the major reason for the poor functioning of the Water User Association was the lack of female members in the WUA committee. This was because the main users of the water for irrigation were the women but they were not represented in the WUA (Dick et al., 1996). It indicates that the social characteristics of the irrigation management have to be equally recognised, analyzed and taken into account for the participatory approach. Like the same example given by Dick et al., I show the irrigation management has social characters which have a major influence on how the farmers participate and are thus, empowered.

The farmers become more effective and spontaneously organize themselves to take over the responsibility of effectively distributing the water to their fields out of the need to improve their livelihoods or basically for survival. It is out of the need base that the users themselves take initiatives and participate in constructing their own irrigation systems and forming groups for distributing water to their fields. It was discovered that the Irrigation Systems managed by the farmers in many parts of the world in the 1960s and 1970s defied the assumptions regarding the limitations of farmer involvement and the necessary role of the state. Studies of systems like the Balinese subaks, Philippine zanjeras, Nepalese kulos, or the Middle Eastern qanats showed that the farmers are capable of the complex engineering and sophisticated management without external intervention or control (Dick, 1997). With this my study also looks into how the PIM approach has brought changes in participation the already self initiated and organized Farmers Managed Irrigation System.

By explaining what PIM is and by stating my own stance of what the approach should really focus on besides the reduction of the governments' cost, the next chapter describes about how PIM was adopted in Nepal.

1.2 Irrigation Development and Participatory Irrigation Management in Nepal

In order to understand the present day irrigation system and how PIM was adopted in Nepal, it is necessary to understand the historical development of irrigation and how PIM evolved in Nepal. This chapter describes the irrigation development and how the trend of irrigation development and PIM approach in Nepal followed the global trend.

1.2.1 Self governed Irrigation Systems

This section describes how the farmers were capable constructing and managing their own irrigation systems before the government intervened giving the historical development of irrigation in Nepal.

Irrigation development and management in Nepal began with the carving of the rice terraces by the Nepalese farmers as stated by Shukla et al. (1997) which means that farmers already had traditional knowledge about how to manage their own irrigation systems. Such farmer-initiated irrigation development and management continued in Nepal, and until the start of the Democracy period in 1951, almost all irrigation systems were developed and managed by the farmers. According to Khanal (2003), many farmers managed irrigation systems emerged out of Birta and Jagir type of land tenure systems practiced those days. Birta and Jagir were land grants awarded to certain individuals by the rulers (Shukla et al., 1997). The owners of Birta and Jagir were called the Jamindars and had judicial and administrative powers over the land use and were in the position to mobilize a labour force to construct a canal system (Regmi, 1978 in Khanal 2003). The objective behind the land grant and subsequent irrigation development, according to Khanal (2003), was to increase state revenue, the major source of income in those days. The Jamindars were there to collect the land tax and submit it to the concerned land revenue office.
According to Khanal (2003), irrigation systems were also developed out of the 'Guthi' system which is the endowments of land and other properties to support religious and charitable activities. Irrigation systems were developed by Guthi to increase the productivity of the land. There were some systems also initiated by the state known as the Raj kulo (royal irrigation canal) but these were few; and most systems were initiated by the farmers themselves with their own initiatives and resources (Shukla et al., 1997). The farmers managed irrigation system (FMIS) was self-governed and had a striking aspect of community participation (Pradhan, 1989). These irrigation systems as explained by Regmi (2004) are the ones owned, developed and managed by the farmers.
As can be observed above, there were lots of origins of the farmers managed irrigation systems. These FMISs' according to Khanal (2003) were regulated through the 'Muluki Ain', the law of the realm, which was based around customary practices relating to irrigation and the traditional customs of different ethnic communities. Thus, irrigation development and management in Nepal was largely based in the context of local land management before the 1950s. This over time led the users to organize activities related to irrigation development and management under self governing irrigation institutions (Benjamin, 1994). According to Shukla et al. (1997), much of what is seen in FMIS today are the results of the users' participation during the period of King's regime. The present FMIS are some government initiated and some are initiated by the users with the help of the government.

Regmi (2004), states that the irrigation development in Nepal was the result of the farmers' initiatives and investments in the construction and the management until the 1950s. These systems according to him are referred to as FMIS.

These shows how there were some form of community participation which was inherent among the users themselves without any intervention from the government and how the farmers were capable of managing their own irrigation systems.

1.2.2 The start of State Intervention

The involvement of State in irrigation construction started to increase after 1951. As the country became democratic, there were changes in the government administration systems and the approaches towards development. As the country's economy was based on agriculture, irrigation sector was given a highest priority and several Departments and Ministries were created to manage irrigation development. Thus, an irrigation office was established in 1952 (Shukla et al. 1997) with technical assistance from India. Later the office was upgraded to a Department to look after irrigation and Water Supply. The water supply wing was detached and the name was

changed to the Department of Irrigation (DOI) and the DOI still remains the main agency in development of irrigation in the country (Khanal 2003).

The DOI was firstly involved in constructing the small scale irrigation schemes and due to lack of financial as well as human resources, such initiatives were supported by the Indian Government as well as by the FAO in providing technical assistance according to Khanal (2003). Later in the Second Plan (1962-1965), a minor irrigation program was started which aimed to develop small scale irrigation systems with voluntary contributions from the farmers themselves. The objective of the minor irrigation program was to develop the systems with maximum participation from the farmers and hand over the system to the farmers for the operation and maintenance of the system. However, according to Khanal (2003), there were no clear directives on the operation and the management of the irrigation systems from the government as some of them was solely managed by farmers while some continued to be dependent on the government for operation and maintenance. There were studies that showed that the performance of the Farmers Managed Irrigation Systems outperformed the Agency managed irrigation systems (Lam, 1998) in most of the key aspects like the agricultural yield, cropping intensities, ability to reach water to tail end.

According to Shukla et al., (1997), by 1980, agencies like Farm Irrigation and Water Utilization Division (FIWUD) which is under the Department of Agriculture (DOA), Department of Irrigation Hydrology and Meteorology (DIHM), Ministry of Local Development (MOLD) and Agriculture Development Bank, Nepal (ADB/N), were involved in irrigation development and management in the country. Besides, there were also nongovernmental organizations like International Labour Organizations (ILO), SNV, CARE Nepal, and United Mission to Nepal (UMN) that included irrigation development as important component of their activities (Shukla et al., 1997). This in case of Nepal and also at the global level was the era of irrigation improvement with "*increased rehabilitation, introduction of new technologies and management techniques, training, introduction of irrigation service fees and farmer participation*".

A major change in the policy came in the Seventh Five Year Development Plan (1985-1990) according to Shukla et al. (1997), whereby the emphasis on the users participation was explicitly mentioned directing the Basic Needs policy of design, involving the users at all levels of irrigation development from project identification, design and construction to operation and management. Many projects like the Irrigation Management Project were implemented on improving both agency managed and farmers managed irrigation systems.

Emphasis on the user's participation in irrigation development and management was spelled out clearly in the Seventh Five Year Development Plan during 1985-1990 which was also the "*era of reform"* at the global level emphasizing on the institutional and policy reforms. Recognizing the basic needs of the farmers, which are to involve the users at all levels of irrigation development from the project identification, design and construction to operation and management, the government introduced a working policy on irrigation development to fulfill the needs in 1988 (Shukla, et al. 1997). .

Thus, this was how the policy change from the earlier local level FMIS approaches of self participation to the organized formal participation with some degrees of official intervention and role in irrigation development took place in Nepal.
Table 1 shows the trend of irrigation development in Nepal following the global irrigation trend.

	Prior to 1950	1950-1970	1970-1980	1980-1990s
Global Irrigation Development	-	**Era of Construction**	**Era of Improvement**	**Era of Reform**
Nepal Irrigation Development	• Existence of many small irrigation systems. • Origins of the small irrigation systems are: Birta, Jagir, Guthi, few Raj kulos and farmers initiatives.	• State intervention on development. • Establishment of Department of Irrigation. • Many irrigation systems constructed by the government and were called the Agency Managed irrigation systems.	• Poor performance of the Agency Managed irrigation systems. • Farmers Managed irrigation systems found to be more successful than the AMIS. • Many improvements of the departments and organizations at the national level with changing the roles of many departments.	• Major approach in the irrigation development with the emphasis on the users' participation at all levels from project identification, design and construction to operation and management. • IMT programs implemented.

Table 1: Context of Irrigation of Nepal in the Global irrigation development trend

1.2.3 Participatory Irrigation Management in Nepal

As the PIM approach through the IMT programs were adopted in most of the countries, in Nepal there already existed participation at the community level where the users initiated and constructed their own irrigation systems. However, officially, the process of the transfer of management first started in the 1990s with the Agency Managed Systems getting transferred to the local organizations (Khanal 2003). According to Khanal (2003), there were three reasons in adopting the approach through the IMT programs in Nepal. First, the dependency on the government on the system development was too high and at the same time the performance of the irrigation systems was low. Second, there were donor support that preferred less government and more private sector involvement in the development activities. The final reason was that there was already a successful tradition of farmers managed irrigation system in the country.

In line with that, according to Shukla (pers. communication 2011), participatory irrigation management came after 1990s with two main objectives. First, it was to promote the farmers managed irrigation systems through investment in improvement in physical infrastructure with the aim of enhancing their efficiency and productivity. The second objective was to reduce the burden of the government in operation and management and upkeep of government developed irrigation schemes which were jointly managed, to eventually turn these over to the farmers. The government according to Shukla et al., (1997) was concerned with the poor performance of the public sector irrigation systems and the expenses of the operation and maintenance. The objective of adopting the approach of PIM was to share the operation and management responsibility between the users and the irrigation agency. According to Shukla et al.,, it was expected that turning over of the irrigation system from the irrigation agency would attract the users and enable participation in operation and maintenance of the system. There were attempts to legitimize water users associations and strengthening their capabilities enabling WUAs to

assume greater operation and management responsibilities. Shukla et al., (1997) states that with the sharing of the activities of operation, maintenance and management, there would be reduction of the financial burden on the Department of Irrigation (DOI) and at the same time increasing the performance of the irrigation system. However, Khanal (2003) argued that the process of the PIM approach was formulated with the emphasis on participation and local organizational development. Although the emphasis on the users was given since 1980s through including the users at all levels, the attention needed for the participation processes was minimal until now.

Taking the emphasis of participation at the local level and how the users were really benefited through the PIM approach, my study looks at the characteristics and factors influencing the participation of the farmers at the community level. I do that by focussing on people and within the communities to investigate how the dialog, information sharing between the users, decision making and negotiations take place. With the approach of the PIM, I investigate how empowering do not takes place for different users of the communities using the framework of participation. I study whether the participatory approach achieve all the objectives. I try to find the answers to whether all farmers are given the opportunities for negotiation and to what extent are they given the platform for dialog? And are there participation at all levels of the community? The study also demonstrates the social relations, power struggle involved in getting access to water and also in participation processes of decision making in the two irrigation systems.

With this study, I come to a conclusion that there is a need to analyze the PIM approach to ensure that the needs of the poor and marginalised are met and also to analyze how the "participation" is taking place in the complexity of different social relations and how through different approaches of development, the word loses its meaning and is misleading. The following section explains my research objectives and questions.

1.3 Research Objectives and Questions

With the findings that I have come across in the two irrigation systems, I attempt to answer the following question. In what ways did the approach of PIM help the users within the two communities? Are the marginalised or the poor helped through the approach by intervening or the social division otherwise reinforced?

Problem Statement;

With these above questions the research problems is thus:

"To what extent have the objectives of the PIM approach, i.e. full participation of local farmers in the identification, design, negotiation, information sharing and decision making processes of surface irrigation systems been achieved, and how have official IMT interventions reshaped existing forms of local-level participation."

Main Objectives of the research study are;

1. To investigate the PIM approach through the official IMT program by studying the different types of participation and analysing empowerment of the poor and marginalised through the participation framework in the two irrigation systems.
2. To understand the social and political processes surrounding the community managed irrigation systems and how these influence the participation of farmers thus, affecting accessibility to water for irrigation.

3. To investigate other factors influencing participation processes in the two irrigation systems.

Main Research Questions with sub questions

With the above objectives, the main research questions and the sub questions to achieve them are as follows:

1. How 'participatory' is the approach of Participatory Irrigation Management in two irrigation communities in the terai region of Nepal before and after the PIM approach?

    1.1 How did the two irrigation systems evolve historically and how did participation take place considering the water distribution and decision making, information sharing and negotiation in the WUA that were carried out before the IMT and how it is now after the IMT showing the processes of participation?
    1.2 What are the different processes of participation taking place?
    1.3 Is there empowerment taking place at all levels (rich, poor and middle) of all walks of life?

2. How do the social and political factors affect the participation processes in the irrigation management?

    2.1 How are the basic social division (gender, caste) and the economic differences affecting in getting access to water?

    2.2 How did the political situation of the communities affect the farmers to participate and influence the decision making?

3. What are the factors affecting the farmers in participating in the decision making processes of irrigation management?

I also mention the gender differences and different ethnic background but the focus of my study is mainly around the marginalised and poor users in the two communities and how they are empowered or left out even after the introduction of the PIM approach.

1.4 Structure of the Thesis

After having mentioned some background of the PIM approach at the global level and the irrigation development and the PIM in Nepal with the objectives of my research, Chapter 2 presents the theoretical framework which was used for the study to collect the data.

