CHAPTER – I

INTRODUCTION

1.1 Background of the Study

Water resource is one of the major natural resources. Anthropologically saying, something becomes resources when it gets socio-cultural value. Shiva (1997) argues that natural resources cannot be developed themselves. Only resources become resources when they get human value. If anything cannot exist in our culture, it cannot be a resource. Likewise, anything in the nature is valuable for one and the same thing may be valueless for other and vice versa. Thus, resource is constructed socio-culturally. Resource should be understood in its social cultural context. Shiva asserts nature has the power of self generation. Because of the self generative power the concept of resource is constituted. Broadly, natural resources are divided into two viz. renewable and non-renewable. In this case water is one of the renewable resources.

It is supposed that irrigation and agriculture might have been developed simultaneously together with human civilization. Prehistoric people started farming near to the river bank. With the development of farming practices, the culture of irrigation might have started. Thus, the history of irrigational practice is as old as that of agriculture.

Nepal as an agricultural country, agriculture plays a key role in country's economy. It contributes one third of total GDP. Agriculture is the major source of people's livelihood. In Nepal, 74 percent people are still depending upon agriculture. Out of 26, 41,000 hectares (ha) of cultivable land only 17, 66000 ha has been found potential for irrigation in Nepal. Now irrigation facility has been used only in 12, 27,000 ha (NPC, 2010 - 2012).

Agricultural activities largely depend upon the availability of water i.e. irrigation facility. For the betterment of agriculture, there should be adequate irrigation facilities. Realizing the importance and the necessity of water in production, farmers have tried to irrigate their land based on their own

technology and capability since very beginning. Farmers have tried to manage water resources from stream, rivers ponds or lake in order to irrigate their field.

Irrigation in Nepal can be broadly categorized into two types; the Farmer Managed Irrigation (FMIS) and Agency Managed Irrigation System (AIMS). The FMIS in Nepal has a longer history than the AMIS. For centuries, the Nepali farmers have been managing irrigation systems without any help from outside. It is estimated that there were around 20, 000 FMISs ten years ago. The total irrigated land in the country, 75 percent was served only by FMIS (APP 1995 quoted in Ostrom, 2010). AMISs were launched by the irrigation Department and are usually managed by some agencies. Studied that have compared AMIS and FMIS have shown that FMIS have stronger water users group and more efficient than that of AMIS (Pradhan, 1989).

Several studies on irrigation management of Nepal (Uprety 2006, Pradhan 1989, Yoder and Martin 2007, and Ostrom 2010) show that most of the farmer-managed irrigation organizations evolved over a long period of time. Hence, the norms, values, rules, roles relating to irrigation management have evolved gradually. Such norms-values, rules-regulations are found to be different from one system to another. Farmers learn lessons from one another's system which are successfully managed.

Simply, equity means fairness or justice or it is a system of social justice and natural justice. The present study is related to the issue of social equity in terms of membership, participation, water allocation, distribution, conflict resolution and so on in FMIS in Nepal. For this, equity implies that most vulnerable, disadvantaged groups and women with in a society require access in common property resource. Uprety (2005) views the existing social science literature on developmental practices describes social equity as social justice in benefit sharing or the fair distribution of benefits. Equality and equity both are of great importance in claiming justice in common property resource management at local levels. Social equity in FMIS is concerned with people of diverse economic and social groups they participate and how proportionately the costs and benefits are distributed among them.

The focus of this study is to look at the issue of social equity in FMIS mainly in terms of class, caste and gender in different age level. This study was conducted in Butwal 13 Mainabagar within the command area of Char Tapah irrigation system. The condition of social justice of this system has been examined in this study.

1.2 Statement of the Problem

Farmer managed irrigation systems are more efficient to facilitate the farmers in comparison to Agency Managed Irrigation Systems. For centuries, farmers in Nepal have involved in irrigation development using their own resources, mainly for the purpose of providing supplementary irrigation for the monsoon paddy.

Pradhan (1989) holds the view that although Nepal has a long history of irrigated agriculture, the importance of irrigation has been realized only in the recent years with the advancement in the irrigated agricultural technology. He (1989: 2) states:

> Planned involvement of government in irrigation development began only after 1951. The Department of irrigation came into existence in 1952. Before this period the irrigation needs were met by several farmer managed irrigation systems (FMISs) and few state supported irrigation canals. Chandra canal was the first public sector irrigation scheme built in 1923 under the supervision of British engineers. During 1932-50 few more irrigation schemes were initiated in terai under Public works Department initiated then for public sector infrastructure development.

Uprety (2007) is of the opinion that there are the empirical evidences that participatory management approaches are being accepted as policy in many countries. He further states: “With the formulation of the participatory irrigation policy (IP) in 1992, the agency managed irrigation systems in Nepal are undergoing a process of irrigation management transfer.”

FMISs are the national heritage like other national monuments of Nepal; they are the symbol of democratic values. FMIS has developed indigenously as well responses to equity and transparency in the system management. Equity

and transparency are generally two major characteristics of FMIS. Equity means sharing the available water in a fair way among all parts of irrigation system. Equity is important in FMIS because it assures that everyone is getting fair share of water. Equity makes the members willing to sustain the organization. It promotes trust which is one of the important bases of social capital. Equity of distribution does not mean equal distribution to everyone; it means distribution according to a system of rules that everyone can understand (Pradhan, 2010).

Participation of farmers in FMIS is analyzed in terms of labour and cash contribution, decision-making process, benefit sharing, evaluation of the system maintenance, and conflict management among the water users. Hence, it becomes necessary to analyze the process through which management factors of the farmer-managed irrigation system has made effective, equitable and sustainable management of water resource. For this purpose, generally the study aims to explore and analyze the equity aspects related to Char Tapah Irrigation System of Rupandehi district. More specifically, the study attempts to answer the following research questions:

1. How proportionately the costs and benefits are distributed?
2. How farmers are being participated in decision making, implementation and distribution of benefits of water resources?
3. How successfully the irrigation management tasks are performed by Char Tapah FMIS?
4. What is the level of participation of disadvantaged groups and women in this system?
5. What are the changes in irrigation organization?
6. What is the role of government agencies to this system?

1.3 Objectives of the Study

The general objective of this study is to document the benefits of FMIS among the users of Char Tapah FMIS.

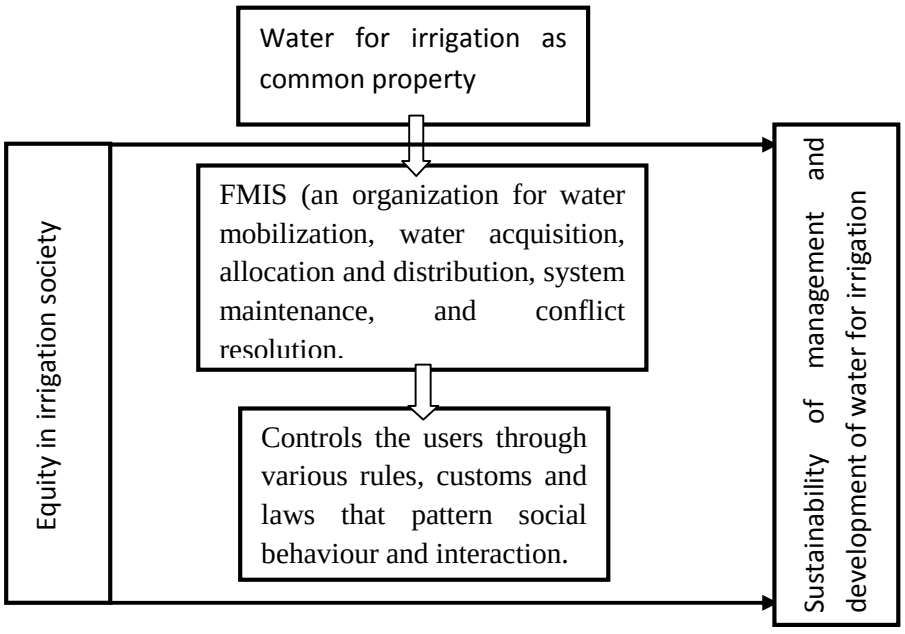
The specific objectives are as follows:

- To evaluate the level of contribution and benefit sharing among the beneficiaries of Char Tapah irrigation system, and
- To ascertain how water appropriators especially women and disadvantaged groups participate in the decision-making process, implementation of irrigation activities and benefit-sharing.

1.4 The Conceptual Framework

Water for irrigation as common property resource requires farmer organization for its mobilization, acquisition, allocation and distribution, system maintenance, and conflict resolution. In farmer managed irrigation system, like Char Tapah of Rupandehi district, is developed as an institution with variety of rules, customs, laws that pattern social behaviour and interaction. There is no doubt that development intervention is needed for such institution but the development must be done with people i.e. development with equity to provide support and opportunities to the irrigation communities particularly the poor, marginalized and vulnerable groups in taking control and play active role for equitable share and rights in the management of water resource for irrigation. Thus, social equity in FMIS plays an important role for sustainable management and development of water resource for irrigation as community property.

Figure -1: The Conceptual Framework for the study of social equity in water resource for irrigation as a common property resource.



1.5 Rationale of the Study

Various practices (Uprety 2006, Pradhan 1989, Yoder and Martin 2007, and Ostrom 2010) have proved that FMISs are more effective for sustainable irrigation development. FMISs have been found the backbone of the Nepalese agriculture system. Therefore it is quite relevant to analyze social equity aspects involved in the process of the FMIS. Evaluating different dimensions of Char Tapah irrigation system, it is expected to be significance in exploring the various areas of intervention in the process of promoting FMIS.

The governmental agencies should learn the lesson to maintain the system only after the request of farmers and there should be collaboration with farmers from planning to implementation of the system.

The study is based on field research. The information generated are new and of its own nature. It has made an effort to investigate the way of managing water resource for irrigation and to trace out social aspect (i.e. social equity) in FMIS. Hence; this study would assist the student for the future research like this. It is hoped that the findings of this study would be informative to everyone concerned with rural development and natural resource management.

1.6 Organization of the Study

This study is divided into seven chapters. The first chapter deals with the introduction, statement of the problem, objectives of the study, rationale of the study. The introduction of the study outlines the context in which the research problems have been identified and the statement of the problem identifies the research problem that is to be addressed in the study. Based on the research problems, objectives of the study have been determined as to answer the research questions.