In Chapter 3, describes the different methods answering my research questions and introduce the two cases by contextualising the two irrigation systems and describe the present processes of development around the two irrigation systems and the social networking in action.
Chapter 4 explains the results and discussions about the historical evolution of the two irrigation systems and the processes of participation taking place then and how it is now, the changes of participation processes.
Finally in Chapter 5, presents the conclusion of my study and answers my research questions. It summarizes the key points and the learning from the research, relating to the organizational structure and the participatory process, the role of socio politics and the power in the irrigation practices with few recommendations.

Chapter 2. Theoretical Framework

In the following, I will define the central concepts that I have used for collecting my data.

2.1 Irrigation System and a socio-technical network

Firstly, to make the reader clear that there are a social characteristics of the irrigation management which in turn affect the participation of groups or individuals, the concepts used by Bolding (2004, p.17) who conceptualizes irrigation systems as the "*socio-technical network*" was taken into account. He explains that the irrigation systems are "*socio-technical network of relations that ties one or more farmers, their labour and skills, a piece of land, crops, a furrow, water and other resources like financial capital, together into some working order*". This concept helped me understand the means and causes of the relations that tied or even divided the farmers of different backgrounds and the level and different types of dependency (labour, cash) between them in the two communities. This socio-technical approach is used in this study, to understand how irrigation systems are operated, maintained and used by the people to get access to water for production. This concept helped me understand that there are social aspects that need to be recognized and considered for designing participation through the PIM approach which was explained more explicitly by using water control as follows.

2.2 Water Control

To emphasize on the socio-technical concepts, **'Water control'** by Mollinga (1998; 2001) helped me define some dimensions of the irrigation management at the level of the communities. Mollinga (1998) states that irrigation system are socially constructed which means that technology development and design are social processes in which different stakeholders interact (communicate, negotiate, take decisions, struggle, etc) and the nature of that process and the different perceptions and interests of the stakeholders shape the technical characteristics of the technologies. Mollinga (1998; 2001) also defines three dimensions of irrigation system management in the form of the water control. These three dimensions are the technical, organizational and socio-political. The technical dimension relates to the physical structures controlling the flow of water by capturing, conveying and distributing the water through the physical artifacts. The organizational dimension relates to the human behavior in the daily irrigation practices such as the WUA and the different rules and regulations to make the WUA work. The socio political dimension relates to the wider societal conditions and also recognizing water as politics, that water delivery often involves political actions and that the members of the WUA are the political actors that shape the possibility of particular management practices to take place. Mollinga's observations are validated by others like Wade (1982); Zaag (1992), and Khanal (2003). Khanal (2003, p.17) states that "*the irrigation systems are as much socio political processes as technical and the access to water are shaped by values, interests, knowledge, and capability of users, local rules and practices, socio political conditions"* which are very much visible in the ground reality of the two systems. Seeing water as the *'central mobilizing actor'*, helped me understand how water as an actor and human as the agent brought about changes through the institutions which are the WUAs and other elements of socio political processes to meet their purpose.

2.3 Participation Framework

By understanding the socio-technical nature of Community Managed Irrigation Systems using the concepts mentioned above, I then use the framework of **"participation"** to understand how the approach of the Participatory Irrigation Management was carried out in complex: social and politically defined irrigation systems. First, I analyze the concept of participation as well as how

the term is defined in rural development and the different interpretations given by different scholars.
Participation can take different forms whether direct participation or representational or indirect. In my study, I take participation as taking part in different levels of societal life which concerns the distribution of water in the two community irrigation systems. I attempt to define what participation really means in the context of the Participatory Irrigation Management and take the different types of participation and analyze how empowerment take place in the two irrigation systems.
According to Khanal (2003), participation has been a central concern in the irrigation engineering with focus on both the development of the WUA and the participatory development processes to support them. However, in practice and at ground reality, the term participation has been subject to a considerable interpretation not only in the development of the irrigation engineering but also in the different discourses of the natural resource management.
To really get a concrete definition of participation is out of the scope of my study; therefore, I take the four interpretations of participation of Oakley and Marsden (1984) in Oakley (1991). These four interpretations that were used in the rural development process are:
a) Participation is considered a voluntary contribution by the people but do not have the platform for negotiation and right to shape or change the program or criticize the contents (Economic Commission for Latin America, 1973).

b) Participation in the rural development includes people's involvement in decision – making processes, in implementation of the programs, their sharing in the benefits and their involvement in efforts to evaluate such programs (Cohen and Uphoff, 1977).

c) Participation is concerned with the organized efforts and has control over the resources and also the institutions from all levels of people, also the ones who were excluded (Pearse and Stiefel, 1979).

d) Community participation is an active process by all the levels of groups of people have an influence on the decision and has a platform to negotiate to enhance their well-being in terms of income, personal growth, self-reliance or other values they cherish (Paul, 1987).

According to Oakley (1991), the above four definitions jointly outline the essence of participation and the above statements are all interlinked with each other and do not have a distinct line separating them. There are as such many forms and dimensions of participation used in the rural development and in the field of natural resource management. There are the key stages of the participation defined by Cohen and Uphoff (1977) in Oakley's (1991, p.8) which were 'influential' in many development projects which are *'decision making, implementation, benefits and evaluation'.* One essential and fundamental to participation as put by Boelens (2002, p. 145) is *"sharing of power- power based on knowledge, economic standing, or social and psychological status."*
For the analysis of the Participatory Irrigation Management, I take the definition and the interpretation of participation mainly consisting of the statements b), c) and d) and the four key stages of participation of Cohen and Uphoff to analyze the approach of Participatory Irrigation Management in the two irrigation systems. I also use the concepts as used by Boelens (2002), who stresses on '*power*' which along with *'control'* are key to participation which is also validated by Shukla et al. (1997).

Types of participation	Characteristics of each type
1. Manipulative participation	Participation is a pretense and people's representatives on official boards but unelected and having no power.
2. Passive participation	People participate by being told what has been decided or has already happened. It involves unilateral announcements by an administration or project management without listening to people's responses. The information being shared belongs only to external professionals.
3. Participation by consultation	People participate by being consulted or by answering questions. External agents define problems and information gathering processes, and so control analysis. Such a consultative process does not concede any share in decision making, and professionals are under no obligations to take on board people's views.
4. Participation for material incentives	People participate by contributing resources, for example labour, in return for food, cash or other material incentives. Farmers may provide the fields and the labour, but are involved in neither experimentation nor the process of learning. This is commonly called participation, yet people have no stake in prolonging technologies or practices when the incentives end.
5. Functional participation	Participation seen by the external agencies as a means to achieve project goals, especially reduced costs. People may participate by forming groups to meet predetermined objectives related to the project. Such involvement may be interactive and shared decision making, but tends to arise only after major decisions have already been made by external agents. At worst local people may still only be co-opted to serve external goals.
6. Interactive participation	People participate in joint analysis, development of action plans and formation or strengthening of local institutions. Participation is seen as a right, not just the means to achieve project goals. The process involves interdisciplinary methodologies that seek multiple perspectives and make use of systemic and structured learning processes. As groups take control over local decisions and determine how available resources are used, so they have a stake in maintaining structures or practices.
7. Self-Mobilization	People participate by taking initiatives independently of external institutions to change systems. They develop contacts with external institutions for resources and technical advice they need, but retain control over how resources are used. Self-mobilization can spread if the governments and the NGOs provide an enabling framework of support. Such self initiated mobilization may or may not challenge existing distribution of wealth and power.

Source: Hobley, 1996

Table 2: Different types of participation

Although Oakley's and Uphoff's interpretations of participation were useful, they do not specifically guide the empirical processes of participation taking place at the ground reality for which the typologies used by Hobley (1996) was used. I used the Hobley's typologies and analyzed whether the participation taking place fit into the participation interpretation by Oakley, Uphoff and Cohen.

For the two case studies that I analyze, I follow the different types of participation which explains how people participate in development programmes and projects as borrowed from Hobley (1996) as shown in the table below. By considering each of the types of participation at different situations in the case studies of the two communities, I indicate how participation is taking place surrounding the two irrigation systems shaping the water management and distribution and whether or not they fit the interpretation of the participation as defined by Oakley and the four key stages of Cohen and Uphoff, thus analyzing the PIM approach.

2.4 Empowerment in Participation

The analysis will not be complete unless the concept of empowerment is taken into account in analyzing participation in the approach of PIM. I take the framework of **empowerment** and question whether empowerment happens through the forms of participation taking place in irrigation-specifically through the PIM approach. In particular, I agree with Cleaver (1999, p.599) that PIMs have not clearly answered *"who is to be empowered*" and explained by what means and when this might take place. Empowerment is a stated objective of the approach of the PIM, but somehow it is missed or overlooked in the application of PIM approaches. Empowerment is also a broad concept and in its broadest sense means *"the expansion of freedom of choice and action"* (Parker, 2002, p 14). In particular, I used the definition of empowerment as used by Parker (2002, p.14) as "*the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control and hold accountable institutions that affect their lives".*

In connection to the concept of empowerment, the other important concept within the context of empowerment was the focus on **power** and how it acted not only as an *"instrument of domination ('power over')"*, but also as a *"capacity to organize collective action ('power with')"* which I used from Boelens (2002, p. 222).

This concept of power helped me analyze who were empowered and how they were empowered because of power. Power can be analyzed in different ways and can take different forms. I follow the notion of Friedman (1992) in Callejo et al., (2009) who pointed that empowerment is related to the access and control of three types of power: a) social, which is understood as the access to wealth base; b) political, or access of individuals to the decision making processes which can affect their future c) psychological, understood in the sense of individual potential, confidence and capability. With this, I show how empowerment does not take place through PIM approaches and to the contrary, the marginalized are disempowered. I also show how the social, political and psychological power affects the participation which defies the objective of the PIM approach.

Power is an integral part of the **socio-political** processes that exists in the two communities. Through this concept of power I also discuss how power struggles continue between different political parties. By using the perspective of power over which is an "*ability to get another person to do something that he or she would not have otherwise done*" (Dahl, 1968 cited in Coleman, 2006, pg.110) is used to show how the political parties dominate the poor (*using power as an instrument*) within the community to gain the votes from the farmers. Another perspective of power with is also used to show how collectively the political parties organize themselves (*power with*) to influence the farmers to vote for the party they prefer to win and thus, making the Water User Association as a '*political platform'.*

In conclusion, with the help of the concepts of the socio-technical network and water control of the irrigation system I show the social characteristics and the complexities of the irrigation systems which have influences on how the farmers participated in the irrigation management. I also show how the social ties and the divisions that affect the individual or some groups of farmers to participate are empowered or disempowered thus questioning the participation in

PIM approach. The schematic diagram in Figure 1, show how I have used the different concepts in helping me guide through my research.

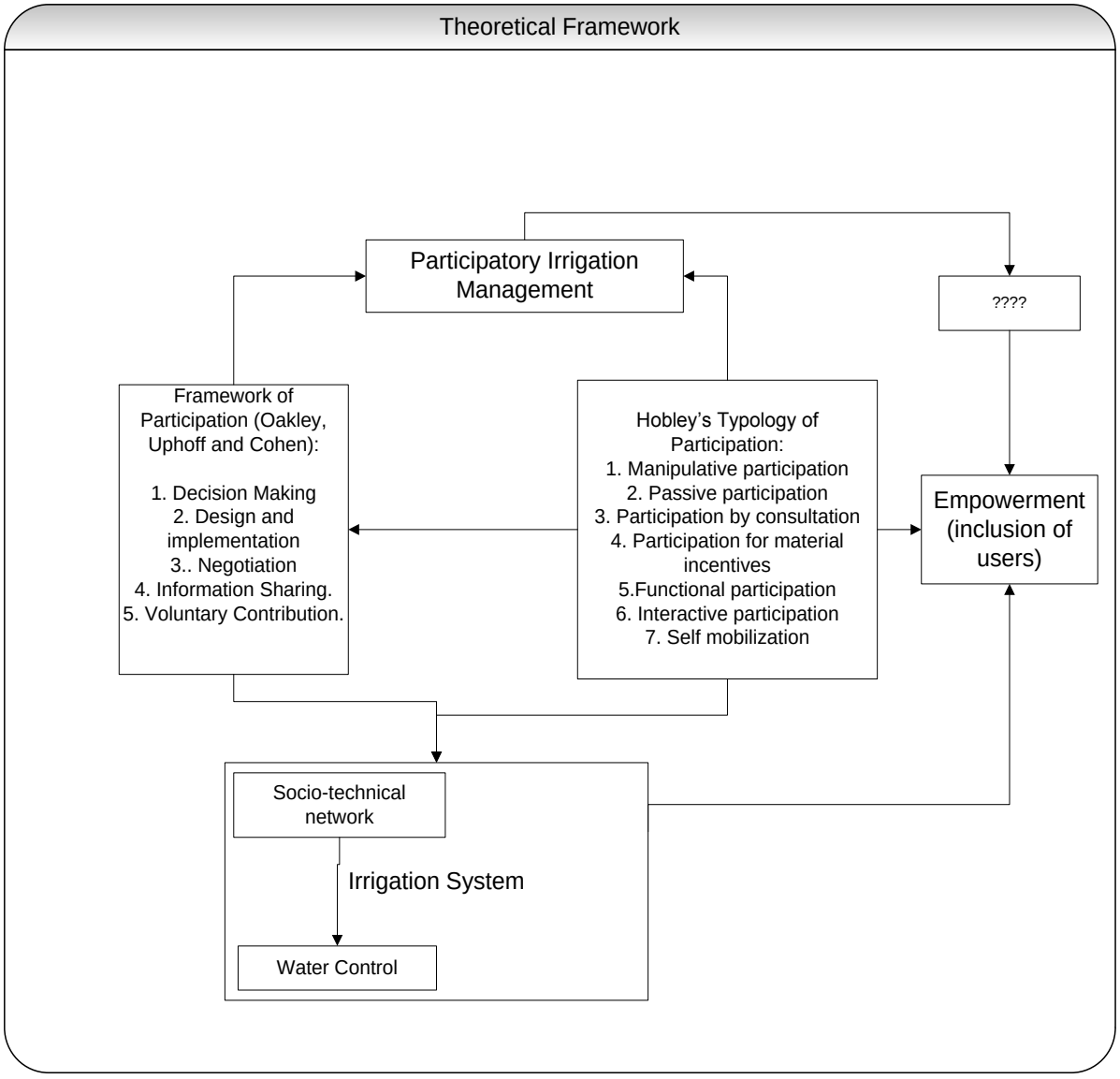

Figure 1: Schematic representation of the Theoretical Framework

The model of how I used the framework of participation and assess the resulting PIM approach through different processes of participation and empowerment is shown in Figure 1. In this model, the interpretation for participation for my study is defined from Oakley, Uphoff and Cohen as decision making, design and implementation by all users, negotiation information sharing and voluntary contribution. The different types of the participation as used by the Hobley are applied on irrigation systems which are defined by using the socio-technical network and water control. The PIM approach is assessed by looking into the participation processes and questioning whether the empowerment of users at all levels takes place or not.