The second chapter deals with review of literatures that helps to figure out the research gap to be bridged by the present study. The third chapter deals with research methodology which is needed to obtain the research objectives, the rationale of the selection of the study area, nature of data, data collection instruments and data analysis techniques.

Chapter four includes the general description of the study area, structural aspect of canal, socio-economic characteristics of the study area, educational status, subsistence pattern, agriculture, cropping pattern, animal husbandry and other economic activities.

Chapter five describes about the organizational activities of the irrigation system i.e. the organizational structures; joint management committee, membership, general meeting, general assembly, executive committee, the irrigation activities; construction, operation and maintenance, water acquisition, water allocation and distribution, resource mobilization, decision making and planning, conflict management, graduated sanctions, communication and co-ordination and the social and organizational change.

Chapter six includes equity aspect in relation to irrigation that represents in transparency and accountability, organizational structure, costs and benefit sharing, information sharing, conflict management, wage management and participation of women and disadvantaged group in planning, decision making and implementation process.

Lastly, summary and conclusion of the study have been presented in chapter seven.

CHAPTER – II

REVIEW OF LITERATURE

This chapter presents a review of pertinent literature for gaining insight on research questions and to identify the research gaps that need to be bridged by new research efforts. A brief discussion is made on theoretical review. Some studies on FMISs in Nepal have been reviewed and a brief review is also presented on social equity and development.

2.1 Common Property Resource: Definitions and Debates

Traditional management practice of irrigation system in Char Tapah of Rupandehi district reflects the use of water for irrigation as a ‘common property resource’ (CPR). Farmers have recognized the paramount importance of resources for centuries and have been building and managing irrigation system on their own initiative to irrigate their fields.

CPR In economics, a **common-pool resource** (CPR), also called a **common property resource**, is a type of good consisting of a natural or human-made resource system (e.g. an irrigation system or fishing grounds), whose size or characteristics makes it costly, but not impossible, to exclude potential beneficiaries from obtaining benefits from its use. Unlike pure public goods, common pool resources face problems of congestion or overuse, because they are subtractable. A common property regime is a particular social arrangement regulating the preservation, maintenance, and consumption of a common-pool resource. The use of the term "common property resource" to designate a type of good has been criticized, because common-pool resources are not necessarily governed by common property regimes. Common-pool resources may be owned by national, regional or local governments as public goods, by communal groups as common property resources, or by private individuals or corporations as private goods. When they are owned by no one, they are used as open access resources. In common property regimes, access to the resource is not free, and common-pool resources are not public goods. While there is relatively free but monitored access to the resource system for

community members, there are mechanisms in place which allow the community to exclude outsiders from using its resource. Thus, in a common property regime, a common-pool resource appears as a private good to an outsider and as a common good to an insider of the community. The resource units withdrawn from the system are typically owned individually by the appropriators. A common property good is rivalled in consumption (Wikipedia, the free Encyclopedia).

Miller and et.al (1987) describes the natural resource policy is social policy as modern consequence. Importantly, a complex management process has expanded the role of science in formulating resource policy. Society has many ways of valuing resources. This tradition provides ground on which agencies, industries, and publics may exchange ideas and either avoid or engender controversy where political ideology and social morality are other grounds on which social scientists debate resource policy. Social scientists are legitimate members of natural scientific community. They manifest an interdisciplinary perspective on resource management. For instance, anthropologist might relate resource management practice to the maintenance of culture and values in the society.

Today, intense interest in Common Property Resources (CPRs) spans the full spectrum of socio-economic sciences, especially in relation to international research and development. The literature is now full of accounts of common management at the local level over a wide variety of natural resources, including land, water, grasslands and pasture, fish and wildlife, forests, trees and forest products, and others. CPRs have become a topic of considerable scholarly research since the famous 1968 article in "Science" on "The tragedy of the commons" by Garrett Hardin (From Wikipedia, the free encyclopaedia). Fisher (1989) defines common property resources as property which is shared by a specified group of people with specified rights as opposed to open access resources without any restriction. Likewise, Berkes and Farvar (1989) describe traditional resource management systems are often community based which involve social institutions (i.e. either formal or informal) as an

integral part. The concept of common property is also well established in institutional arrangements based on customs and tradition. They prefer ‘communal ownership’ in the sense of common property which is used by many. Thus, CPRS is the alternative model for Hardin’s Tragedy of the commons. For the sustainable use of resource, the need is to plan with people and reduce conflict in water for irrigation as CPRs.

On the subject of livestock herding on common grazing land, Hardin views the herdsmen as victims of a basic human impulse which leads them to maximize benefits even in the face of declining resources and diminishing social controls. According to Hardin, common resource means resource managed by community. It is an equal or open access resource having equal rights to use and free for all. There no any rules and regulations to use resources. Freedom in commons brings ruin to all (Hardin, 1968). He concludes that resources should be either privatized or controlled by government to ensure sustainable use. Hardin provides ground for discussion about the common property resource but he ignores social, cultural, political dimension. He gives more priority on individual and forgets that the leadership of community is stronger than individual. Historically, community managed systems are strong for sustainable management. In local community, peoples have their own management system. We can see the management systems of water resource which are properly managed by local people. When the resources are privatized or nationalized then they may destroy globally. All commons do not bring tragic situation but unmanaged commons bring tragic situation.

Pradhan (1989) explains water as community property needs well-organized system based on community decisions. In most farmer managed irrigation systems, the irrigators organized to preserve water resource as community property and distribute benefits to the members of the community. In a well-organized system, irrigation activities are performed collectively by the beneficiaries. Management and decisions related to irrigation are based on the premise that water is ‘community property’. The common effort to

communalize the water resource requires formation of an irrigation organization to direct water acquisition, allocation, distribution and conflict management (ibid; 1989). Thus water for irrigation as 'common property resource' requires collective management and development by the beneficiaries which is the basis for organization.

Uprety (2005) argues that organizations are designed for the acquisition of water, mobilization of manpower and local resources to the operation and maintenance of the system, equitable water distribution and minimizing conflict. The nature of water as a transient resource requires co-operative sharing of irrigators to utilize and manage it for irrigation. Martin (1986) holds the notion that common property institutions are the most important means of regulation of "fugitive resources" where the farmers are owner and manager of an irrigation organization. The FMISs have been considered as indigenous irrigation systems where they have designed organization for resource mobilization, water acquisition, water allocation and distribution, system maintenance and conflict resolution. They have formally or informally defied rights and duties of water users (Pradhan, 1989). The focus of the present study is to understand 'water as common property resource' where 'social equity' plays an important role for the sustainable irrigation management and development. So the irrigation practice of Char Tapah of Rupandehi district is one of FMISs in Nepal which is the area of study.

2.2 Literatures on Farmer Managed Irrigation System in Nepal

Several studies have been undertaken on farmer managed irrigation system in Nepal. Some of them have been reviewed and presented here to understand the trends in farmer managed irrigation system in Nepal.

Pradhan (2007) writes that two Cornell University graduates started field investigation for Ph. D thesis in Argeli Raj Kulo and Chherlung irrigation systems along with other systems in early 1980s. Their Ph. D thesis became the landmark studies in FMIS.

In most parts of Nepal, the local communities which are recognized as users groups have been instrumented in managing natural resources including

water and forests either through an indigenous or traditional management system or through their involvement in externally sponsored initiatives. By now, local communities or users group have gained fame as extremely competent and knowledgeable managers of natural resources (Chhetri, 2007). Pradhan (1989: 1) writes:

> Irrigation development in Nepal remained in the hands of people for many years. This tradition gave birth to FMISs scattered all over the country. Historically, irrigation development has fallen under the domain of a religious trust, individual initiatives or community efforts. The legal tradition and local administrative structures over a period of time have permitted farmer managed irrigation systems to operate without interference from an irrigation agency or other administrative units. However they have been assisted by the government from time to time when natural calamities required resources beyond the capacity of farmers.

It is commonly believed that local users of natural resources are often more competent and knowledgeable as resource managers. Indigenous knowledge and experience over the generations have been playing a vital role within the irrigation system. Local people develop different knowledge in different environment. Accordingly, they have to adopt alternative system in changing environment. Chhetri (2007: 341) observes:

> Some new construction posed by engineers sent to Lomanthang by the concerned government agencies has been found to be unsuited to the needs of the local conditions. In fact, such engineers themselves are said to have realized that the local knowledge and technology was better suited to keep the irrigation system strong while meeting the needs to the irrigation system strong while knowledge about the way of constructing, maintain and managing the irrigation system have been proven more practical.

A deeper understanding of socio-cultural variables helps how the intervention has to be made in the community. The head-reach farmers used the water excessively at the cost of middle and tail-end farmers who generally

expressed their unwillingness to pay water change on the pretext of water unavailability/inadequacy. Every time the farmers having their fields a relatively far from outlets of the water courses were the ones to suffer and face the problem to get water (Uprety, 2007). Sometimes farmers have to face and suffer water stealing problem. Such problems create a conflicting situation among farmers. Uprety (2007: 64) states:

> In general, the water users had the perception that participation was imposed on them. Farmers were having the access to the irrigation facility even without being organized and making any contribution (cash/labour). When they were asked to be organized in the form of WUA and make contribution for the operation and maintenance, the farmers were unenthusiastic and unwilling for making the desired contribution.

The indigenous FMISs of Nepal were built over centuries through participation of local rulers are the living examples of participatory irrigation management. In FMISs there is the feeling of ownership towards the irrigation systems.

International Network on Participatory Irrigation Management (INPIM), Nepal (2007) has been mainly in response to address two broader issues: poor performances of irrigation systems and pressure on the government to reduce its operation and maintenance budget on irrigation by generating more resources locally. Water is getting scarce due to competing use of water. Thus, in the coming days, agriculture sector must learn to manage with the limited waters.

Coward presents the conceptualization of sociology of irrigation in the regime of common property. He argues that sociological perspective of irrigation can commence with two fundamental concepts, namely “institution” and social “organization” (Uprety, not dated).water acquisition

In this study, equity aspect of Char Tapah Irrigation Community will be analyzed on the basis of principal functions of the irrigation organization as mentioned by Uprety (2000). These are resource mobilization, water

acquisition, water allocation and distribution, system maintenance, and conflict resolution.

Resource Mobilization: Labour, money, material, and leadership or information should be mobilized effectively for the sustainable development of irrigation system. There is a direct relationship between the amount of irrigated landholding and the amount of labour contribution. Likewise, farmers have to pay cash or crop as irrigation fees on the basis of size of landholding. More women and vulnerable group of people are involved in resource mobilization, but their participation in decision making for resource mobilization is low (Ghimire, 2005).

Water Acquisition: Water acquisition is the process of acquiring water from the water source which is related to the design, construction, operation and maintenance work. Though it is challenging task for women, the women and men of lower income group are involved for monetary gains (Ghimire, 1996).

Water Allocation and Distribution: Water allocation is related to the use right of water on which water is allocated according to the rules and procedures of an organization at all levels, from main branch to tertiary levels. It is found that customary practice of water allocation has the law of upper stream lands have the first priority. And the water is allocated according to the size of landholdings with the system. And, distribution is the actual physical delivery of water to the fields (Uprety 2000). Men are more involved in distributing water at the main branch whereas the women of all groups irrespective of class, caste, ethnicity, are involved at the branch and field channel levels (Ghimire, 2005).

System Maintenance: System maintenance is the repairing and cleaning of the canal for regular efficient flow of water. Male and female members of household and labours are participated in this process by providing labour.

Conflict Resolution: Water theft problem, breaking down of laws and rules of system creates conflict between the head-end farmers and tail-end farmers, among the water users and sometimes with non-members of the irrigation

community. Such conflicts are resolved by the farmers themselves in several ways, like physical punishment, fine payment and so on.

Uphoof (2003) suggests that we should think and act in terms of the cognitive and normative dimensions of social structures. He (2003: 58) notes:

> Norms, values, attitudes and beliefs that are inside people's heads (and hearts?) are not just reflections of individual, material interests. They are shaped by people's culture and religion as well as by their personal experiences and convictions. These are influences by family and community interaction to produce unique individuals with a sense of self interest but also of fairness, legitimacy, justice, and solidarity.

Uprety (2007) views that the socio–economic processes of change and development have influenced the development and management of both farmer-managed and agency–managed irrigation systems. Among these processes, some are urbanization, commercialization of agricultural production, educational values and growing disinterest among the educated youths in the traditional agricultural profession, migration from rural to urban area, labour shortage for the agricultural purpose, including the construction, operation and maintenance of the irrigation system growing competition for water for drinking water, irrigation and industrial purposes. Thus, it is important to address the challenges of irrigation development and management in the future policies, strategies and roles of different stakeholders for the sustained development and management of irrigations.

Ostrom (1992) has developed the following eight "Institutional design principles" that characterized long enduring self organized irrigation institutions. These are: clear definition of boundaries, proportional equivalence between benefits and costs, collective choice arrangements, monitoring, graduated sanctions, conflict resolution mechanism, minimal recognition of rights to organize, and nested enterprises.

Clearly defined boundaries are related to use right of water source. Boundaries should be defined in justifiable way. Farmers at the head-end of the system may be unpredictable and inadequate for agricultural use. While

defining boundary, such facts should be taken into consideration for sustainable development of irrigation system.

Successful long–enduring institutions that appear to be based on quite different underlying designs have all developed to equate the costs of building and maintaining the irrigation system appropriately to the benefits that are achieved. In long enduring system, those who receive the highest proportion of the costs (cash, labour, or materials). Crafting rules to apportion benefits and costs has to take into account many of the unique features of each system.

In the case of many self-organizing systems, no external authority has sufficient presence to play any significant role in the day- to- day enforcement of the rules-in-use. In long-enduring system, however, irrigations themselves make substantial investment in monitoring and sanctioning activities. In any system, land assignment and subgroups organization can increase or decrease the level of conflicts facing members. In many irrigation systems, conflict resolution mechanisms are informal and those who are selected as leaders are also the basic resolvers of conflict. In an effective irrigation, the right of users make in their own consensus are to be recognized by national governments as legitimate form of organization. Appropriation, provision, monitoring, enforcement, conflict resolution and governance activities are organized into many tiers of nested organizations.

Thus, the 'Eight design principle' will help any irrigation institution in achieving the goal of equity for sustainable management and development of irrigation system. Where there is the consideration of these principles, then there will be the equity in irrigation system. And when there is equity in the system, then the system will be sustainable.

2.3 Issue of Equity and Justice in Resource Utilization

Very little research has been done on the equity aspect of common property resource management. These days public interest has been growing toward equity since this is the vital part of the development project. The World Bank Report 2006 has defined equity in terms of two basic principles: equal opportunity and the avoidance of absolute deprivation. Equity is seen as a part

of law and, therefore, should be achieved by applying the formal rules. Different culture and religions around world may differ in important respect but they all share a concern with equity and fairness. A study of UN suggests that worker perception of whether they have been treated fairly or unfairly can affect their efforts and thus product, quality, in important ways. People feel that a very unequal income distribution reflects unfair processes and unequal distributions of opportunity. World Bank Report (2006: 207) asserts:

> Greater global equity is a shared value. Equity in international law in compasses notions of corrective justice and distributive justice that the strict application of the law should be tempered by considerations of equity or fairness to achieve a just result and that international law should promote a more even distribution of resources among states. Equitable principles have been applied to many areas of international law from the of sharing scientific benefits, technology and natural resources to laws governing the sea, international waterways, outer space, can carbon emissions.

There has been an increasing emphasis on the notion of social equity or distributive justice as one of the guiding principles of contemporary people centred development paradigm. On the basis of theories of social psychology, Lind (1995) treats fairness or social equity or justice as a device for resolving conflict (quoted from Uprety, 2005).

Though equity is not a new concept, but there has been surprisingly little detailed discussion on the meaning of equity in natural resource management. There may be differences in the level of resources or benefits received by different stakeholders, for instance, according to their effort or role in a resource management system, if this rate of distribution is perceived as fair, then it may be regarded as an equitable arrangement. And the benchmark for measuring equity needs to be determined situationally to account for social contexts, norms and values. There should be equity between social groups within a community stakeholder at different levels, localities and through the generations. Several practices in the past provide lessons that the inclusion and participation of marginalized women is necessary for better resources

management practices (Chhetri and Nurse not dated/downloaded from internet).

There are three kinds of objectives in managing irrigation system: water adequacy, equity and timeliness. Where social capital is high, these objectives of irrigation management are met. Adequacy means supplying the exact amount of water that is needed for crop growth. Equity means sharing the available water in a fair way among all parts of the irrigation system. Timeliness means supplying water just when the soil and crop need it. In most government-managed systems, the objective of adequacy dominates the operation plan. In farmer-managed systems, one finds that equity is the dominant objective. Equity in a water distribution brings belief in fairness (Pradhan, 2010). The opposite condition of equity is inequality which brings conflict among the water users. The allocation and distribution have to be fair. So, equity in water distribution and belief in fairness of irrigators' decision are important aspects of cognitive social capital.

Social capital refers to those stocks of social trust, norms and networks that people can draw upon to solve common problems. Physical capital and human capital are important but social capital can help the physical and human capital to be more productive. For the sustainable and durable institutional development of the farmers in the water sector, proper attention for the promotion of 'social capital' is to be given. The right type of government policy to encourage community role in resource management can promote social capital (ibid: 82).

Resource management systems which have emphasized participation of the various interest groups in the governance structure and decision making processes in the most inclusive way, and equity in the resource mobilization and distribution of benefits have remained sustainable (Uprety, 2005). Equity in information sharing is equally important in sustaining FMIS. Efficiency and equity can be promoted by empowering certain people or increasing their access to resource or contacts, "countries with unequal distribution of resources and political power become more egalitarian and democratic and previously

powerless people gain power and influence, Institutions clearly have distribution effects and bad institutions often arise because they benefit some group or elite." Good institutions arise when checks are placed on the power of elites and when the balance of political power becomes more equal in society. Justice systems and legal institutions embedded as they are in the political and socioeconomic structure of societies can be hijacked by special interests. Greater equity in access to and control over natural resources and the global commons may lead to more sustainable use. The rules that govern the use of natural resources need to become more equitable (World Bank Report 2006).

This report has argued that equity has a central place in the interpretation of development experience and in the design of development policy. The core of development discourse and practice over the last three decades has put forward the four broad stands resources allocation mechanism, the importance of human development, the role of institutions and a focus on empowerment.

Through the experience of participatory management of Khokana irrigation system by Manandher eva (2010), there he found that equity is said to be maintained when all the head-enders and tail-enders get the allocated water. WUA formed in 1996 had tried to maintain equity by choosing the system of distributing water form tail end during winter season. This practice was not maintained by the new WUA. Consequently, tail-enders did not get adequate water, that the equity dimension of the system is lost. Manandhar (2010: 159/160) shares:

> Irrigation system can be viewed to be related to many aspects. They are physical structures, institutional mechanism, changes realized before and after the system developed, addressing social issues, policy dimensions, environmental concerns, predictions of hazards and making them ready cope and mitigate the effects. When we identify critical aspects of feature and work out corrective measures. We can then make the systems sustainable.

It is necessary to ensure that how the users get equitable distribution of benefits from irrigation systems. The question is: who gets benefits from

irrigation systems? How can it be ensured that all segments of the community within the irrigation system get benefit from the development of the irrigation system? Oftentimes, the public investment by the government is received only by the elite group of the society. Equitable distribution of benefits of public investment among all the segments of the public requires appropriate policy of irrigation within the irrigation system. The irrigation policy has to address the questions of the participation by the irrigator community, livelihood to the marginal group of people, gender issues and inclusiveness in benefit sharing (Shrestha Vijaya and Pradhan P, 2010).

Likewise, Uphoff (2002) holds the view that there is no wide consensus about farmers' participation in irrigation management, whether in small-scale local systems or large-scale government schemes. With appropriate organizational structures and incentives, they can improve efficiency and often equity under quite a range of conditions. He presents simplicity, transparency and equity, as operational objective of FMIS. He found farmers in of Gal Oya Left Bank committed themselves through their farmer organizations to equity is more remarkable.

Parajuli Umeshnath et.al (2007) suggests that the issue of poor governance and equitable distribution of water of the turnover irrigation system can very well be addressed through a carefully implemented, adequately resourced and sustained participatory intervention process. Such intervention will result in positive livelihood outcome of the poor and marginalized group of farmers, and help to minimize the vulnerability due to external factors. Adhikari Basanta Prasad (2007) writes:

> Equity and justice is very important part of any kinds of development to the entire community who has their concern over the resources. In modern sense equity not only focuses on sharing of the responsibility. Equity, justice and good conscience are very vital aspect of making the decision about the management of irrigation system.

He has suggested that leadership capacity of women and marginal groups should be enhanced to ensure the meaningful participation and governance

accountability mechanism of Irrigation Water User Association needs to be developed for effectiveness of management on the basis of equitable principles.