Chapter 3. Materials and Methods

This Chapter introduces the district and the two communities and the methods that are used in collecting the data. As I wanted to distinguish what differences and changes the PIM approach have brought I took the two communities by basing the differences in the initiation of the irrigation systems where Chainpur Irrigation System was self initiated by the farmers while Pithuwa Irrigation System was initiated by the government.

3.1 Selection of the Study Area

The study was carried out in the two communities of Chainpur and Pithuwa irrigation systems in the district of Chitwan which is an interesting area because of the recent resettlement initiated by the government through the Rapti Development Project in 1953. It was selected with the help of the local advisor Mr. Ashutosh Shukla who is a professor in the Nepal Engineering College and Jan Willem who is a PhD student of Wageningen University.

Chitwan District is located in the inner Terai of Nepal which is one of the three main physiographic zones of Nepal and is the zone of low-lying plains, ranging in elevation from about 60-500 meters (Khanal, 2003). According to the literatures and also the local inhabitants, most of the valley was uninhabited jungle forty years ago but there were some Tharu settlers (the local tribes of Nepal) since ancient times. There are numerous small and medium streams in the eastern part of the valley from which the settlers could develop the irrigation system to support their livelihoods. The district has now been converted to a green valley after the implementation of a planned resettlement program and subsequent irrigation development. The government of Nepal encouraged the resettlement by clearing forest in flat terai and Inner terai during the 1960s. Chitwan continued to be the major focus of irrigation development as it could provide food for the growing population due to its fertile soil from the decayed forest material and water supply. Amongst 88 irrigation systems in Chitwan District, two systems are considered for my study. These are the Pithuwa and the Chainpur irrigation systems which are mainly developed by the migrants by using the source from the Kair Khola.

The two different irrigation systems were selected because the PIM approach was carried out in 1990 and not much of study regarding the participation processes were carried out. I selected these two systems based on the differences these two irrigation systems had regarding the initiation of the construction. Chainpur irrigation system was farmer initiated system (FMIS) and Pithuwa irrigation system was government initiated (AMIS) and turned over to the farmers.

3.2 Description of the Study Area

The description of the study area provides the general information about the area where the research has been conducted. Some of the information like the historical background, farming system, different castes and political background and socio-economic conditions are based on the survey, literatures, group discussion and transect walk during the field visit.

3.2.1 Location and Area of the Irrigation Systems

Pithuwa Village Development is located west to the Kair Khola. Almost all the population living there are from immigrants from the hills especially from Dhading and Gorkha Districts. The irrigation system lies downstream of Kair Khola and was initially constructed for 600 ha command area by the government in 1967 A.D. It was then extended by the farmers and is now 1300 ha providing water to 2800 households as per the record of WUA.

Figure 2: Map of Nepal and Location of Chitwan. Source: Wikipedia

The figure shows the location of the Chitwan District on the map of Nepal and is located at the terai (southern plains) of Nepal.

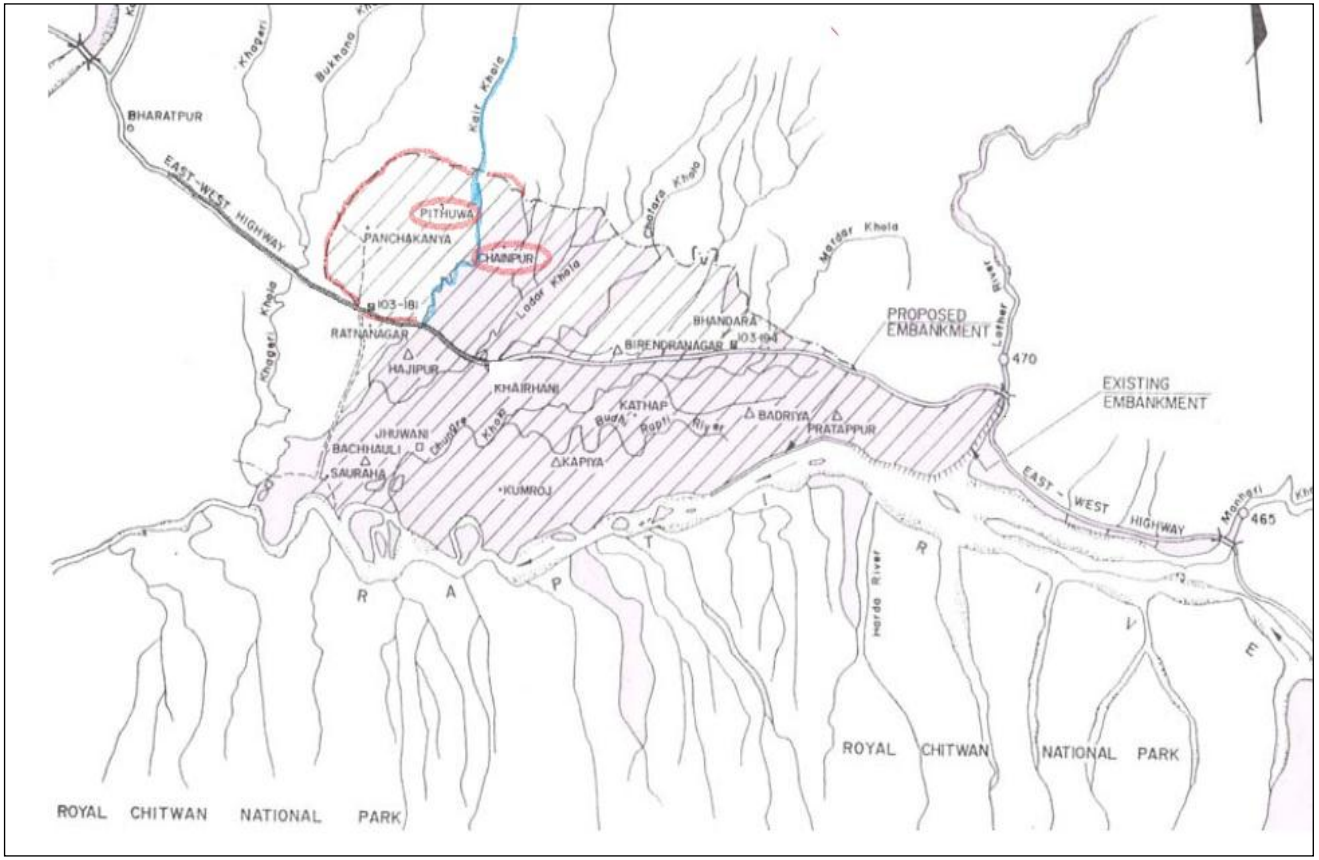

Figure 3: Pithuwa and Chainpur VDCs in Chitwan. Source: Roy, R.

The figure shows the location of Pithuwa and Chainpur Village Development Committee separated by the Kair Khola.

Chainpur VDC lies upstream to the Pithuwa VDC. The population is also the immigrants from the hills like in Pithuwa VDC. The irrigation system was constructed by the farmers who first migrated in the village in 1963 A.D which was later rehabilitated by the East Rapti Irrigation Project 1992 A.D. The irrigation system in Chainpur is smaller than the Pithuwa irrigation system with the command area of 368 ha with 10 branch canals and one tertiary canal. The CIS is presently 4 Km long providing water to the 850 households of wards number 3, 8 and 9 according to the records of the WUA. The other wards of Chainpur VDC use the deep tube wells for irrigation. The farmers are also actively using the deep tube wells for irrigation and for drinking purpose

3.2.2 People and politics

In Pithuwa, as per the Nepali Data Census (2001), the population was 10,590. They belong to caste systems like *Bahun, Chetri, Newar, Gurung, Thapa, Magar and Kami.* With the political change at the National level, it can be clearly seen how the political situation of the country has affected in dividing the farmers at the ground level which thus affect the management of the irrigation system directly or indirectly which will be explained later. Every household belong to the UML (Unified Marxist Leninist), the Congress or the Maoist (the Communist Party of Nepal). And all the farmers of the Kami (lowest) caste belong to the Maoist.
In Chainpur, as per the Nepali Data Census (2001), the population was 14,511. The ethnicity groups is similar to that of PIS with almost 80 percent of the upstream being the Gurung caste and the rest of the settlement are all mixed with different ethnic groups. The party politics of the community is also same as that of Pithuwa community.

3.2.3 Farming System

In both the irrigation systems, the farming system is mix farming consisting of both livestock and crops. Farmers in both the systems depend on the rainfall during the monsoon (July to September) and on the surface irrigation systems for growing their crops with some exception of farmers using ground water which is not included in the study. The agricultural crops grown in both the communities are rice during monsoon and lentils, mustard, maize and other crops like wheat during the dry periods (January to July). Since recently, few farmers are starting to grow rice twice a year using the ground water and also grow different vegetables like tomatoes and cabbages in the Chainpur community. The system of share cropping is common in both the communities. Most of the farmers in both the communities are small scale farmers whose life basically depends on subsistence farming.

3.3 Research Design

I used the strategy of case study to understand and explore the social interaction between the farmers. I explored how farmers interacted with each other in the field and how through the technology of the irrigation system, they were connected to each other. There are three strategies of case study as described by Yin (2003) which are the *"exploratory, descriptive and explanatory case study strategies"* which were used to collect the data for my study. The unit of analysis taken was the irrigation system.

3.4 Data Collection Methods

This section explains the methods that are used to collect the data to fulfill my research objectives.

3.4.1 Sampling

Initially I carried out a random sampling to select one Branch canal in both the communities. I did that first in PIS and selected the Branch Number 9 but found it difficult to collect the farmers in that Branch. So I had to ask the secretary of the WUA who suggested that I take the Branch number 8 for the detailed study as there are many diverse groups of farmers and I also based the selection on the command area of the Branch which was neither too big nor too small. The command area is of 65 Bigha and 8 Katha with 109 farmers. In Chainpur, I selected the Branch Number 10 also suggested by the office secretary of the WUA of Chainpur based on the most conflictive case of the branch. So, in both the communities I carried out purposive sampling by using the expertise of the key informants like the members of the WUA. In both the communities, I targeted to carry out the semi structured interview a total number of 15 farmers each with 5 farmers from the head user, 5 from the middle and 5 from the tail end of the two branch canals.

3.4.2 Primary Data Collection Methods

3.4.2.1 Participatory Rural Appraisal

In PRA, the transect walk, making maps, community history and wealth ranking in both the communities were used. First, I carried out transect walk with some farmers and the member of the WUA in both the canals of the two communities to get a visual understanding of how the irrigation systems were operated. It helped me understand how the irrigation water was used and managed by different groups of farmers are different levels (head, middle and end users) of the branch canals. It also gave me some idea about how the farmers practice their agricultural system whether mechanized or manual and also an idea of the living conditions of the farmers.
Second, I carried out the community history, giving me information on the historical development of both the communities and how decision making and negotiation were carried out before.
Finally, the farmers were made to construct the maps of the irrigation systems and were made to locate the poor, middle and rich farmers according to the wealth ranking which also helped me in choosing the farmers to interview.

Figure 4: PRA (Community History) in progress

3.4.2.2 Semi Structured Interviews

The key informants and the 15 farmers each from the branch canals were interviewed. The key informants included the Chairman of the WUA of the communities, the secretaries, the gate openers, the female members and the former members of the WUA in both the communities.

These key informants were selected through the snow ball method while the 15 farmers each from the two communities were selected based on the wealth ranking method where more focus was on the poor. The questions for the key informants included information on the historical development, their roles and responsibilities as the members and information on how the decisions, negotiation, conflict resolution and information were taking place in the two irrigation systems. The questions for the total of 30 farmers included their perceptions on the rules and regulations of the WUA and also about the information on the process of participation especially on the decision making, negotiation and the information sharing.