Bhusan Udas Pranita (2002) states that women contribution in managing water for agriculture field is remarkable but their participation in formal WUA meetings is very low, almost minimal. However, government-quota system has provided space and opportunities for women to physically represent in the WUA meetings instead of the social norms and values that hinder their participation. Yet, it is not enough. In the perspective of in irrigation system management, Irrigation Policy 2003 has the provision of at least 33% participation of women and representation of Dalit and marginalized ethnic group.

Empowerment and social inclusion play complementary roles in promoting equity of agency and sustainable prosperity for all (Bennet and et. al. 2006). Everyone's participation or inclusion rather than exclusion of some in the game for example policy making, conservation, research, governance etc. ensures better results (Chhetri, 2008).

The irrigation system management also must ensure social inclusion as one of the prerequisites of the democracy. The social inclusion is possible only through the democratic system in irrigation where Dalits, women, ethnic groups and marginal farmers have space to make decisions.

Equity between and among the groups is addressed on the basis of access of individual irrespective of his social, economic status. Property rights in water have emerged as function scarcity. Most of the principles, doctrines of distribution developed in water law traditionally employed political, geographical or sociological facts and basic principles of distributive justice or equity. Property rights in water resource centres on a comparison of the 'riparian' and 'prior appropriation' doctrine. The riparian doctrine stands for riparian right and natural flow theory. It focuses on geographical location of the land and ensures water right i.e. right to use water among the farmers of the land contiguous or riparian to the stream. The prior appropriation doctrine favours those who are first in time, first in rights to use water resources. Thus,

the person acquiring the first water right on a stream has the superior right to all others.

Above mentioned riparian right and prior appropriation doctrine of water right found elsewhere in irrigation management do not support equity as it is based on feudalistic pattern which may create conflict among the users about seniority in the priority system. Thus, it is needed to consider appropriate right principle as to serve the development demand as well as pursuit of justice.

Osanami Fumio and Joshi Neeraj N. (2005) found that it is difficult to make consensus among farmers in Sankhu. Upstream farmers are uncooperative to downstream farmers about the availability of irrigation water in dry season where as downstream farmers have to pay more cost than upstream. Such practice can be found in other systems as well. The water use in dry season should be reallocated to achieve more equity use between upstream farmers and downstream farmers. Equitable sharing of resources and Good Governance are prerequisite for multiple use of water amongst different user groups. For the well functioning of irrigation system, the issue of equity in sharing of the water resources is to be addressed (Karki Ajoy 2005).

Thus, there is no doubt that equity consideration is more important in sustainable development of water resource. Equity is one of the most important parts of sustainable development. Above mentioned reviews show that transparency, equity or justice are to be addressed equally as vital part of irrigation development in FMISs. There is a lack of linking social equity in each level of FMIS and gap in providing clear conceptual and theoretical framework. This study will develop own conceptual framework on the basis of possible theories to relate the research problems. Most of the studies focus on organizational activities rather than pointing out the nature of organizational configuration and articulation of social identities; ethnicity, gender identity, age, educational status, residential status, occupation etc to irrigation role in equity basis. On the other hand external social environment such as political, economic, and religious dimensions influences the equitable opportunities, which must be specified. The present study has attempted to bridge such gaps.

CHAPTER – III

RESEARCH METHODOLOGY

This chapter presents a brief discussion of research methods employed to acquire necessary information for this study to get into the research objectives. It contains the rationale of the selection of site, techniques of data collection, modes of data analysis, and limitations of the study.

3.1 Rationale of the Selection of Site

This study was conducted in Butwal 13 Mainabagar within the command area of Char Tapah irrigation system. The Char Tapah irrigation system consists of four main Tapah named Eghar No. Tapah, Khadawa Tapah, Chha No. Tapah, and Panch No. Tapah scattered in Butwal Municipality 13, 14, 15 and Naharpur, Motipur, Semlar, Khadawa Bangain, Saurah Pharsatikar VDCs of Rupandehi district. There are various reasons for selecting the area as study site that there is a practice of FMIS. Farmers have their own irrigation organization. This area is accessible to the researcher whose permanent settlement is near to it. For this reason, the researcher felt that this area would be economically affordable for her.

3.2 Nature and Sources of Data

Both primary and secondary data have been used in the study. Mainly the information collected here from primary sources i.e. interviews with key informants, focused group discussions with knowledgeable experienced people, observed facts from direct observation, case studies of women and ethnic people about irrigation practices, organizational condition, agricultural practices etc.

Secondary data such as written records, constitution of Char Tapah Irrigation System, different office records (i.e. Butwal Municipality, Semlar, Motipur, and Pharsatikar VDCs, District Agricultural development office Rupandehi, FMIS Trust, Central Library of T.U.) about irrigation system, male female and caste ethnic population of the command area were collected from for supplementary information.

3.3 Design, Size and Selection of Sample

The universe of this study is Char Tapah Irrigation System. Key informants of different age level old/young knowledgeable, elected and selected members were purposively selected for interview. Among them 6 elected executive members (among them two members from Khadawa, two from Eghar No., one from Panch No., and one from Chha No. Tapah), 4 representative members and 4 Badhghars from each Tapah and two ex-chairman from Eghar No., one female member from Khadawa, one male and one female member from Panch No., and one female member from Chha No. Tapah. Some informal interview is also taken and discussion is made with the users. Seven comprehensive cases of 4 women from each Tapah, 2 ethnic male (one from Eghar No. and one from Panch No.) and 1 Dalit male from Chha No. were carried to garner the information about level participation of women and disadvantaged group in decision making level. They are as nominated members in Char Tapah Committee. Four FGDs is completed from each Tapah having 6 to 12 knowledge people. In Chha No. Tapah 7 members were presented and 12, 8, and 6 members in Panch No., Khadawa and Eghar No. Tapah respectively. It is made to ensure the representative picture of the sample size.

3.4 Techniques of Data Collection

The purely qualitative data were used in this study. And qualitative data were collected using ethnographic methods: direct and participant observation, key informant interview, case study and informal discussions. Direct and participant observation and key informant interview were involved as the principal tool of this study.

Observation was instrumental in garnering the necessary data and information on the physical location of the study area, social infrastructure, topography, hydrological system, settlement pattern, agricultural practices, canal maintenance practices vis-à-vis design, construction, water acquisition, operation, drainage etc.

Participant observation, as a form of social interaction, always involves impression management was useful in establishing the rapport with the

community. It helped to understand the local culture, use native language in formulating questions to garner substantial amount of qualitative data and information on managing water for irrigation as a ‘commons’.

Key informant interview, as an important tool within the ethnographic method, was used to garner the necessary data for this study. Informants are those who are capable of providing adequate information about social structure, institutional arrangements, organizational cultural activities vis-à-vis decision making and planning, resource mobilization and management, water allocation and distribution, communication and co-ordination, conflict management, culture of maintaining the transparency, accountability and social equity and subjectivities such as social norms, values and belief, social solidarity, ideas trust, aspiration, leadership, friendship etc. and their role in sustaining irrigation system.

Case study: Case study represents a more real record of personal experiences and gives us a clear insight into life. It is often used by the anthropologists and ethnologists to garner qualitative information. In the present study the case approach has been used to furnish data about participation of women and disadvantaged group in the committee and their role in decision making and implementation. Further it used to find out the influence of socio-cultural, political, economic, educational factors on the participation of women and disadvantaged group.

Group interview technique was used to garner the necessary information about the changes in the social structures and irrigation management occupational structures of water user such as agriculture, service, agricultural wage, business etc. and local development initiatives such as educational institutions, role of the governmental and non-governmental institutions, farm roads, and other social infrastructures of the study area etc. A check-list was used for guiding the interview.

Focused Group Discussion: In the present study, four groups having six to twelve knowledgeable people about irrigation system and irrigation activities were chosen for discussion focusing on specific issues on the subjective factors

such as the role of leadership personality and ideas etc., culture of maintaining transparency and accountability and social equity in managing water and their bearing on sustainability of irrigation systems from different committee.

Ethnographic notes such as methodological notes, descriptive notes and analytical notes were maintained in the field. Field diary helped the researcher to interpret her notes. Methodological notes dealt with the data collection technique. Likewise, descriptive notes contained the information obtained from interviews with informants' observation in an elaborate form. Analytic notes helped in the preparation of the preliminary analysis on the data, generated in the field.

3.5 Data Presentation and Analysis

The study is based on qualitative analysis. The collected information were noted down and organized by categorizing, ordering, manipulating and summarizing the data obtained from field. The collected data using direct observation and participant observation method and key informant interview has been presented analytically. The researcher of this study is adopted descriptive method to explain observed facts, situation and events of Char Tapah irrigation system.

3.6 Limitations of the Study

The study has been undertaken for the partial fulfilment of the requirements of Master degree in Anthropology though researcher has made every effort to make the study an academic, the selection procedure was purposive which do not ensure that every unit of the population will be included / represented. Thus, this study has limitations in acquiring sufficient information to generalize the whole system. Moreover, the field study period was only one month which was too short to collect sufficient information. This study is limited in Char Tapah Irrigation System that may not represent the whole Rupandehi district and all Farmer Managed Irrigation Systems in Nepal. There is also limitation in researchers knowledge while applying theories and and methods to study social equity FMIS.

CHAPTER – IV

GENERAL DESCRIPTION OF THE STUDY AREA

This chapter deals with brief introduction and general description of the study area, socio- economic description, educational status, subsistence pattern, occupation structure, agricultural practices, animal husbandry, and other economic activities of the study site.

4.1 Physical/Environmental Description

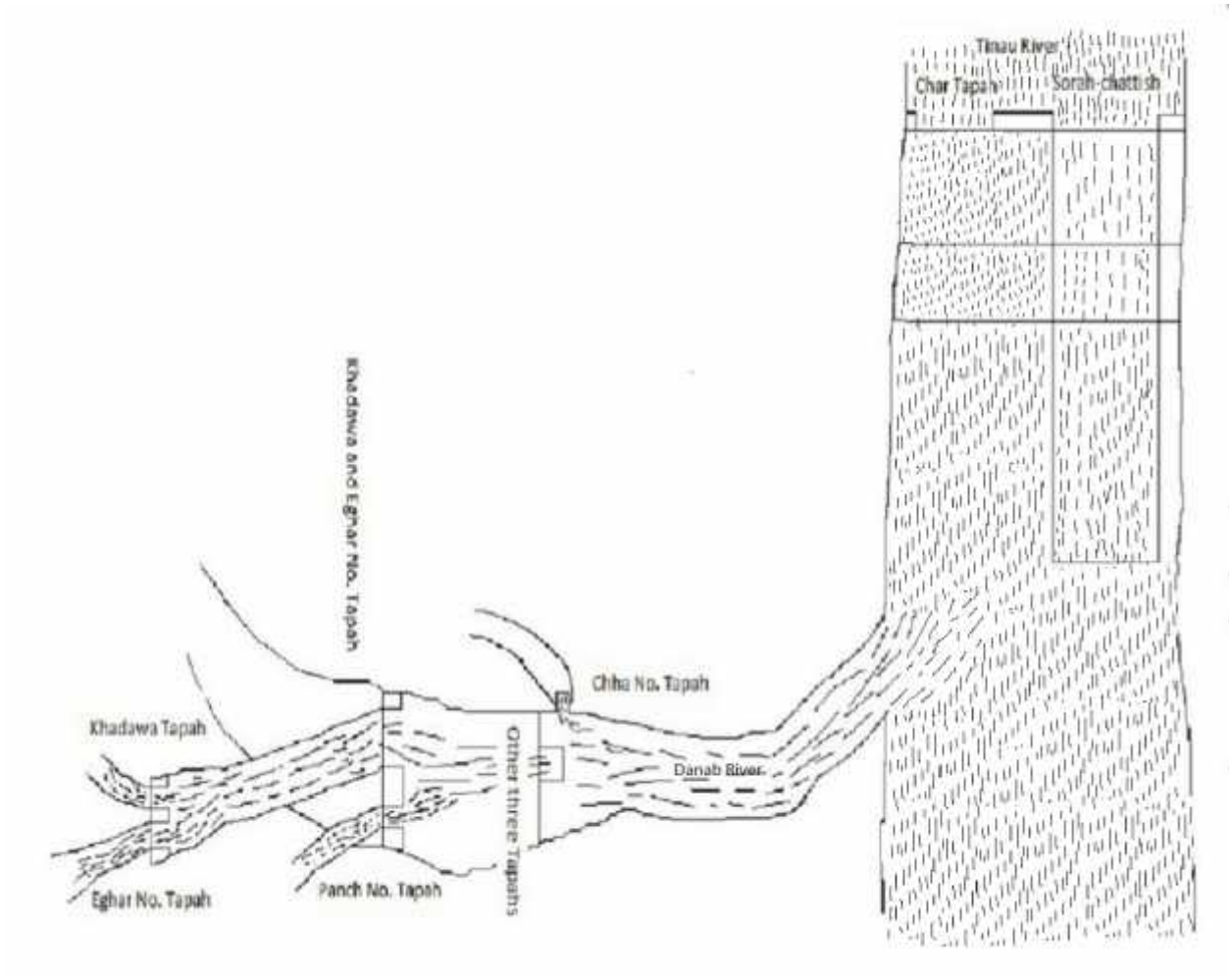
Char Tapah irrigation system is located in Southern part of Rupandehi district where the plain land (terai region) lies. The command areas of this system fall under Butwal Municipality ward no. 13 Naharpur, 15 Belbas, and five other VDCs i.e. Motipur, Semlar, Khadaw Bangain, Sauraha Pharsatikar and Amuwa VDCs.

The total area of Rupandehi district is about 1360 sq. km. The topography of this area is flat and plain. The soils are alluvial, finely textured silty loam and silty clay. The minimum temperature in the area is about 8.75 degree centigrade and maximum 42.4 degree centigrade. The average rainfall is about 1391 mm. Like other terai areas of Nepal, the command area has three distinct seasons: a warm wet sea from mid-June through September, a cool dry season from October through February and pre-monsoon hot season from March to mid June (Agricultural Development Office of Rupandehi District 2007/08).

The total command area of the Char Tapah Irrigation System is estimated to be 3500 hectare which includes 65 villages. There is a joint operation system for water acquisition and for water sharing among the four different Tapahs within this system. It has been revealed by the key informants that there is the Tinau Water Share Committee which is a kind of informal organization comprising the representatives of water users of Sorah-Chhattish Mauja in the eastern side of Tinau river and Char Tapah Mauja in the western side of Tinau river. The users of Sorah-Chhattish joint management committee and Char Tapah joint management committee have been sharing the water on

the traditional basis according to the decision of this committee. From the total water of Tinau river, 60 percent water has been allocated to Sorah-Chhatish Mauja and 40 percent of water has been allocated to Char Tapah Mauja.

Figure -2: Showing diversion of four Tapahs of the system.



Thus, the allocated water (40%) of Tinu river to Char Tapah flows in the way of Tinau river for some metre then it changes the way and mix to Danab river which flows in the east of Tinu river. The irrigation activities of this system are performed through different planning and projects. Khadawa-Motipur Irrigation Planning in 1480 hectare area of land which is running under NISP irrigation project Motipur-Khadawa Irrigation Planning in 1500 hectare area of land under Middle scale project, Char Tapah joint irrigation system in 3714 hectare area of land and underground water for irrigation under

Bhairahawa Lumbini Bhumigat Jal Pariyojana and some areas are irrigation through private irrigation system.

Table – 1: The stages of Land using in Rupandehi District

S.N.	Details	Hectare	Percent (%)
1	Cultivable land	85122	60.21%
2	Forest area	30484	21.56%
3	Pasture land	8882	6.28%
4	River area	2460	1.74%
5	Mountain area	414	0.29%
6	Settlement	5953	4.21%
7	Other (Parti land)	8052	5.71%
	Total	141367	100%

Source: District Agricultural Development Report Rupandehi 2009.

In the command areas of Char Tapah different natural resources like forest, water, land resources, pasture management practice found. The total agricultural land of Rupandehi district is about 85122 hectare which 60.21 percent of total area (land). About 44583 hectare land is only irrigated which is 52.37 percent of total agricultural land and in 40539 hectare land the irrigation facility is not reached yet which is 47.63 percent of total agricultural land. Thus, nearly half of the agricultural land is facing irrigation problems. It shows the importance of irrigation management for agricultural development. About 3500 hectare land is irrigated through this system.

4.2 The Structural Aspect of Canal

The length of Eghar No. Tapah canal from the diversion of Tinau river to tail-end location of the command area is about 12 kilometres. The length of Kadawa Tapah is about 10 kilometres from Tinau river to tail location of the system and the length of Chha No. Tapah is 6 kilometres far from Tinau river to tail location. The width of canal varies from minimum 6 feet to 22/25 feet (15 metres).

The allocated water for Char Tapah flows in the way of Tinau river in some kilometres. Then, it changes its way and mixes in Danab river which lies

in the west of Tinau river. Some metres ahead from where Danab river starts, an intake structure at Mainbagar where the office of Char Tapah is under construction, has been constructed using the stone crates and at the same location an iron gate for controlling the excess water has been installed, and at the same location the Chha No. Tapah separates from other three Tapahs. The cemented walls and concrete beams have been constructing across the canal to keep outlet level with the canal bed. The cemented deviser is under construction with the collaborative efforts of water users and government of Nepal in each diversion of Tapah, Mauja and Mohada. Some 500 metres ahead from Mainabagar, another diversion intake has been installed which separates Panch No. Tapah in its east from Khadawa Tapah and Eghar No. Tapah. Then, both remaining Tapahs (Khadwa and Eghar No.Tapah) share single canal for some 200/300 metres and then, they use separate canal.

The water user of Char Tapah constructed cemented deviser for the distribution of water from the main canal in some Maujas taking government support (i.e. technical and financial support). And some other cemented deviser and outlets are under construction with the help of World Bank through IWRMP under Khadawa-Motipuur irrigation Project which covers the command area of three Tapahs only i.e. Khadawa Tapah, Eghar No. Tapah Panch No. Tapah. At the field study period 2068 Baisakh, 75/80 percent construction has been completed and about 20 percent is yet to be completed. Before that, water used to be diverted into intakes with the support of temporary spur weirs, which had been constructed by the water appropriators using their age old experience, knowledge and skills.

The other remaining outlets are constructed by using the locally available materials such as poles, brushwood, stones and sand bags. The district irrigation office has been providing some help (i.e. wire, net) for the users of Char tapah in emergency time period.

Figure -3: Photographs of study site

Photo No. 1: Tinau River

Photo No. 2: Danab River

Photo No. 3: Diversion Intake

4.3 Socio-Economic Characteristics of the Study Area

The command area of Char Tapah Irrigation System is situated in Rupandehi district of western terai. It has its own historical identity and recognition. The religious value is linked to this district. It is known as the Birth place of Lord Buddha. Nawalparasi district lies in its east, Kapilvastu in the west, Palpa in the north and Bihar state of India in the south. This district is also known for the discovery of the fossil of Ramapithecus, one of the human ancestors. It is Tinau river which is the main source of water for Char Tapah system, where the jaw of Ramapithecus was found. Historically, it is famous for the place of king Mani Mukunda Sen of Palpa during the pre-unification period of Nepal. At the present, there we can find a famous park established in his name called “Mani Mukunda Sen Park’’ or “Phoolwari Park” which is half kilometre far from Tinau river.

The command areas of this system have heterogeneous social composition of water users because of the hill migrant to terai area. There were only the water users of Tharu ethnic community prior to 1940 AD. It has been revealed by the key informants that expanding population in the hill where all good agricultural land was already under cultivation and the malaria control efforts in the terai in 1970s encouraged rapid migration into the command area of Char Tapah. Most settlers who moved into the area after 1950 were from the hill. Many acquired land by encroachment, cleaning a jungle plot for a residence and for subsistent cultivation. Since the canal was first built to deliver water to fields, the new settlements gradually expanded in the command area. The command area continued to increase with the changes of living pattern in the hill as in other parts of the terai, in-migration in the system.

The total population of the command area is estimated 52361. The indigenous Tharu community that built the irrigation systems, now they have become a minority group and the majority of the population is from hill districts such as from Palpa, Gulmi, Baglung, Syangja, Argakhanchi, and Parbat. The majority of water users are Brahmins and Chhetris except Chha No. Tapah. In the case of Chha No. Tapah that covers Butwal municipality

ward no. 13, 14, and 15, the more water users are from ward no. 15 to where the Magars are at majority (i.e. 34.86%). See annex – 1 (page 85) for Tapah wise distribution of land, population and household.