3.4.2.3 Informal conversation

The informal conversation was more helpful in getting information which was not asked in the questions of the semi structured interviews. It was not easy to ask the sensitive questions about the political situation of the communities and the activities of the local elites and the rich farmers. These information were collected through the informal conversation while drinking tea and buying some vegetables. And it was of my advantage that I could understand their language and also sensed that they did not feel comfortable to talk about it when I had a pen and a paper with me. Although the farmers claim that there is peace right now compared to how it was before five years, they are still wary of giving information about the violence that had happened around the WUA and the communities.

3.4.2.4 Storylines

The storylines were used in both the communities to get the historical development of the irrigation systems. The oldest and the first immigrant of CIS, Om Bahadur Basnit, told the story about how the irrigation system in Chainpur was initiated by farmers and also about the decisions on how the decisions, information sharing, conflict resolutions and negotiation took place when the system started. While in PIS, the former and the first Chairman of the WUA (Tilak Bahadur Thapa) who was also a former village headman told the story about how the government initiated the irrigation system in Pithuwa and information about the decisions, information sharing, conflict resolutions and negotiation took place before. They also gave the information on how the water was distributed and about the formation of the WUA. The information also helped in triangulating the data that I got from community history.

3.4.2.5 Observation

Farmers' fields were also visited to see how they were irrigating their fields and how the gate openers carried out their daily work of opening and closing of the gates. In some of the cases, even though farmers and the members of the WUA mentioned about the different rules and priorities for distribution of water, in practice, I found that some of the rules and the priorities as verbally said were not practiced. So this visual observation acts as a triangulation to cross check the data obtained from the interviews of the members of the WUA. Through observation, I understood the gap and the differences of how the rich and the poor behaved with each other. I also observed how respected and powerful the political leaders were. I also observed the gender differences and the invisible or inactive roles in the management roles.

3.4.2.6 Attending meetings

By attending the annual meeting of CIS and the monthly meeting of PIS, I got an opportunity to triangulate my data that I got from the PRA and the interviews. Observations of how the meetings were being held regarding the irrigation management gave me insights of how

participation was really taking place especially the decision making and the information sharing processes. The presence of the political leaders and the influences of these leaders made me realize how the politics have influence on the management of the irrigation systems.

3.4.3 Secondary Data Collection

To understand the study area, subject matter and background of the research, secondary data were collected from the beginning when formulating the research proposal. Such secondary data include study reports, manuals, survey reports, officially published data and other related published papers. Also some of the local literature and some unpublished papers were obtained from the offices at the local and national level. From these studies, it helped to get a better insight of the topic regarding irrigation development and the present day irrigation systems of Nepal and the two communities. The previous findings related to the similar researches even helped to compare and contrast the findings from this study.

3.4.4 Data Management and Analysis

Secondary data including the data collected during interviews, group discussions and daily observations were organized and recorded in the laptop. Texts recorded during the interviews were condensed and compiled into short forms and categorized into different themes. Comparisons of the data obtained from the literature and the field work was done whenever needed. Finally, all the related information obtained from literature review and other methods were managed, examined and analyzed to get the final report.

Chapter 4. Results and Discussions

This chapter deals with the results obtained from the analysis of the interviews and the qualitative information of the informal talks and observations made during the study.

4.1 How 'participatory' is the approach of Participatory Irrigation Management: Past and Present.

In this section I present the results of the past history of how the irrigation systems in the communities evolved and illustrate how participation was taking place before PIM in 1990s and how the situation is now at present after PIM.

4.1.1 Historical evolution and participation in the two irrigation systems

This section discusses the historical development of the two irrigation systems and how users participated in constructing and forming a WUA.

The malarial infested Chitwan densely covered with forest became attractive to most of the hilly people after King Mahindra announced that the region will be opened for the settlement in 1957 A.D. "*There were all forest and no land for cultivation*", was the most commonly heard phrases when I conversed with the farmers and the members of the WUA. Feeling nostalgic, Om Bahadur Basnit, one of the oldest farmers and the first one to come to Chainpur tells the story of how he had come from Gorkha. He had come in 1957 and he remembers that only six people came to the village of Chainpur. There were already Tharus and Kumal living a bit far away from the village of Chainpur. He could choose where he wanted to live and settle. He chose a place where there was a river flowing next to the land. There was already a demarcation between the government land and the land where the migrants could settle. The rule of the King was that any migrants could get a land no more than 4 bigha land for a family and had to clear the forest and start cultivating. So, over time, many people started to migrate to Chainpur and also Pithuwa and the forest were cleared yearly for cultivation. Later in 1969, a cadastral survey was conducted after which the migrant had to buy the land for settlement in the two villages. The surveyors did not measure the land which was not cultivated. Some families got 4 bigha while some even had 6 bigha of land like Tilak Bahadur Thapa, the local leader of Pithuwa community that time.

Om Bahadur Basnit remembers that it was very difficult to get water for cultivation and mostly depended on rainfall for cultivation. He started growing rain-fed rice, maize and mustard. Realizing the need for water for cultivation, in 1963, 21 farmers in the village of Chainpur gathered and went to the forest near Kair khola to construct a canal. They had to go to the forestry office which was located nearby the village to get the permission of cutting down the trees. The 21 farmers took two months to complete 5 Kms of canal after which they started paddy cultivation. Later more people joined in constructing the canals as a contribution which he referred to as "*Shramadan*". All farmers that time agreed that if they see water somewhere and if they could construct a canal, they will get something out of it. They all worked eye to eye and little or no conflicts were seen that time. Later, some people started to be absent for the work and had to pay NRS.2 which was considered to be a very high amount that time. Some debates and conflicts started to arise as more and more people became users and more people had different ideas. The idea of committee just generated from the debates and disagreements that sprouted from the conflicts within the users. It was during the construction of the canals he said, when some people were absent someone was needed to mark who was absent so that they could collect the money from the absentee later. Gradually there was a formation of committee with the farmers forming their own rules and regulations. He was elected as the treasurer of the committee for the first time. Later in 1990 A.D, the WUA had to be legally recognized by the District Irrigation Office in Bharatpur.

The story above clearly illustrates how the farmers participated in the development of the irrigation system and how they formed a WUA according to the consensus among them. Although it is still unclear whether all the farmers of different levels like poor had participated equally and benefitted according to the work they have contributed, there were platforms for negotiations as they had debates going on.

While in Pithuwa, the similar story of migrants, malaria and forested areas were told but with a little difference in how the irrigation system started and how the WUA was formed. Pithuwa irrigation system as seen in the literature was initiated under the Minor Irrigation Development Program of His Majesty's Government in 1966. Before the irrigation, the migrant farmers in Pithuwa used to grow only maize. *"Those were the difficult times. Forget about irrigation, it was difficult to even get drinking water"* mentions the previous Pradhan Panchayat (Village Headman), Tilak Bahadur Thapa who is now 80 years old. He was also the first chairman of the WUA of Pithuwa Irrigation System. According to him, Pithuwa was under the Jhutpani Panchayat under the Rana Regime and later in 1966, it became another Village Development Committee in which he was the first elected Pradhan Panchayat for twelve years. According to the many farmers that I talked to said that the Minister of the Economic Affairs, Ratna Prasad Kharel who was already in Pithuwa had some hand in influencing the government for choosing Pithuwa under the Minor Irrigation Scheme. Tilak Bahadur Thapa also agrees and said that they became to know each other and that the land on which the VDC building stands is also contributed by the Minister.

The system after the construction in 1975 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 Pithuwa VDC. Later in the same year, a prominent and charismatic farmer who had migrated from western Nepal who was a Junior Development Officer and had a prior experience in providing leadership in a Farmers Managed Irrigation System Organization in the village of his origin, realized the need of users organization and started organizing the farmers of his branch into a user group. The branch number was Number 8 and an executive committee of the user group was constituted including the chairman, a secretary and members for day to day operation and management and also decision making. This gradually passed on to other branch canals and all branch canals (16 that time) had formed user groups. Later in the same year, the users initiated the formation of the federation of branch level water user groups and thus the Water User Association was constituted.

From this historical background of the two irrigation systems, I draw the conclusion that in Chainpur irrigation system which was a farmer initiated and managed was already in a position to organize themselves and according to the storylines from the old immigrants, there was no problems about water distribution and was enough for all the users. There existed conflicts which was regarding the unequal labour contribution. Thus it can be said that negotiation and decision making were carried out including all the users. While in Pithuwa, even with the government initiating the system, the accessibility to water by the middle and the tail end was not equal or not there at all. In other words there was no inclusion of all the users and according to the farmers it was always the powerful and the wealthy farmers who were the beneficiaries. The following table shows the differences of the two irrigation systems and the participation processes in the past.

Past	CIS	PIS
Differences	1. Farmers initiated. 2. Gradually formed WUA with the consensus of all the users. 3. No conflicts caused due to the inequality in water distribution. 4. Inclusion of all users in decision making and negotiation in formation of WUA. 5. There were few farmers. 6. Had to contribute either labour of irrigation fees.	1. Government initiated (good connection with the higher level official) 2. Left at a state of anarchy and many conflicts were created. 3. Head users were the only beneficiaries. 4. Branch Number 8 formed the user group which gradually passed on to other branches and thus finally the WUA was formed. 5. More farmers. 6. Had to contribute irrigation fees.
Similarity	1. WUA formation by farmers	2. WUA formation by farmers.

Table 3: Differences and Similarity between CIS and PIS in the Past.

4.1.2 Present Systems and Participation

4.1.2.1 WUA in Pithuwa Irrigation System

It is visible from the walk along the canal about how the WUA in Pithuwa is organized around the irrigation system. There are two tiers of irrigation organization. One is the branch level committee and the other is the main level committee. The gate opener of Pithuwa Irrigation System is responsible for the opening and closing the gates for the main canal and not the branch canals. The branch canals are opened by the farmers whose turn it is to irrigate. The branch level committee is formed by general assembly of the farmers of respective branch canals each year. The functionaries of branch level committee include a chairman, a secretary and 3 to 5 area members depending on the area served by each branch.

The main level committee is composed of a chairman, a vice chairman, a general secretary and the 23 branch chairman who are all elected by the users of the respective branches. The chairman of the main canal committee is also elected by the farmers in a General Assembly. The tenure of the main committee is for four years. There has to be an election after three years whereby the farmers elect the members of the WUA during the general assembly as per the constitution of WUA. However, while interviewing the ex-chairman of the main canal of the WUA he said that he served for fifteen years because the people elected him.

The monthly meetings are carried out by the members of the WUA and the decisions are made by these members. The information of what the decisions have been made has to be passed on to the lowest users possible according to the constitution. This has to be done by carrying out the meetings between the branch committee and the users. According to the interviews of the farmers at the tail ends, there seldom is a meeting held monthly between the branch committee members and the users.

This illustrates the different levels of WUA where the users have to first go to the Branch committee for issues relating to water like conflicts which is then sent to the main level committee to resolve or to approve. This also indicates how the information flow does not take place systematically and how the decision making are in the hands of the members of the WUA only.

4.1.2.2 Water Distribution in PIS

The water allocation to the branch canals is based on the area of the land according to the members who I have interviewed. The strong gates of the main canal opening to the branch canals could be opened only by the wrench of the gate opener. According to the gate opener, there used to be pipes but that caused conflicts as there was no proportional distribution of water according to the size of the land different branches. But they also have to pay the irrigation fee according to the size of the irrigated land which at the moment is NRS.20 per katha. During the time this research was conducted, it was the time of dry periods. Water was distributed according to the rotation system and the schedule for the different branch canals were made by the main committee members while the users had to request the chairman of the branch committee to irrigate their land. According to some members, it could also happen that the schedule will not be followed as some farmers of the branch canals were in need of more water according to the crops they have grown. During the time of the research the banana saplings were given the priority and most farmers who were growing maize did not get water.
According to the farmers and the members of the WUA interviews, in the rainy season there was no rotation system 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 watch played an important role during this time of the year. The time of irrigation was according to the bighas of land the farmers owned. The time of irrigation was 3 minutes per *katha*. The farmers made sure the watches on them told the same time as even a second made a difference in the flow of water.
Through the transect walk I observed that starting from the middle to the end of the branch canal 8, the maintenance was very poor and when I interviewed the farmers at the tail end, they said that they never got water during the dry periods. The first thing they told me was that they do not receive any water during the dry season and the water they get during the monsoon according to the rotation schedule made by the chairman and the secretary of the branch canal is not enough. The production is low and they want to have more time for irrigation but they do not know to whom to ask and request. According to them, there is no meeting held at all and even if there is one, they do not know about it. "Only the local elites seat in the meeting and they do not consult or listen to the public", says one of them. It would need a lot of effort and convincing for one individual to ask the chairperson and the secretary for increasing the time of irrigation, thus they need to cooperate and request to them in a group. It was observed that the farmers would discuss in groups but they do not have the freedom of speech to speak and request for more time for irrigation that affect their livelihood. They did not have a platform to negotiate with, control or have influence on the decisions made by the members of the WUA in PIS. Thus this indicate that there is no equal participation taking place in PIS especially the ones at the tail ends who were found to be poor as per the PRA.