According to the 2001 census data, the household size of Rupandehi district is 6.01 (District Profile 2010). Tharu households of the command areas have higher degree of joint family system. Some family of Tharu community have a tendency to live separate being nucleated because of educational awareness and influence of hill migrants. As the Urbanization is taking place in the head and middle locations within the command area, the new settlements are being developed. The houses are dispersed along the road alignments.

All the command areas of the system have the access to the roads. East-West highway passes through Chha No. Tapah. One pitched road from Butwal to Pharsatikar and another from Butwal to Amuwa links the command area, other roads in some head, middle and tail locations have only been gravelled. In most of the Maujas, the regular transportation facility is available. Along with the access of road and transportation facility, the farmers have got chance to sell their agricultural and livestock product to the market area and buy the essential commodity. The access to electricity, supply of safe drinking water, health and the communication facility is increasing though not sufficient. There is also the system of organizing Hat Bazar (periodic market mostly once and sometimes twice a week) where the farmers sell and buy the agricultural product as well. In the command areas, Hat Bazar is organized in Pharsatikar on Saturdays and Tuesdays. In Motipur, it is organized in on Thursdays and in Semlar and Buddhanagar, Hat Bazar is on Fridays. There are market shops in some places of the command areas where people can consume commodities everyday as per their necessity.

Key informants reported that there are governmental and nongovernmental institutions such as Sahakari, Rural Swabalamban, and educational institutions, banking and finance and medicals providing public services. Local co-operative groups like forest user groups, teachers groups, Youth Clubs, Ex-Army Union called “Bhu. Pu. Sainik Sanghas”, Mother

groups, ethnic groups like Magar Sanghs, Gurung Samaj, Chhetri Samaj, Tharu Samaj are formed and working in the community of the command areas. According to the Agricultural office record 2009, there are 25 non-governmental organizations (NGOs) of the command areas registered in the District Administration. And some other international non-governmental organizations (INGOs) work in wide range of areas such as the integrated rural development, poverty alleviation, health awareness, women empowerment and development, environmental protection, Dalit upliftment, educational development, community development etc. Likewise, Agriculture Service Centre provides the technical services, training and counselling to the farmers for improved farming, processing and marketing of agricultural commodities. There are some other unregistered NGOs also working in the command areas.

4.3.1 Educational Status of the Command Area

According to the District Profile 2009, the total literacy rate of Rupandehi district is 66 percent, male literacy is 76 percent and female literacy is 56 percent. There are a lot of educational institutions being developed in the command area such as governmental, private, public ones. But no equal access of education facility in each Mauja. In comparison of all four Tapahs, Chha No. Tapah has more school and colleges. The highway linking east-west passes through the command areas of Chha No. Tapah. The influence of Butwal Municipality is found in the development of educational institutions in this area. Eghar No. Tapah, the biggest tapah of Char Tapah, even though it is rural area, has higher educational development.

Some Mauja have more educational facility and some other Mauja have no educational facility at all. For example, in Pharsatikar mauja of Eghar No. Tapah (where the researcher lives) has four secondary schools (one government and three private), one lower secondary (private), two private +2 colleges and a public college. But in the East Mainahiya Mauja of Eghar No. Tapah which is the researcher's membership area is not so far from Pharsatikar mauja (they are neighbouring maujas), there is hardly a public primary school. And in its neighbouring Mauja 'West Mainahiya', there is no educational facility. It is so

because Pharsatikar mauja is a command VDC of Eghr No. Tapah and hill migrants, who are more conscious about the value of education, live in that area. And in Maianahiya maujas the majority Tharu communities live who are less conscious about schooling of children. Because of the influence of modernization and urbanization, the awareness about the importance of education is increasing gradually.

Table – 2: Educational status of respondents by caste/ethnicity, age and sex.

S.N	Caste/ ethnicity	Age	Sex	Tapah	Educational Status
1.	Brahmin	44	Male	Khadawa	B.A / B. Ed.
2.	″	46	″	″	Literate
3.	″	″	″	″	″
4.	″	42	″	″	I.A
5.	″	54	″	″	S.L.C.
6.	″	36	″	″	″
7.	″	48	″	Eghar No.	″
8.	″	60	″	″	″
9.	″	38	″	″	I.A
10.	″	56	″	Chha No.	S.L.C.
11.	″	47	″	″	″
12.	″	62	″	″	I.A
13.	″	″	″	″	″
14.	″	38	″	″	B.L
15.	″	43	″	″	B. Com.
16.	″	51	Female	″	Secondary
17.	″	48	Male	Panch No.	Literate
18.	″	43	″	″	S.L.C.
19.	″	41	″	″	Secondary
20.	″	55	″	″	Literate
21.	″	72	″	″	″
22.	″	51	″	″	″
23.	″	34	Female	Khadawa	Primary
24.	Tharu	53	Male	″	Literate
25.	″	52	″	″	″
26.	″	59	″	Eghar No.	Lower Secondary
27.	″	57	″	″	Secondary
28.	″	48	″	″	S.L.C.
29.	″	47	″	″	Literate
30.	″	51	″	Panch No.	″
31.	″	36	″	″	″
32.	Magar	57	″	″	Lower secondary

33.	**″**	**43**	**″**	**″**	**Literate**
34.	**″**	**″**	**″**	**″**	**Secondary**
35.	**″**	**68**	**″**	**Chha No.**	**″**
36.	**″**	**56**	**″**	**″**	**Literate**
37.	**″**	**44**	**Female**	**″**	**S.L.C.**
38.	**″**	**49**	**″**	**″**	**Secondary**
39.	**″**	**60**	**Male**	**Eghar No.**	**Lower Secondary**
40.	**″**	**22**	**″**	**Khadawa**	**I.A**
41.	**Gurung**	**48**	**Female**	**Panch No.**	**Primary**
42.	**Dalit (B.K)**	**50**	**Male**	**″**	**Literate**
43.	**″**	**″**	**″**	**Chha No.**	**Secondary**
44.	**Newar**	**52**	**″**	**Eghar No.**	**″**
45.	**Thakuri**	**40**	**″**	**Khadawa**	**Literate**

Source: Field Study 2011.

4.3.2 Subsistence Pattern

Subsistence of people of command areas depends on various economic activities such as agriculture, livestock rising, and different kinds of business, wage labour etc. People are adapting different types of occupations. Social identity, social relations and the unit of stratification accessibility to resources influence in adapting such occupations.

Almost all of the key informants revealed that they occupy agriculture as first occupation. People are engaged in government services, higher education, and wage labour of local/national/international, abroad study, trade/business etc. Most of the females work as housewife. Only limited numbers of female are engaged in outside work and occupation. Some ethnic/social groups are adapting their traditional occupation such as tailors in stitching clothes, goldsmith in ornaments, masons repairing building, blacksmiths repairing iron tools, cobblers making shoes, women's in weaving and stitching clothes as well. Traditional healing practice by priest, Lama to cure the sick people is found at present too.

4.3.3 Agriculture

Agriculture is one of the main occupations for subsistence in the command areas of Char Tapah. Presently the practices of main crops growing in the area are paddy, wheat, maize, mustard lentil, and vegetables etc.

Majority of the water users' household are practicing agriculture as the main source of income. According to the key informants, the level of dependency on agriculture as the main source of income varies from mauja to mauja. The head and middle locations of the command areas are increasingly being urbanized for a decade. The agricultural lands are reduced because of the fragmentation of lands with modernization and urbanization. In Chha No. Tapah, more agricultural lands are being fragmented and used for settlement.

There is the practice of 'Parma' system as well. But this practice is reducing gradually. Most of the agricultural labours are wage labours. Some Maujas have large command areas whereas some Maujas have very small command areas and some water users own higher amount of landholding and some users own small amount of landholding.

There are three types of land tenure status found in the command area which is similar in all Maujas. These are: absentee landlords, owner cultivators, and tenant cultivators. Owner cultivators are those who have their own land which they cultivate themselves. Tenant cultivators do not have their own land that they cultivate the lands of absentee landlords who do not cultivate their land. Tenants are relatively poor and marginalized farmers. Tenant cultivators cultivate the land of absentee landlords on crop sharing basis. Two different types of tenant cultivating practices are found in the command areas. These are called 'Thekka' and 'Adhiya' system in local term. In Thekka system tenants have to share paddy only to landlords either the production is high or low. They have to pay 'Kattha Muri' (i.e. one muri per kattha) which becomes twenty muri per Bigha and all production inputs borne by tenants themselves. Whereas, in Adhiya system tenants have to share production inputs equally such as seeds and costs of fertilizer, irrigation charge but all labour inputs are from the tenant farmers. They share all crop production equally. The agreement for contract is verbal which is done for a year. The landlords can change tenants as per their will each year.

4.3.4 Cropping Pattern

Farmers produce paddy, wheat, maize, corn, mustard, lentil, vegetables in the command area. Paddy, wheat, lentil are the principal crops. Paddy is the main crop of water users which needs more water. It is transplanted in the field in July and harvested in October and November. After harvesting paddy farmers grow wheat, vegetables, lentil, mustard, potatoes from November to January and February. Mixed cropping is also found in some places for instance peas, beans with corn, mustard with wheat, maize. From January and February to March and April farmers grow corn, green vegetable, onion, garlic etc. And some farmers grow only two crops: first one is paddy and second depends on the choice of farmers and types of land.

Table -3: Cropping Patterns of the Command Area

1.	Paddy – wheat – corn
2.	Paddy – wheat - vegetable
3.	Paddy – vegetable - corn
4.	Paddy – lentil - fallow
5.	Paddy – mustard - vegetable
6.	Paddy – mustard - corn
7.	Paddy – wheat - fallow
8.	Paddy – mustard - fallow
9.	Paddy – potato – onion/garlic
10.	Paddy – wheat - onion/garlic
11.	Paddy – wheat + mustard - onion/garlic

Source: Field Study, 2011

Farmers grow higher yielding new verities of paddy such as Sama Mansuli, Sabitri, Mala, Sonam, Radha-17, Sarju-52, Rampur Mansuli, Radha-4, Kanchhi Mansuli etc. Mostly in winter season they grow potato, onion, garlic, green vegetables such as cabbage, cauliflower, pumpkin, peas, beans, rajma, chilly, tomato, radish, spinach etc. Some farmers grow only for domestic consumption. They sell only when they stock for a year whereas others grow for profit or earning the cash.

According to District Agriculture Development record 2009, the cropping intensity or Rupandehi district is 145.12%. The cropping intensity of the command area varies according to the type of land and availability of water which ranges from 100% to 300%. The average cropping intensity of the command area is above 200%.

The agricultural land is called ‘Khet’ in local term which is of two types. These are ‘Khala Khet’ and ‘Danda Khet’. Khala Khet is covered by water for 6 to 8 month and Danda Khet is in height which mostly needs more water for agriculture. According to type of land and choice farmers, different types of crops are planted. Mostly tail reach farmers are facing the problem of water scarcity in winter season so that they cannot grow more crops as head and middle reach farmers grow. Cropping pattern largely depends upon availability of water for irrigation.

4.3.4 Animal Husbandry

It is one of the most important means to support agriculture and livelihood strategy in the command area of Char Tapah. Water users have raised different sorts of animal husbandry such as buffaloes, cows, goats, pigs, and poultry. There is also a system to herd livestock in the morning and day time after 3/4 pm in the fallow land, sometimes at the side of road also. Buffaloes and cows are raised for milk. Most of the farmers raise cows and buffaloes for household subsistence and others raise them to sell dairy product for cash income. Some raise buffalo son and cow son for ploughing the field which is very rare at present. Goats, pigs and poultry are raised for meat production. Some users tame fishery to sell and earn money. The users earn good cash income from livestock raising.

Another implication of livestock raising is that animal’s dunk is used for cooking fuel as firewood and gas planting. Moreover, it is used as compost and ash from burning of dried dunk used in crop production which works as anti-bacterial. Sometimes water users in the command area have to face the problem of stray cattle that those cattle destroy crops and demolish the irrigation canals as well both at night and day time but most often in night time. It is difficult to

recognize the owners of stray cattle who they leave old oxen, barren cows etc. after accumulating benefits.

4.3.5 Other Economic Activities

There are some other income generating activities among the water users. Some household members of water users are involved in different services such as teaching, British army, Indian army, employed in government and private sectors, some others have gone abroad for wage labour. Because of growing population and urbanization, some households are practising the small scale business such as hotel, lodge, restaurants, tea shop, fruit stall, cyber cafe, vegetable stalls, wholesale, and trade market, garage, furniture, transportation etc. Mostly women are involved in stitching, weaving, tea shop, market shop, household work, animal husbandry, and teaching as well.

Wage earning is another important economic activity practising mostly by poor and marginalized water users for their livelihood. They are either agricultural wage labours or other types of labours work in construction site, mills, furniture, pottery, driving. And the wage labours are both male and female from child to adult but most of the wage labours are adult males. There is gender bias while paying wage fee. Women are paid from Rs. 150 to Rs. 200 whereas male members are paid from Rs. 200 to Rs. 500.

CHAPTER – V

ORGANIZATIONAL ACTIVITIES OF THE SYSTEM

This chapter presents a brief introduction of the irrigation system, organizational structures, irrigation activities and the social and organizational changes. The organizational structures include joint management committee, membership, general meeting, general assembly, and executive committee. Irrigation activities cover construction, operation and maintenance, water acquisition, water allocation and distribution, resource mobilization, decision making and planning, conflict management, graduated sanctions, and communication and co-ordination.

5.1 Brief Introduction of the Irrigation System

The Char Tapah Irrigation System is one of the Farmer Managed Irrigation Systems of Nepal. The key informants reported that this system was established by the local users of four different Tapahs under the leadership of late Balbikram Shah in 1983 August 17 and named it 'Char Tapah' joint management of irrigation system. These are: Eghar No. Tapah, Khadawa Tapah, Panch No. Tapah, and Chha No. Tapah. Before 1983, these four Tapahs are running in their own way. Chha No. Tapah was running with the collaboration of Khadawa Kulapani Committee (i.e. present Khadawa Tapah) since 1969. After 1983 the system started in its own name 'Chha No. Tapah'. The informant of Panch No. Tapah revealed that the canal of this system has been functioning since 1959. Before 1983 this system used the water from eastern side of Tinau river where Sorah-Chhattish mauja shares water at present. After 1983 the system started in the name of Panch No. Mauja and registered as the form of committee in 2001. Before the unity of Char Tapah, the Eghar No. Tapah was running separately since 1961.

The total users of this system are 6799, among them 2656 users from Eghar No. Tapah, 1993 from Khadawa, 1250 from Chha No., and 900 from Panch No. Tapah. The ethnic composition of the system comprises; Brahamin, Chhetri, Gurung, Magar, Thakuri, Dalit, Newar and so on.

The heavy flood of 1981 destroyed the physical structure of different system including these Tapahs. Then they united and started to share water from the same diversion since 1983. They cooperated for the management of water for irrigation from the headwork to Mainabagar diversion intake from where the water has been divided proportionately to the respective command maujas.

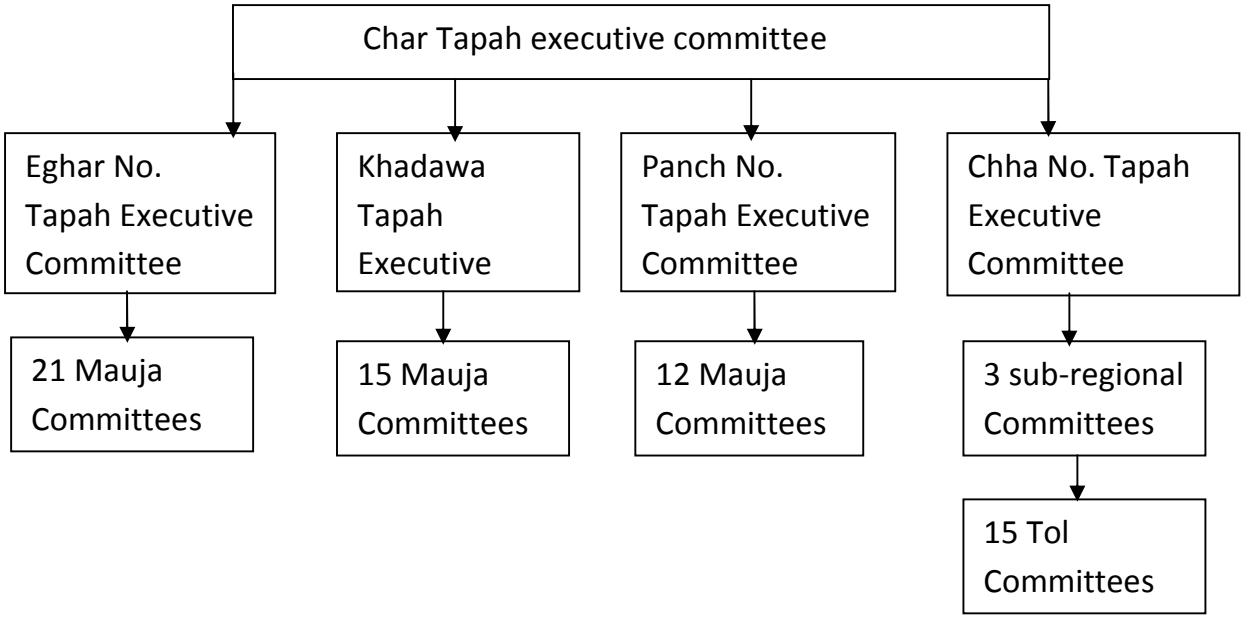
Previously the system was serving 11 villages of Eghar No. Tapah, 8 villages of Khadawa Tapah, 5 villages of Panch No. Tapah, 6 villages of Chha No. Tapah i.e. total 30 villages of Char Tapah joint management committee. Presently this system serves 55 villages located in the Butwal Municipality 13 Naharpur, 14 Belabs, 15 Nayagaun, and Motipur, Semlar, Saurah Pharsatikar, Khadawa Bangain, and Amuwa VDCs that becomes 23 villages of Eghar No. Tapah, 15 villages of Khadawa Tapah, 15 villages of Chha No. Tapah, 12 villages of Panch no. Tapah.

Water users organize for the management of water for irrigation as a ‘common property resource’ as Fisher (1989) defines common property resource is property which is shared by a specified group of people with specified rights as opposed to open access resources without any restriction. Such practice as the users of Char Tapah organize and manage water a natural resource as common property is well established in institutional arrangements based on customs and tradition. Pradhan (1989) explains water as community property needs well-organized system based on community decisions. In Char Tapah irrigation system the irrigators are also preserved and managed water resource as community property and distribute benefits to the members of the community in a well-organized way. They made collective decision about irrigation and irrigation related activities are performed collectively by the beneficiaries.

5.1 The Organizational Structures

See page 27-28 for more detail.

Figure -4: The Organizational Structure of the Water User's Committee



5.2.1 Char Tapah Joint Management Committee

As four different Tapahs united and started to share water from the same diversion since 1983, they formed a joint management committee under the leadership of late Bal Bikram Shah. The representative is selected through democratic process i.e. direct election process from all four Tapah and quota is divided on the basis of size or command area of respective Tapah.

Key informants revealed that being a largest Tapah the leadership was given to Eghar No. Tapah on consensus in the past but now this tradition has changed and leadership is given or selected on the political affiliation. Those persons are chosen who can impress the farmer. Now the leadership is elected from Khadawa Tapah the second largest Tapah. Before 1983, the leader was chosen on consensus but since 1994 the election process was followed in the selection of leader to this system. In the present Executive committee, 2 members are elected from Eghar No. Tapah, 2 members from Khadawa, 1 from Panch No., and 1 from Chha No., other 4 mambers from each Tapah representative. They are nominated through their Tapah and sent to committees making a total of 10 members. In this executive committees comprising 10 members, one is elected as the chairman, one senior vice-chairman, one vice-

chairman, one secretary, one treasurer, one vice-secretary, and other 4 representatives of respective Tapah remain as members.

Other 7 members are nominated by the executive committee from four different Tapah considering caste, ethnicity and gender participation. There are 4 female members, 2 from Janajati and other 2 members from Brahamin and 3 male from Janajati nominated in the committee at present. Then, they also form an Advisory committee of 11 members. The experienced, knowledgeable people, caste, ethnic representatives from all Tapah are nominated for this committee. They cannot play role in decision making, can only provide suggestions to the executive committee. The committee comprises of 8 knowledgeable Brahmins, 2 from Tharu and 1 from Dalit nominated in the committee.

Through the formation of executive committee the system completes a number of irrigation tasks such as pulling the resources from the external agencies for infrastructure development of the system, co-ordination of the organizational activities between four different Tapah. The committee ensures the right of water from the main diversion, 36 percent to the command area of Eghar No. Tapah, 28 percent to Khadawa Tapah, 18 percent to Panch No. Tapah, and 18 percent to Chha No. Tapah, and mobilizing the cash and labour resources proportionately on water share basis for the operation and maintenance of main canal and dam.