4.1.2.3 WUA in Chainpur Irrigation System

The WUA has a chairman, vice chairman, secretary of the committee, treasurer, vice secretary and two members who are paid and they are the office secretary and the gate opener. The money for their salary is also collected from the farmers as the irrigation fees from the farmers. Unlike the PIS, the 10 branch canals in the Chainpur irrigation systems are grouped into 4 areas. Under each area there is a member for each branch who is responsible for the respective branches and

is monitored by the member of the area. The branches 1, 2 and 3 are under area number 1, the branches 4, 5, 6 are under area number 2, branches 7 and 8 under area number 3 and the branches number 9, 10 under area number 4. There are 2 female members and according to the secretary, they contribute in giving the decisions during their monthly meeting. The formalization of WUA took place in 1992 when the farmers had to make their own rules and regulations of the system. There were already an existing informal WUA where the farmers were already following some rules of their own formed through their own experiences. The members of the areas are elected by the users of the different branches and the member of each branch is elected by the users of the respective branches. Like in PIS, there are meetings conducted every month where mainly the issues of conflicts and the maintenance and operation of the canal are discussed. 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. Like the chairman, the secretary has been in the same position for the last 10 years. The secretary and the gate opener sat for the exams to get the respective positions and they will be serving the same positions throughout their lives. The secretary was paid NRS.4500 and the gate opener was paid NRS. 3000.
Most farmers that I interviewed 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.

4.1.2.4 Water Distribution in CIS

The rotation for water allocation is same as that of the PIS. The time for irrigation is proportional to the size of the land owned by the farmers, thus the bigger the land, the more water there is. The farmers pay the irrigation fees according to their capacity. For Bagbhati Neopani, who was the former female member of the WUA in Chainpur owns 2 bigha land pays only for 25 katha of their land. According to her, there has been an improvement in the system with fewer conflicts since the change of the gates installed through the project of the East Rapti. During the monsoon, there is enough water so all the fields of the farmers of the wards number3, 8 and 9 get enough water for paddy cultivation. But in the winter, there is rotation system and the farmers have to wait for their turn to irrigate their fields. Like Bagbhati who gets 1 or two times during the dry seasons of four months, many farmers have to wait like her or sometimes do not get water at all especially the ones who are the end users.
Through the transect walk, I observed that the canals were well maintained although unlined. According to the farmers at the tail end, they at least received once in the dry period but the problem is that the upstream users steal the water. According to them, there is a deep tube well funded by the government to help the tail end users for which the members of the WUA are not doing anything.
According to the farmers interviewed, only the farmers who have a strong political background and doing economically good talk in the General Assembly and the decisions are already made by them. There was a recent increase in the irrigation fees in CIS from NRS.50 to NRS.60 per katha and the users were not asked for approval. It was just announced in the General Assembly and the farmers had to pay it before Baisakh (New Year in Nepal). The farmers had to pay because otherwise they will not be considered as a user and will be not given the water for irrigation. The following tables show the differences and the similarities between the two irrigation systems at present.

Figure 5: Canal in Branch Number 10 of CIS

Figure 6 : Branch Number 8 of PIS

The figure as discussed above shows how the farmers manage their branch canals. In branch number 8 after the middle part of the canal, the canal are either blocked by the sand as shown or are totally destroyed and some parts have even become flat without any canal. While in CIS, at the middle and up to the end, although water distribution is unequal, farmers still maintain their canals by themselves.

Present	CIS	PIS
Differences	1. Irrigation Service Fees paid based on the capacity of the farmers. 2. Canals well maintained (Branch Number 10).	1. Irrigation Service Fees paid based on the area of the land. 2. Canals well maintained (Branch number 8)

Table 4: Differences in the two irrigation systems at present

Present	Similarities between the CIS and PIS
Similarity	1. WUA officially registered. 2. Two tiers of organization. 3. Irrigation Service Fees made mandatory. 4. The water allocation is on the rotation basis. 5. There exist unequal water distributions. 6. Decision making by the members of the WUA. 7. Poor flow of information. 8. No platform for negotiation.

Table 5: Similarities between CIS and PIS at present

This section showed the past and the current situation of the two irrigation systems and structure of the WUA to show how the system was managed and is being managed and how participation takes place in the decision making, information sharing and negotiation. The users have to firstly deal with the branch member or the secretary or the chairman who sometimes do not even bring up the issues in the main canal meeting. When there is no meeting held especially in the branch canals, then there are no place where the users can suggest for improvement. In both the systems, there are only meetings during the rainy season either for cleaning the canals or for making the schedule for water allocation.
The next section presents the different processes of participation using Hobley's typology.

4.1.3 Process of participation taking place in the PIS and CIS

This section examines the different types of participation taking place in the two irrigation system and the effect the different types have on the water distribution to the different groups of farmers. It also shows who participates and who do not and the reasons behind the participation and non participation. After the types of participation are explained, I attempt to analyze how these are not fit into the objectives of PIM approach thus, misleading or misinterpreting the essence of the word "*participation"*.

Type 1: Manipulative participation

The presence of female members in the WUA in both the systems can be said as manipulative participation. There are two female members in both the systems who attend the meetings and sometimes come to visit the WUA office. While attending one of the monthly meetings of the WUA in PIS, I could not help but notice how the selection of the committee members in WUA is manipulative. The discussion was mainly about the construction of the service road along the main canal. Some members were against the idea and some were really for it. I could notice that all the members talked and gave their views and opinions on it. Out of the two female members, only one had come to attend the meeting and all the members having given their opinions, I was waiting for the female member to give her views. But she did not even speak a word. And when the decision was finally taken to construct the servicing road along the main canal, the female member, Laxmi Shrestha was selected as one of the member committee for the activity. There were few who were disagreeing to become the member but she did not say a word nor was she asked about her opinions. The secretary while selecting the member even said that it is according to the law and policy that there has to be a female member.
In CIS, the female member was from the Kami caste and like the female member in the PIS; she did not have any active role. Kaushila Bika is a simple lady and the way she interacted with the people around her, one could easily notice that she did not have a leadership quality. I tried to interact with her and called her for the PRA, where I noticed how withdrawn she was from the rest of the group. When I asked how and why she was selected as the member of the WUA, most farmers did not know who the female member was and the secretary gave me the same answer as the secretary in PIS; *"Because the law and policy says so".* This indicates how manipulative participation takes place in both the irrigation systems.

Type 2: Passive Participation

Information sharing and the flow is also one of the way how participation can take place. While the important decisions are taking place in the meetings held in the WUA office, it can be said that the users do not receive what the decisions have been made.
In the PIS system there are two tiers of irrigation organization. One is a branch level committee and the other is a main level committee. In the monthly meetings of the WUA, only the branch level committee members consisting of the chairman and secretary and the elected members of the main canal committee sat in the office of the WUA. The decisions made about the construction road along the main canal had never reached the farmers. It was an important

decision as the land of most of the farmers had to be excavated to construct the road. According to the secretary of the branch number 8 who was also selected as one of the member of the road construction activity, the constitution of WUA says that there has to be 3 meters of distance between the main canal and the field of the farmers. So according to that the road was being constructed. However, at some point the work was stopped as one of the farmers who had already finished sowing the maize in his land and whose land was less than 3 meters away from the main canal, laid in front of the excavator. He said that if the excavator has to proceed, it will have to be over his dead body. He had not known about the decisions made by the WUA members and no consultation was made. The work was halted for a day and there was negotiation, that his field will be ploughed again for free but the other land which he had sown maize did not belong to him. Downstream of the main canal, there were many farmers who had the same situation. The secretary of the branch number 8 along with some members of the WUA had to negotiate and persuade the farmers. Clearly there was not even a consultation, let alone the consensus.

In the CIS, I was invited by the chairman of the WUA to attend the annual meeting (the General Assembly). It was held at the *"chowk"* where most farmers gather and it was an open hall with just a roof. Just next to it was a big tree. There were chairs arranged inside the chowk where the well dressed mostly men sat, whom I later found out were the members and also rich users. Most farmers came and were made to sign in a register. Farmers who looked poor went under the tree to sit. The chairman and the former chairman of the PIS were also present. Few female farmers came but signed and left even before the chairman of CIS started his welcome speech. The General Assembly lasted for about 3 hours with reading out of the activities that have been accomplished in the past year and the future plans for the next year. The budget was also read out. But before that, the chairman said; *"there is not going to be any discussion as it is going to take a very long time, so I will be reading out and you will be listening".*

It was observed, that only the ones who were sitting on the chairs were listening and the farmers who were sitting under the tree were talking to their own groups and I was sure that some of them did not even hear what the chairman and later the secretary were reading out. After the meeting, there was another meeting of only the members of WUA and no outsider was allowed to attend the meeting. Thus, there were only unilateral announcements and no views and opinions were asked from the users, even when the General Assembly was thought to be the only platform for the users to participate meaningfully. Thus, these examples illustrate how the passive participation takes place.

Type 3: Participation by Consultation

This can be explained in the PIS when the construction of the canal started initiated by the government through the Minor irrigation Scheme. Although to some extent, the farmers were also involved in bringing the project to Pithuwa as they had requested it, it was clear that the designing and the decision making were not in the hands of the community. The absence of the branch canals and the state of anarchy right after the construction of the canals demonstrates the level of participation of the users. This type could be explained even within the community where the consultation did not exist. The clear example is the decision made by the members of WUA and how the information on the construction of the servicing road along the irrigation canal without any consultation with the farmers.

In CIS, as the irrigation system was self initiated, this type of participation was not found. But within the community, this typology also did not exist. It is clearly illustrated by the example of the increase in the irrigation fees by the members of the WUA without any consultation with the users. While interviewing the farmers at the head end of the Branch number 10, they did not know about the increase of the irrigation fees and also the deadline for the payment. I was the one giving them the information.

This demonstrates that there was no participation by consultation and users were not consulted either by the government in PIS or the members of the WUA in CIS and PIS.

Type 4: Participation for Material Incentives

It is common to see this participation in both the irrigation systems but with few differences from the characteristics explained by Hobley (1996). It can be said that this participation type was present since the beginning of the construction of both the systems. In PIS, farmers contributed labour for the repairing and maintaining of the canal in return for getting water to their fields. Until 1985 the annual repair and maintenance of the PIS was borne by the government and farmers provided labour who were paid wages as per the government's norm. According to Ternastrom (2001), since this time the WUA has been mobilizing the labour from among the users and the annual maintenance grant provided by the government was kept aside to pay for the fuel and cost of food for the excavator operator.

It is different from the characteristics provided by Hobley, because in PIS, farmers learnt through their own experiences. The farmers initiated in forming the WUA and being the users themselves requested the government to hand over the system to them. Initially until 1990 A.D, the government treated the system as the government managed irrigation system and like any other government managed irrigation system; the users were required to pay the irrigation fees. Since the operation and maintenance was already taken over by the WUA which the farmers formed themselves, the WUA requested the authority of collection of irrigation fees to be transferred to them. The authority was transferred in 1989.

In CIS, as the farmers initiated the construction, there was labour contribution from the farmers who wanted to use water from the irrigation canal. Like the farmers of the PIS, the farmers in CIS were also involved and learnt through their experiences and eventually formed WUA.

With these examples, participation took place in both the systems depending on the needs of the farmers.

Type 5: Functional Participation

At the level of the community and the government and later the East Rapti Project, the functional participation existed in both the irrigation systems as per the characteristics provided by Hobley (1996). The government while constructing the irrigation system in Pithuwa, had involved the users but just as labours and one of the main objectives for involving the users was to reduce the cost of construction. Later after handing over the system to the WUA by the government, the WUA requested for the East Rapti Project in 2052 B.S. (1995 A.D). The ERIP's rehabilitation and improvement assistance was provided in three phases and the users were made to share their contribution in three phases. According to the checklist of Ternastrom (2001), the farmers contributed NRS. 3, 6 and 12 only, per katha for the first, second and third phases respectively. In addition the farmers also contributed labour. In the process of rehabilitation and improvement, the main canal was lined at critical portions, outlet to the branch canals and the water distribution structures were improved and cross drainage works and culverts were constructed. Thus, the cost from the government and the project was reduced. In the case of PIS, both the goals of the external agencies which in this case are the government and the ERIP were achieved by reducing the cost and also the goals of the farmers were achieved by improving the system. According to the description of Hobley's, as the cost was reduced from both the government and the project and the users also participated to meet their demand, it is a functional participation. Although the decisions made were by the government and the project.

In CIS, the ERIP also came at the same year and the strategy used was the same as that in the PIS. There was a shared decision making in the ERIP and the users in the rehabilitation and the improvement of the system. The canals were re aligned according to most of the farmers that I interviewed and the situation became much easier after the implementation of the ERIP in 1996. But according to some farmers at the tail end, they had to go and contribute labour to get the water for irrigation while some farmers were paid wages for supervising the work.

It can be said that although it could be said that there were functional participation taking place, there was no equal participation.

Type 6: Interactive participation

In PIS, there were debates of the collection of fees from the users either by the government or by the users themselves. The collection of fee in itself was confusion to the users with no analysis on why and how much fees to be paid to the government and later to the WUA. According to the farmers interviewed, the water was not delivered if the users did not pay the irrigation fees. Thus this shows that there was no interactive participation in PIS according to the characteristics provided by Hobley (1996).
In the case of the CIS where, the users could contribute labour but later according to the farmers it was made mandatory to pay the irrigation fees for being the users of the irrigation system which became effective after IMT program. This shows that there was no interactive participation because the farmers were not willing or happy to pay the irrigation fees.
Thus, interactive participation does not take place in the two communities.

Type 7: Self Mobilization

Both PIS and CIS can be said to be of this typology because in CIS, the users initiated the construction and forming the WUA for having equal distribution and allocation of water to all the users independently and in PIS, the formation of WUA was the initiation of the users without any help from the external agency. Both the systems contact the engineers of the District Irrigation Office in Bharatpur when needed but retain the control of how the water is used and distributed.
With the definition of participation especially focusing on the empowerment, one can easily witness that empowerment do not take place in the two communities especially the poor who hardly have the freedom of choice and control or even influence. For example in Chainpur, although, they are encouraged or sometimes forced to participate in the meetings (General Assembly), it was observed that they are called there to listen to the activities undertaken and about the future plans. The decision making processes are only in the hands of few who are the members of the WUA and the others have no say in it. It was just a representational participation and I agree with Cleaver (2006) who mentioned that the representational participation is not enough to say that the objectives of the farmers are met. The farmers when asked about their participation in the meetings said that they came for the meetings to avoid the payment which is kind of a forced participation.
In conclusion, by looking at the different types of participation taking place in the two systems, most participation do not fit the definition of participation in the context of PIM as interpreted and defined in the conceptual framework especially considering the voluntary contribution, decision making, implementation and control.

4.1.4 Is there Empowerment of farmers at all levels?

To answer the sub question of whether empowerment takes place or not, I repeat the definition of the empowerment by Parker (2002, p.14) as *"expansion of freedom of choice and action"* and show how this does not exist for the marginalized and poor groups of farmers in the two irrigation systems. According to Boelens (2002, p. 146), *"participation in the empowerment sense refers to the defense of and advocacy for the objectives and interests of the least privileged groups in negotiation and confrontation forums: the arena of struggle and consensus-building that lay the ground work for irrigation development."*As the concepts of power and empowerment are closely related, I will use both the concepts together and I use the statement used by Callejo et al., (2009, p.45) which says that, *"empowerment may be a strategy favoring an increase in power of marginalized groups that can gain access to the use and control of material and symbolic resources, participate in and influence change."*

To answer this sub-question, I located poor farmers who were mainly the focused group for interviewing and collecting information on how they participated in the management of the irrigation systems from the map constructed by the farmers during the PRA and the wealth ranking process,

Power plays an important role and is an important input in the process of struggle and empowerment for the people of PIS and CIS. It is through the different forms of power like social and political forms, farmers get access to water and with power one can maneuver the distribution of water. I will discuss how in the two irrigation systems of Pithuwa and Chainpur, the struggle of farmers at the tail end of the systems and the low caste, economically and socially poor background farmers exists even when the rules and regulations are written in the constitutions of the WUA for equal distribution of water to all the fields of all the farmers mainly the tail end, poor and lower caste farmers. The forces and relationships in the society can modify the rules and increase the gap between the rich and poor instead of reducing it.

In PIS, as per the rule of the WUA, the water is distributed in the rotation basis during the dry season for the branch canal. Within the branch canal, the farmers request either the secretary or the chairman for irrigating their field. The rotation schedule for the branch canals is made according to the sequence so that every branch canals gets equal chance of irrigating the fields of the farmers in the different branches. According to the sequence of irrigation, when I was there, it was the day for the branch number 12 to get the water. It was a season for growing maize and every farmer were requesting their respective branch canal member or the secretary for the turn to irrigate their field because they need to irrigate once before sowing and another one after that. I went to ask the gate opener whether I could accompany him for opening the gate for the branch number 12 in the WUA office. He said the rotation has been changed to branch number 14 because his field needed water which was in branch number 14. He said that he negotiated with the secretary of the branch number 12 to irrigate his own field. But all the farmers in the branch number 12 equally needed the water as the gate opener as most of them were planting maize. While talking to one of the old farmers in the branch number 12, she said that she had gone to request for her turn, but the secretary said that there is no water in the main canal and is not enough. She did not even know that it was the turn of the branch number 12 for irrigation. The secretary of branch number 12 had agreed to the gate opener's request without getting the consensus or even consulting the farmers in his branch. In the family of the old women, she and her old husband are the only ones who work in the field. If empowerment is the expansion of freedom of choice and action, where is the freedom for the old couple who wanted to irrigate their field at the same time as the gate opener? Their freedom of choice was deprived when the secretary told them that there was no water in the canal. Even when the couple had the equal right or was in this particular case had more right to irrigate their fields than the gate opener; they were deprived off their rights because they were old and were not aware. It indicates how the political power of deciding the rotation of the irrigation schedule is in the hands of the gate opener.

At the level of the community, it can be said that there are few who are empowered and have the freedom of choice and action and are able to influence the decisions as they are the ones deciding. But where is empowerment at the level of individual farmers especially at the tail end farmers who being the part of the community do not get any opportunity to raise their voice or give opinions?

The other example where empowerment do not take place in CIS is clearly given in the typology 3 (passive participation) where the farmers are called to listen to the activities that have been undertaken and were not given any opportunity to discuss about the future plans. Moreover, the farmers had to pay a fine of NRS.200 if they did not go to attend the meeting. So each member of a household should go to the General Assembly according to the constitution of WUA. The time for reaching consensus was often too short in the General Assembly. It was the people who could speak out loud and have good public relationships and are the richer farmers of whom the

views and decisions are taken. The poor are not accustomed to being asked questions or views and to take decisions.

4.1.4.1 Disempowerment of the Lower Caste

It is continuations of the previous section also answering the research sub-question of whether empowerment of all farmers at all levels (poor, middle and rich) take place in the two irrigation systems.

There are different levels in the two irrigation system which are marked by the different socio economic well being and the especially the caste system. It was found that even if the lower caste people were economically wealthy, there were some differences and difficulties in accepting the issues raised by the lower caste people. Although the farmers claim that all people are treated equally and the caste system have been abolished since 7 years ago, the differences could be still felt even among themselves. One such farmer is Phoolmaya Parihar who had come to settle in Chainpur. She is from a Damai caste and owns 2 katha land. For her to irrigate her field, she has to use the land of another farmer through whose field the branch canals are constructed. She had not known of the schedule and missed her irrigation turn for her field. She went to the office of the WUA but was told that it was her own fault of not being aware of the irrigation schedule. "*The rich and the better off farmers tend to find faults in the poor farmers like us even when we try to stay away from problems*", says Phoolmaya. There was no room for her to negotiate.

One of the newly settled immigrant farmer who is also from a kami caste in PIS, says that she has to listen to lots of scolding from her neighbors to irrigate her field. Shanti Parihar owns a big house and just behind the house was her field of 10 katha which is comparatively big. She is economically doing good as her son is outside the country working and sends her money. As she was not so familiar with the rules and regulations, she had once opened the gate to irrigate her field when she saw the water in the branch canal. She was scolded by all the farmers from all the sides, the upstream and the downstream.

There are farmers like Phoolmaya and Shanti who have to struggle to get access to water. Although the committee members say that the priorities are given to the poor and also to the ones where there are no male farmers, it was written only in the constitution but not practiced.

With the concept of empowerment defined as above, I conclude that no empowerment of the poor people takes place in both the communities before and even after the PIM approach. Thus, it can be concluded that in a place like Nepal where there is a major social differences because of the caste system, the forums and arenas of consensus-building for negotiation especially for the poorer and the lower caste people is difficult.

4.1.4.2 Power and Water Accessibility

Here I explain how through different forms of power that exists, the users get their share of water. I show the different forms of power for which the different political parties struggle using the WUA as a political platform and to control the use of the irrigation systems.

In PIS, the empowerment related to social power is evident from the farmers maintaining their relation with the gate opener who has a very big influence in distributing water especially during the dry season. There was one political meeting at the same time as one farmer wanted to irrigate his banana field. He had come to the office of WUA to request water for his field. The farmer was explaining that he has three appointments and was saying that he would not be able to attend the political meeting. The reply to that by the gate opener was; *"you know what will happen to your field"*, meaning that if the farmer did not come for the political meeting, he will not be opening the gate to the branch canal where the farmers field is located. This shows how powerful the gate opener is as one of the member of the WUA and also the chairman of the Congress in the ward number 3 of the Pithuwa VDC.

To get access to the political power which is to get access to the decision making process especially in relation to their own future for an individual is negligible or difficult in both the systems of the PIS and CIS. In a system where there are layers of bureaucracy at the level of the community, the users have to really struggle to access to give their opinions and the process of decision making. Thus, the political power rarely exists.
The psychological power is understood in the sense of individual potential and capability which depends on the ethnic, social and economic background of an individual which can be seen in the farmers of both the communities who are rich and of higher caste. In both the systems, if an individual is of a low caste and is also not doing economically good, the struggle for getting water to his or her field is enormous compared to the ones who are economically doing well and is from a high caste.

4.2 How do Social and Politics affect participation?

In this section, I relate and associate the concepts of socio-technical network and water control on the ground reality and answer my second research question. It is important to understand the social and political elements that surround the irrigation system which are important because of the influences they have on the participation processes of certain group of people in the communities. Thus, by using the approach of socio-technical network of irrigation system through water control, I understand how socially constructed the irrigation systems are in both the communities and how they are managed. The social element around the irrigation system depicted how the users participated in the decision making processes which answered the research question of whether participation was really taking place.

4.2.1 Water Control

In this section, I will explain how water is controlled through the technical artefacts, how organizations at the community level and the socio political elements come into play in the two community managed irrigation systems of PIS and CIS. By discussing about the different dimensions of the irrigation system, I discuss how the users are not given the arena to give their views and their perceptions.

4.2.1.1 Technical Dimension of the irrigation systems

Relating the definition given by Mollinga (1998,2001), I explain the technical dimension as the physical forces to control the flow of water and how the water is captured, controlled and distributed technically through the physical artefacts in the two communities.
The water in the two communities is not enough for irrigation during the dry seasons which falls between Januarys to July. The water in the source which is the Kair Khola needs to be excavated for increasing the level of water in the irrigation canals of both the system. The physical characteristics of the two irrigation systems are not very complicated. Both the systems have main canals and the branch canals and few tertiary canals. The diversions and the outlets to the branch canals played an important role in shaping the system. Although there was no measurement carried out, time played an important factor in determining the water distribution. There was no head works at the source as shown in the figure.

Figure 7: The diversion at the source of PIS and CIS

To control the water in the river it is just a simple control of the stream with the diversion constructed with some piled up stones as shown in the figure 4. So the farmers from Pithuwa and Chainpur divert the water by removing or piling the stones in the stream. This khola cannot be controlled during the monsoon as it becomes flooded due to heavy rain. It was observed that one technical dimension of both the irrigation systems were the gates which was observed to be not very strong and could be maneuvered causing the stealth of water and resulting in no water at the tail end which was the similar case in both the systems. The technical dimension of the gates as shows in figure 5, gives way to for the farmers to steal water and especially for the tail ends, there are not much of monitoring carried out which resulting to conflicts and unequal distribution.

Figure 8: Gates of the Branch canals

The planks were the technical dimension of the irrigation system and were easily removed by the farmers to divert the water to their fields even if the turn was not theirs.

Another physical force to control water is the excavator that the Pithuwa community owns. This physical element has become very important for both the communities. It is also an income generating source for the Pithuwa Community. It is also decided by the members of the WUA in PIS of how and when to use the excavator and according to the farmers at the middle and the tail ends, the accountability of how the money is utilized and how the excavator is being used is not transparent.

4.2.1.2 Organization Dimension of the irrigation systems

To explain this dimension taking place in the two communities, I relate to the behaviors and the different views and opinions farmers have especially taking the head, middle and the tail end farmers into consideration in their daily practices of irrigation.

There are layers of organizations which are formed for managing the water from the source to the field of the farmers. In the source, there are the committee for the excavator from PIS who are responsible for leasing out the excavator to CIS and the accounting of the funds that go and come in the community through the excavator. In both the communities, although not formally distinguished, there are head end farmers who get most of the water and also are the ones who steal the water by extending the hours they are allocated, and there are the tail end farmers who get less water. But the farmers in both the communities are equally contributing in the labor as well as paying the irrigation fees as per the rules. The farmers in these two groups had different opinion on the WUA and the ways they were managing the system. As the farmers in the head were getting more water, they were satisfied with the WUA while the tail end farmers were not happy and were also economically poor. The tail end farmers did not get the water during the dry season but could not do anything about the situation.
It was observed that for every activity related to the irrigation, a committee was formed, for example to construct a servicing road along the canal or for the excavator or for the drinking water purposes. But the members of all the committee were all the same from the members of the WUA indicating that the decision making were in the hands of a few.

4.2.1.3 Socio political dimension of the Irrigation System

In this section I will refer to '*water as politics'* in the two irrigation systems which involves political actions where WUA is used as the political platform and the WUA members are the political actors. I discuss the politics of water at the local level with social relations of power shaping and being shaped by the daily practices of irrigation and how theses affect participation. Firstly the word politics as to be understood for which I use the definition used by Mollinga (2008, p.8) as "*any activity concerned with the acquisition of power*" and "*maneuvers or factors leading up to or influencing (something)*". With this definition of politic, I attempt to show how the different social processes are involved in the two irrigation systems and how all these social processes involve the mediation of the interests of different farmers.

In PIS, the first chairman of the WUA was by default the local headman (panchayat) of the community. After the registration of the WUA in the DoI in Bharatpur and drafting the first constitution of the WUA, election of the members of the WUA started with the start of the politics. According to Tilak Bahadur Thapa, who was the first chairman of the PIS, says *"the WUA is all about politics".* He sees the differences in how the irrigation system was managed before and managed now. He says that before people used to listen to him but now there are many people who like to talk and exert power and have their own ways (referring to the Maoist which is a party politics). He said that before there was only one party politic (the Congress) who used to decide on the management of the system but now there are three party politics who give different views and opinions and which are always opposing to each other.

It was observed that the social interactions between the farmers were also involved with the politics. One cannot ignore how politics is embedded in the society which is visible in the process of the election of the members of WUA. To be a committee member of the WUA is a prestigious and an advantageous position. To become a chairman of the branch canals in the PIS means getting their field ploughed for free by the tractors which are rented by using money collected from the users of the respective branches. It can be easily seen that the WUA is a platform to exert power, hold a position where one can do what he or she wants to do and be

respected in the community. But it is not easy to get the opportunity to be the members of the WUA. One needs to be have a good link to powerful and rich people and politically active.

Another facet of politics in the PIS is the "*relationships involving authority or power"* and *"any activity concerned with the acquisition of power"* (Mollinga, 2008) can be shown by describing the friction between the party politics through WUA. The members would not tell me as an outsider about the process of election, but I got the information through some farmers who are not very fond of the present chairman. The former chairman is respected by the community and he belongs to the Congress party. As he is already a chairman of the East Rapti Project, he had wanted his cousin brother to become the present chairman of the WUA. Thus, with the power and the influences he had over the people in Pithuwa community, he made most of the people belonging to congress vote for his cousin brother who belongs to the UML party. The other reason was to prevent the Maoist from getting hold of the position. It clearly shows how party politics use the WUA as a political platform to gain power and how the elections can also be politically manipulated through the social relations. This also shows that the farmers do not vote according to their own decision but their decisions on voting the chairman are influenced by the political leaders and to the party politics they belong.

The representatives of different party politics are always present during the monthly meeting of WUA to give their ideas and opinions which influence the shape of the management. As all farmers belong to a party, it is likely that a farmer will vote a WUA-executive candidate by taking into consideration to which political party the candidate belongs in both the irrigation systems. Thus, indicating how politics influences the participation processes in the decision of electing the member of the WUA.

The example of the socio political dimension of the two irrigation systems can be illustrated through the process of election taking place in the two systems. The election of the members of the WUA in both the irrigation systems is held once in four years during the General Assembly. The process of election in PIS as explained by one of the farmer has voting system whereby the farmers will write a name and put in the box of their preferred candidate. For the branch chairman, the users of the respective branch canals elect their own candidate. The farmers claim that they select the person who is capable, honest, trust worthy and is hard working. However, some of the chairman in some branch canals, it has been like heredity like in the case of the branch number 8. The father of the present chairman of branch number 8 was the chairman before him and he says that his son will be the next chairman. The present chairman of the branch 8 is also the secretary of the community forest and the drinking water. Although he was the chairman of the branch number 8, he did not really know the situation of the canals which I observed during the transect walk along with the chairman and some of the farmers.
While in CIS, the process of election is different. The voting system is carried out whereby the names of the candidates will be announced in the General Assembly. The farmers are made to clap their hands according to their preferred candidate and the more clapping the crowd will hear, the more likely the candidate is going to win. The candidate with the most clapping is considered to be the winner. This is done for the chairman, treasurer and the secretary of the WUA. As for the branch canals members, the users of the different branch canals are responsible for electing the members of the respective branch canals.

In both the systems, being a committee member of the WUA provides privileges and a position to exercise power influencing water distribution. It was also found that the members of the WUA in CIS get to irrigate their fields for free. For women to be a committee member in both the communities, they have to own a land. In both the systems, it was a male dominant with only two female members each in both the WUA. By looking at the gender dimension there is no equal platform given to the female users to become the member of the WUA.

It can be concluded that there is a direct link between the party politics and the functioning of the WUA. The different party politics involve social process as a way to get authority and power

in the two systems thus determining the day-to-day management and organization of water. The WUA offers an arena where one can exercise power. And these power differences and the fear inside the farmers also affect how they participated in the irrigation management especially in the decision making process of election of the members of WUA.

4.3 Other Factors Affecting the Participation Processes

In this section I answer my third research question of the other factors affecting the participation processes.

Some of the factors which affected participation and were evident from the two case studies were the gender differences which in turn were based on the traditional and cultural norm of the communities. Women participation in decision making process in the management of the irrigation system was not seen as a normal thing to do or to be accepted. It is a tradition and culture in Nepal especially in the villages that women have no say in the decisions made by their husbands. Even for attending the meetings of the users in the branch canals and also the General Assembly, most women feel that it is the job of their husbands or the sons mainly the male figure that have to go to attend. *"Our work is here at home and we feel comfortable doing the kitchen and field work, not in the office*", was what one of the female farmers told me during an interview. Although they went to attend the meetings and went to ask for water, it is not what they liked to do and felt comfortable in doing. Most women whom I encountered during the interviews as well as for informal conversation had the same opinions.

It also depended on the interests of the female farmers that affected the participation in the decision making process. Although the forum of getting the views and opinions were not really given to the users, even if they were given, I felt that the women would not speak out their views and opinions. According to the female farmers they felt that they were not qualified enough to be listened to by someone. Or even if they spoke out, people would think it is rubbish about what they were talking about. There was sense of insecurity of how the women users were feeling in the two communities. Although they say that the platform for the women has been given and opportunities are more for women compared to how it was before when there was 'panchayat' system, some female farmers whom I interviewed still feel that it will take some time for the situation to change especially in the decision making of the two irrigation systems.

The second factor that was affecting the participation of all the farmers from all levels is economic and social background like the caste system which really held back some farmers from raising their voices. The participation that was seen in the examples above can be said was partial as not all were included in the decision making during the General Assembly and also in the committee meeting. The farmers of the lower caste and who are economically poor are so used to listening to the farmers who are rich and economically stable. The marginal farmers are dependent on the decisions made by the rich farmers and the process of participation still remains a myth at some levels of the community.

The psychological factor can be said to be affecting the participation of the farmers who are from lower caste and economically poor farmers. The farmers of these groups do not feel confident enough to speak out what they feel about the WUA. For example, the farmers at the tail end of branch number 8 felt that they will be black listed by the WUA if they raised their opinions. There are a power differences and farmers of lower caste and the low economic background were frightened of the consequences if they went against the rules of the WUA.

It is one of the main objectives of the PIM for the women to participate in the WUA where they can play an important role in the decision making being one of the maim users. Although few women are seen to be taking part in the meetings, they do not play an active role. By experiencing how women participated in the WUA, I feel that they will be more productive where they feel more useful and more open and comfortable to work at. Like one of the women whom I interviewed and was the former committee of WUA, she thinks that she has more

important things to do than to attend meetings and that her fields need her more than the meetings. The meetings she says was not meant for the women but for men.

In conclusion, other than the social and political factors, there are other factors like the cultural and tradition, the interests and the psychological factors which affect the farmers to participate in the management of the irrigation systems which need to be further researched for the PIM to meet the objectives of including all the users at different levels.

4.4 Dublin's Principle of Subsidiarity

I will include this discussion although it is not a part of my research objective. I find this discussion important as the Dublin's principle of subsidiarity was the backbone of the PIM. I argue that for the PIM approach to be successful and implemented at the ground reality there is more than reduction of the governments' resources that need to be focused. In the light of the results that I obtained, I will argue that there is more to the approach of PIM than just the subsidiarity principle.

"Do *as much as locally, and reserve government support for those levels of the irrigation system that cannot be managed effectively through local resources alone.*"

This principle according to Bruns (2003, p. 19) when put into practice "*involves decisions about how much power water users, their representatives and other stakeholders will have in decisions*" which I do not encounter in my study.
Yoder (1994) mentioned that the IMT for improving the irrigation system management had positive options like a "*strategy to increase irrigation participation in system management*" and "*transferring authority to the irrigators and giving them voice in all affairs of the system*" (pg.87). He also mentioned about the multi tiered organisation with the executive members of the main committee composed of the branch committee members which he says would be a good structure for the information sharing. The points which Yoder (1994) had mentioned about the irrigation participation, information sharing and voice in making decision making which attributed IMT as a positive options were not seen in the two systems.

In the two cases that I have carried out my research on, it is obvious that the government resources are reserved because the management is carried out by the users. The government does not have to recruit the staffs in the WUA for the management of the irrigation systems and does not have to worry about the collection of the irrigation fees from the users. The government did fund the irrigation systems annually which were a very minimal amount. With the approach of the PIM and transferring the irrigation system to the users, the government did transfer the cost of managing the irrigation system on the whole, but in the process, I argue that the government did not pay enough attention to the politics and the social divisions existing within the communities. The major questions about the power of the individuals, groups and the communities are often left unanswered. It can be observed and seen through the results that not all the users are actually involved in making the decision of how the irrigation water should be managed or distributed and even consulted on increasing or decreasing the irrigation fees.

With this I conclude that this principle do not really meet the objectives of the participation in the PIM approach within the community at the ground level in the two communities. Although the responsibilities of the irrigation management are taken over by the users from the government in case of PIS, equal burden or payment of irrigation fees and management of the system was transferred to the users. And in CIS, which was a case of a complete self managed irrigation system, where the communities did not receive any support at the beginning, I argue whether this PIM approach through the official program of IMT was really relevant to intervene. The approach did not help in empowering all the users especially the poor. The differences in the power which existed before PIM approach could still be seen today.

Chapter 5. Conclusion and Recommendations

5.1 Conclusion

It is questionable as to how the meaningful participation takes place in the two communities surrounding the irrigation systems. So this study deals with the changes the PIM approach had brought about through the IMT program. The main source of the study are the primary data collected from the interviews, observations and informal conversations from the two irrigation systems located in Chitwan in Nepal.
It began with the objective of investigating how the PIM approach through the IMT programs have affected the outcomes in the management of the irrigation systems in the two irrigation systems in Nepal by focussing on the inclusion of users at all levels in already existing.
To summarize and to conclude, I repeat the three main research questions and answer them.

1. How 'participatory' is the approach of Participatory Irrigation Management in two irrigation communities in the terai region of Nepal before and after the PIM approach?
For the first research question, in the two systems, with historical evolution and how the management was carried out then and how it is now, it can be said that in the farmers initiated irrigation system of Chainpur, while they were few in numbers, the negotiation and decision making were carried out by including almost all the users and there was no problem in water distribution. While in the government initiated system of Pithuwa, there had be exclusion of the poor farmers especially the tail end users and the system was a chaos with conflicts about the unequal distribution of water. The farmers being the users can be said to make the best and effective decisions for them-selves compared to the external agents.
After the introduction of the PIM approach, with official registration of the WUA and new rules and regulations the farmers said that the water distribution improved, in both the irrigation systems. However, the tail end users were complaining of getting not enough water and of getting deprived of their rotation schedule. Moreover, after the official IMT program through the PIM approach, the decisions were carried out only by the members of the WUA with information sharing not being carried out systematically as per the rules of WUA and with no proper platform for all the users to raise their voice. Thus, it can be concluded that no major differences in the form of participation was brought about by the PIM approach in the PIS.
While in CIS, some changes and differences of participation regarding the decision making, negotiation and information sharing could be found as per the oldest immigrant, Om Bahadur Basnit. He mentioned that all farmers were consulted and involved for negotiations and decision making before which cannot be seen now. But, PIM approach is not the only reason for changes because as discussed, the farmers were few and were easier to negotiate and take decisions in the past.
With the discussions of different types of participation that are taking place in both the communities being manipulative, not functional and only representational and most being forced to participate, it can be concluded that the participation is not a meaningful one and the poor are not benefitted. As there is no meaningful participation taking place in the two irrigation systems even after the PIM approach, I agree with Ostrom, (1992) who said that without meaningful participation of a large number of users in the management or irrigation, there are performance weaknesses in the organization which also means weaknesses in communication, representation, democracy and accountability which may lead to free riding and rent seeking.
I conclude that empowerment of the poor and the marginalised do not take place and the PIM approach has made it even more difficult to empower them. Through the official IMT program, the decision making were carried out only by the local elites and the poor had no influence over them. They do not have any platform to raise their voices or change the decisions and finally the information sharing did not take place as described in the examples above, indicating that empowerment do not take place.

2. How do the social and political factors affect the participation processes in the irrigation management?

For the second research question, the social and political status of the user had a major influence how the users participate in the decision making, negotiation and information sharing to get accessibility of water. It was found that being a female or old and poor had a disadvantage of participation or getting information, let alone decision making and consultation. As discussed above the female had to own some land to be the member of the WUA and most information of the decisions made by the members of WUA were not heard by the old and poor people.

There was an equally influential role of the politics on how the participation took place within the community. It was especially during the election of the members of the committee of WUA, which very much depended on the party politics he or she belonged to. The members were often the important figures with power and wealth, in the management of the irrigation systems as discussed above. It was found that in both the systems, the people used their social status and the political affiliation to be elected in the WUA and then further expand their economic and political power. Thus, the social and politics played a very important role in the participation processes either directly or indirectly.

3. What are the factors affecting the farmers in participating in the decision making processes of irrigation management?

For the third research questions, I explore other factors besides the social and political factors that influence participation through the approach of PIM through the IMT. It showed that the hierarchical structure of the organization which in this case was the WUAs, the social division of the users which are psychologically embedded and also in the tradition and culture posed barriers to the PIM objectives of empowering farmers of all levels through participation. The approach of the PIM is a good theory but is difficult to put in practise.

The poor and the lower caste with no power and especially the tail end users were not seen to be included in the decision making processes and also not given a platform for them to speak out. Even for negotiation, poor people with low economical background and socially discriminated have to increase their wellbeing and security and also their self-confidence to negotiate with the more powerful. Sometimes, when there is already a social divide like the caste system in Nepal, it was found that it is difficult to negotiate even when the low caste people are wealthy.

Thus, it is obvious that if management implies some kind of control over decision making and planning, it is less likely that people with low income and low caste will be considered managers.

5.2 Recommendations:

Based on the study, I recommend the following:

1. Nepal has been emphasising on the participation of the users since the 1960s, and for the PIM to be effective at the ground reality, equal focus on the empowerment with more emphasis on the users should be taken into account by creating platforms for negotiations.
2. The politics of the country although very sensitive and not very stable have been found very influential in both the management of the irrigation system. There are further research arenas in these fields of political situation, government and irrigation systems.
3. Further research on the quantitative analysis of the PIM approach is recommended.
4. Although not related to my study, the study on the effects of the ground water use which is increasing at a very high pace on the farmers' livelihood and on the surface irrigation system would be another important researchable area.

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Annex 1

An overview of the interactions which led to the outcomes discussed in this thesis.

1.1. In Pithuwa Irrigation System

Sl. No.	Name of the informants	Number of interactions	Information Obtained
1.	Gokarna Pokhrel (Gate opener)	>10	The irrigation distribution, operational rules (past and the present), the labor aspect of the old system and the new system, his relation with the WUA and the irrigators, availability of water, his love for his fields, the construction of the branch canals and some historical aspects. His roles and responsibilities as a gate opener.
2.	Bishnu Kattel (water user in branch number 4)	1	Rules and regulations of the WUA, his perception on the rules. His perception on the differences between past and present irrigation system.
3.	Rama Budhathoki (Member of the WUA: Secretary of the Branch number 4)	1	Rules and regulations of the WUA, operational rules (past and the present), labor aspect in his branch canals, his perceptions on the rules and regulations, politics involved in the election of the committee members. His roles and responsibilities as a member of WUA.
4.	Indra Bahadur Budhathoki (Member of the WUA: Chairman of the Branch number 4)	1	Rules and regulations of the WUA, operational rules (past and the present), labor aspect in his branch canals, his perceptions on the rules and regulations, politics involved in the election of the committee members. His roles and responsibilities as a member.
5	Eshore Kumar Shrestha (Member of the WUA: Chairman of the Pithuwa irrigation system)	2	Rules and regulations of the WUA, operational rules (past and the present), labor aspect in his branch canals, his perceptions on the rules and regulations, politics involved in the election of the committee members. His roles and responsibilities as a member.
6	Dil Bahadur Aley Magar(Member of the WUA: Secretary of Branch Number 8)	5	Rules and regulations of the WUA, operational rules (past and the present), labor aspect in his branch canals, his perceptions on the rules and regulations, politics involved in the election of the committee members. His roles and responsibilities as a member. Helped in carrying out PRA with the farmers of Branch number 8.

7	Bhuwan Shrestha (Member of the WUA: Secretary of Branch Number 12)	1	Rules and regulations of the WUA, operational rules (past and the present), labor aspect in his branch canals, his perceptions on the rules and regulations, politics involved in the election of the committee members. His roles and responsibilities as a member.
8	Tilak Bahadur Thapa (First Chairman of the WUA)	1	Historical background of the irrigation system and the changes he has seen during his time on the rules and the regulations of the WUA. His roles and responsibilities as a member.
9	Jayendhra Nath Shrestha (Former Chairman of the WUA, also a political leader)	3	Historical background of the irrigation system and the rule and regulations of the WUA that he has come across. His opinion on the past and the present system. His roles and responsibilities as a member.
10	Santa Mani (Head end user in number 8, former secretary of the WUA)	>2	Historical background of the irrigation system and the rule and regulations of the WUA that he has come across. His opinion on the past and the present system. His roles and responsibilities as a member.
11	Hom Nath Bhattarai (Head end user in number 8)	>10	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members and the General Assembly.
12	Kalpana Regmi (Head end user in number 8)	1	Perceptions on the rules and regulations of the WUA, how she gets her fields irrigated, the social aspects and the politics involved in getting access to water. How she participates in the election of the members and the General Assembly
13	Anil Bhandha (Head end user in number 8)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
14	Munna Bahadur Kuwar (Head end user in number 8)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members and the General Assembly
15	Loknath Pokkrel (Middle user in number 8)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members and the General Assembly.

16	Goma Khonal (Middle user in number 8)	1	Perceptions on the rules and regulations of the WUA, how she gets her fields irrigated, the social aspects and the politics involved in getting access to water. How she participates in the election of the members and the General Assembly.
17	Kalpana Dakkal (Middle user in number 8)	1	Perceptions on the rules and regulations of the WUA, how she gets her fields irrigated, the social aspects and the politics involved in getting access to water. How she participates in the election of the members and the General Assembly.
18	Sabitri Kattel (Middle user in number 8)	1	Perceptions on the rules and regulations of the WUA, how she gets her fields irrigated, the social aspects and the politics involved in getting access to water. How she participates in the election of the members and the General Assembly.
19	Durga Khanal (Middle user in number 8)	1	Perceptions on the rules and regulations of the WUA, how she gets her fields irrigated, the social aspects and the politics involved in getting access to water. How she participates in the election of the members and the General Assembly.
20	Kalpana Singhkara's father (Tail end in number 8)	1	Perceptions on the rules and regulations of the WUA, how she gets her fields irrigated, the social aspects and the politics involved in getting access to water. How he participates in the election of the members and the General Assembly.
21	Sarita Khanal (Tail end)	1	Perceptions on the rules and regulations of the WUA, how she gets her fields irrigated, the social aspects and the politics involved in getting access to water. How she participates in the election of the members and the General Assembly.
22	Ram Kattel (Tail end)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members and the General Assembly.
23	Kopila Bhatta (Tail end)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members and the General Assembly.
24	Okhar Bahadur Thapa (Tail end user)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members and the General Assembly.

1.2. Chainpur Irrigation System

Sl. No	Name of the informants	Number of interactions	Information Obtained
1	Hari Powdell (Gate Opener)	>5	Rules and regulations of the WUA and distribution system of the water for irrigation system. His roles and responsibilities as a gate opener.
2	Bal Krishna Neopani (Present Chairman of the WUA)	3	Rules and regulations of the WUA, some historical aspects of the irrigation system, his roles as a chairman of the WUA.
3	Basu Dev Timal Sinha (OfficeSecretary of the WUA)	>5	Rules and regulations of the WUA and distribution system of the water for irrigation system. His roles and responsibilities as an office secretary. Carried out the transect walk and also helped in carrying out PRA.
4	Kaushila Bika (Female member of the WUA)	3	Her roles and responsibilities as a member, Transect walk and PRA. The distribution of water for irrigation in her field.
5	Om Bahadur Basnit (oldest immigrant)	2	Historical background of the irrigation system, how the WUA evolved overtime, his perceptions of the changes he has seen in the irrigation system, his roles during the time when he first arrived. How he participated in the decision making, implementation in the initial stage of the irrigation system and how he participates now.
6	Edu Nath Dhakal	1	Historical background of the irrigation system, the formation of WUA, how the system functioned before when there was no WUA, his perceptions of the changed he has seen in the irrigation system, his roles during that time. How he participated in the decision making, implementation in the initial stage of the irrigation system and how he participates now.
7	Shree Prasad Pandit	2	Historical background of the irrigation system, the formation of WUA, how the system functioned before when there was no WUA, his perceptions of the changed he has seen in the irrigation system, his roles during that time. How he participated in the decision making, implementation in the initial stage of the irrigation system and how he participates now.
8	Chandra Maya Thapa (Head user)	1	How she gets her field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How she participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
8	Gauri Thapa Magar (Head user)	1	How she gets her field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How she participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.

9	Sabitri Thapa (Head user)	1	How she gets her field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How she participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
10	Roma Maya Thapa (Head user)	1	How she gets her field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How she participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
11	Indra Budhathodki (Head user)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
12	Phool Maya Parihar (Middle user)	1	How she gets her field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How she participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
13	Bagbhati Neopani (Middle user)	1	How she gets her field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How she participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
14	Kalpana Devi (Middle user)	1	How she gets her field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How she participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
15	Indra Bahadur Adhikari (Middle user)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
16	Krishna Prasad Neopani (Middle user)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.

17	Jyoti Raul (Tail end user)	1	How she gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
18	Bupendra Khatri (Tail end user)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
19	Prakash Dawadi (Tail end user)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
20	Kamla Neopani (Tail end user)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.
21	Dol Maya Gurung (Tail end user)	1	How he gets his field irrigated, some aspects of the history of the irrigation system, the social aspects and the politics involved in getting access to water. How he participates in the election of the members, the General Assembly and in the decision making and implementation concerning the irrigation system.

Annex 2

2.1. Participatory Rural Appraisal in PIS showing Wealth Ranking and Community History.

a) Community History (Branch number 8)

Date	Events	Effects on Community
2020-2023 B.S (1963-1966 A.D)	No water irrigation as no irrigation system.	Only maize and mustard were grown.
2024-2031 B.S (1967-1974 A.D)	Main canal started. In 2031 B.S, the construction of branch number 8 started by the farmers.	Only few farmers were able to irrigate from the main canal and most farmers could not irrigate. Only few farmers started to cultivate rice and others could not.
2032-2038 B.S (1975-1981 A.D)	Branch number 8 was still in the process of construction.	50 % of the farmers could cultivate rice and other could not.
2038-2039 B.S (1981-1982 A.D)	Completion of branch number 8.	Rice cultivated by all and helpful for the farmers.
2064 B.S (2007 A.D)	Excavator granted to the Pithuwa Community.	More water to the community for irrigation.

b) Wealth Ranking

Rich Farmers	Medium Farmers	Poor Farmers
1. Owns more than 2 Bigha land. 2. Government employees. 3. Holds Bachelor's Degrees. 4. Owns house in Kathmandu and Bharatpur. 5. Owns car, motor bikes, and many cattle. 6. Gets pensions from the government and also from the Indian government. 7. One member working abroad thus, income from the foreign country.	1. Owns more than 1 Bigha land. 2. Government employee 3. Bachelor's Degree holder. 4. Owns more than 1 motor cycles, and few cattle.	1. Owns 2 Katha land. 2. Works for other farmers. 3. Owns few cattle less than the medium farmers.

c) Farmers present in PRA

a. Buddhi Bahadur Thapa

b. Homnath Bhattarai

c. Ramakant Khanal

d. Shambhu Kattel

e. Tulasi Aryal

f. Dil Bahadur Aley Magar

g. Top Bahadur Thapa

h. Bhim Prasad Adhikari

i. Khadanand Dhakal

j. Lilakant Khanal

2.2. Participatory Rural Appraisal in CIS showing Wealth Ranking and Community History.

a) Community History

Date	Events	Effects
Before 2019 B.S (1962 A.D)	No irrigation canal	Cultivation of maize only.
After 2019 B.S to 2030 B.S. (1962 A.D-1973 A.D)	- Canal started by few farmers who were the first immigrants. - It was difficult to bring water from Kair Khola to the main canal and the branch canals which were very small. - It was difficult to get drinking water.	- Rice, maize and mustard were cultivated. - Less area cultivated and irrigated by few farmers. - The drinking water was fetched from the forest.
After 2030 B.S (1973 A.D)	- Conflicts between the farmers because of stealing of water. - More farmers came and increased. - There was a necessity for making the rules and regulations to manage the irrigation system.	- Canal rehabilitated by the farmers. - More demand of irrigation from the canal. - Conflicts still existed because of the increasing numbers of farmers.
After 2048 B.S (1991 A.D)	- No gate at the source. - Not enough money to line the canal. - Rules and committee formation were necessary.	- More conflicts between the farmers. - Requested for funds from the NGO and started the collection irrigation fees from the farmers. - Water distributed according to the irrigation fees paid by the farmers.

b) Wealth Ranking

Rich	Medium	Poor
- Owns > 1 Bigha land. - Employed. - Owns tractor and many cattle	- Owns 10 Katha to 1 Bigha land. - Normal source of income which means that they have enough to eat.	- Owns below 4 Katha land. - Not enough to eat. - No income source. - Works for others to meet the ends.

c) Farmers present in PRA

a. Basu Dev Timal Sinha

b. Hari Powdell

c. Kaushila Bika

d. Bagbhati Neopani

e. Indra Bahadur Adhikari

f. Prem Prasad Dodel

g. Narayan Prasad Pandit

Affidavit

I hereby declare that I wrote this thesis with the title "*The Approach of Participatory Irrigation Management System in Nepal*" independently and without the use of any other sources than cited in this document.

Sonam Pem
augustus 29, 2011