5.2.2 Membership

Four different Tapah has taken the membership of Char Tapah since the system started in 1983 and registered in district irrigation office division no. 6 in 1999 in the name of Char Tapah Irrigation Water Users' Association. The executive committee of each Tapah was formed in different time on their own way. Executive members are elected by voting system. General Assembly members can only participate in the election process or the voters must be the member of General Assembly. The membership is given on the basis of water allocation, for instance, one member equals per Aana. So it becomes 36

members from Eghar No., 27 from Khadawa, 18 from Panch No., 18 members from Chha No. Tapah.

There has been a norm of providing membership to New Mauja on the basis of initial cash contribution. For instance, if a mauja wants to join in Eghar No. Tapah, it has to pay Rs. 6500/- for the membership of its users. This sum is collected from the potential household member as per the size of land to be irrigated. If any mauja is not benefited or unsatisfied from the system, users can drop the mauja membership of respective Tapah. If any mauja left the system previously wants to join the system again, it should pay Rs. 6500/- for the resumption of membership. They cannot take back their money when they closed the membership.

Similarly, if a mauja needs to increase the existing number of Kulaharas, it has to pay Rs. 700 per Kulahara. If the payment is not given then the membership is automatically dismiss. The membership criteria are similar but not the same in four different Tapah. In Eghar No. and Khadawa Tapah membership is given from 1 to 4 members per Aana water but in Panch No. and Chha No. 1 member equals per Aana water. To take membership of the system i.e. membership of General Assembly, the member must be selected or elected from the respective mauja. One must take the membership of mauja. The general criteria to take membership are: irrigable landholding, permanent settlement, farmer, followers of rules and regulations managed in constitution, and citizens of Nepal.

5.2.3 General Meeting of Committee

Organizational activities are managed through the decision and the decisions are made through the wide discussion in general meeting and the decision are passed/approved through it which exists in all four Tapah and Joint Committee. There is the provision of holding meeting in each Char Tapah ‘constitution’ and other Tapah. Basically the meeting is called by the Chairman in any time as per the necessity in order to make discussion and decision on any complicated subject. If the 25 percent of total members are given written application to make discussion on any subject the Chairman has to call general

assembly meeting within 15 days from application date. And such meeting can discuss only the subject about which the application was given.

In Char Tapah main committee, only general assembly members (i.e. 127 members) who are selected from certain procedure can participate in it. And there are rules of having four representatives per Kulahara (i.e. each 4 Aana water user equals one Kulahara). Kulahara is a person who contributes labour for Kulahi. In each Tapah such system is prevalent except in Chha No. Tapah. In Chha No. Tapah, there is no such culture. Informants shared that the water users have taken it as the powerful decision making body which demonstrates the grassroots democracy in common property management. The water users are institutionally involved in the governance system that the voices of users are reflected in the formation of operational rules and regulations in policy making through their representatives in the command area. Basically, the principal functions of general meeting are: formation of the policies, rules and regulations, approval of annual income and expenditure, election of the functionaries of executive committee, making decisions on the issues raised in the meeting or general assembly, preparing annual work schedule for improvement and development of irrigation. The presence of 51 percent of total members is sufficient to make any decision.

5.2.4 General Assembly and Meeting

The ‘general assembly’, the organizational arrangement of Char Tapah constitutes 127 members elected by members of each mauja. The membership of general assembly is given on the basis of water allocation for instance one member equals per Aana. So it becomes 36 members from Eghar No., 27 from khadawa, 18 from Panch No., 18 members from Chha No. Tapah and other 28 including 17 executive members and 11 nominees are as assembly members automatically.

The General Body i.e. one to four representatives per Kulara, the selection procedure is different in each Tapah. In Eghar No. general assembly members are selected as one representative per Kulara by the members of mauja, in Khadawa they are selected as one to four representatives per Kulara,

and in Panch No. members are selected as one representative per Aana water user. If some uses less than one Aana water that value as one member. This system is not found in Chha No. Tapah. They only select and sent members for main body which becomes 18 members from three branch (i.e. 15 village level maujas). General body plays a role of guiding the work of executive committee for the improvement and development of the irrigation system.

5.2.5 Executive Committee

There is a system level executive committee of Char Tapah Joint committee consisting of 10 members among them 6 members (i.e. chairman, senior vice chairman, vice chairman, secretary, vice secretary, and treasurer) are directly elected by the general assembly of water users. The command area is divided into four regions. So there are four regional level executive committees which form and function as system level committee at their respective Tapah and coordinate with main committee. The four regional members are either selected or elected by the water users of respective command areas of the regions. Thus 10-membered a new executive committee is formed and this committee nominates maximum 7 other members including women, Dalit, Aadibasi Janajati (indigenous people) from Badhghar, Mukhiya, or intellectual farmer of all Char Tapah regions. Then they also form an 'Advisory Committee' of 11 members from intellectual farmers of the command area. The advisory committee is also form at regional level which can give only suggestions and advices to executive committee. The duration of the executive committee is 3 years if the election is not completed in time, and then they can add another 6 month from expired date.

The functionaries have to be accountable to the water users' community. If they failed to maintain transparency and accountability in their system and promote the equitable distribution of benefits, the water users would begin to lodge the complaints against them. Political grouping plays important role in electing the functionaries in each tier of organization. The issue of unaccountability and injustice are capitalized during election time that those

may not be elected again. But party politics is not played within the organization after election.

The functions of that committee is to conduct meeting, make discussions about the related issues, take appropriate decision, approve financial issues, imposition of irrigation fee, fine, and make policy, planning, revise and reformation of constitution, rules, regulations as per necessity of time, form sub-committee and dissolve it as per necessity, financial management. There is a fund of Rs 33 thousand (i.e. Rs. 12000 from Eghar No., Rs. 9000 from Khadawa, Rs. 6000 from Panch No. and Rs. 6000 from Chha No. Tapah) established for committee management which is spent in emergency situation.

There are other functions of committee such as the management of wage, delegation of authority, auditing, formation of auditing committee and election committee. Key informants revealed that the functionaries of the executive committee honestly take their responsibilities as mentioned in constitution which are as follows:

a. Chairman takes the role of leadership, calls meeting, and takes decisions being within the boundary of constitution and implement the decisions made by the general assembly.
b. Senior vice-chairman helps the chairman and works in the absence of chairman except economic behaviour.
c. Vice-chairman helps the chairman and senior vice-chairman, works in their absence; especially he takes the responsibility related to Kulahi and allocation and distribution of water.
d. The role of secretary is to help chairman, maintaining accounts, keeping official records and document safe, conducting meeting.
e. Vice-secretary helps secretary, works in his absence, and helps in the implementation of decisions made by committee.
f. Treasurer mobilize fund after consulting with chairman, takes the whole responsibility of economic behaviour, and maintain the records of financial issues.

g. There is also an Advisory committee formed by regional level executive committee.

In Panch No. and Chha No. Tapah there is the system of selecting a 'Mauja Mukhtiyar' now called as 'Mauja Mukahiya' from mauja leaders at the regional level who receive the message from executive committees about organizational decisions and activities and inform the water users. Especially, Mauja Mukhiya takes the whole responsibilities of Kulahi from village level to system level and prepares water schedule and distributes water by ensuring the equity. He also directs the Chaukidars in the delivery of necessary messages from committee to Mauja and collects complaints and decisions made in each mauja through Chaukidar and delivers it to system level committee as per the necessity.

There are four regional level executive committees and various mauja level committees within each Tapah (region). Eghar No. Tapah has 23 mauja level committees, Khadawa Tapah has 15 maujas level committees, Panch No. Tapah has 12 mauja level committees and Panch No. Tapah has 3 sub-regional committees and 15 mauja level committees. Mauja level committee is the lowest level of organization of the water users. There are 2 to 11 functionary members in the mauja level committee selected through mauja level general assembly and nominated as mauja leader each year in each mauja. The duration of that committee and elected functionaries is two years but the mauja leaders remain as members are selected each year. Like regional level committee and main committee, the functionaries take the responsibilities as their post demand. There is also the culture of making committee inclusive by adding other members from Dalit, Aadibasi Janjati, and women.

There is the system of selecting Mukhtiyar, Badhghar and Chaukidar as per the necessity at mauja level. In some mauja the same person plays the role as the Mukhtiyar, Badhghar and Chaukidar. Basically, like in Panch No. and Chha No. Tapah 'Mauja Mukhtiyar' takes the responsibility of Kulahi within village to system level. The role of Badhghar is to assist Mukhtiyar and takes responsibility in his absence and the role of Chaukidar is to communicate

messages from main committee to water users' household and mauja to regional and system level. Institutionally, they work as contact persona with the system level executive committee.

5.3 Irrigation Activities

Irrigation activities refers to design and construction of canal system, operation and maintenance of the system, acquisition of water, allocation and distribution of water, resource mobilization, conflict resolution, graduated sanctions, decision making and planning, communication which are discussed below.

5.3.1 Construction

This system is old so most frequently the minor constructions are performed by the participation of local people. Now the new constructions are running through the help of government and WB. At the field work period, 75 percent construction had completed and the remaining work was on the process. The development was launched by the fusion of scientific knowledge with indigenous knowledge. Functionaries consult with the users and engineers while designing the construction. They are building new dam, deviser, and diversion intake in different places using modern technology. They are wishing to make cemented deviser in each diversion and Mohada from head to tail location. Most of the informants of the command areas said, "It is yet to look how effectively the construction will support the farmer and how much will it be sustainable in the management of irrigation to this system". Farmers have high hope toward it. If it functions well, the users will get rid from Kulahi and utilize the saved time from Kulahi in agricultural activities. Then, the production will be high that will support to increase GDP.

If the government helps regularly in the future the users also have hope to construct canal and office building of main committee. Eghar No. Tapah and Khadawa Tapah have already built the office hall that Eghar No. at motipur 7, Ranibari and Khadawa at Semlar 9, Belbhariya. Other two Tapah do not have office building.

5.3.2 Operation and Maintenance

There are formal committees from system to mauja level to operate the system. Functionaries especially vice chairman at system level, the chairman and Mukhiya at regional level and Mukhtiyar/Mukhiya/Badhghar at village level play the important role in making the system operational. The users have developed the rules and regulations through the ages to operate the system and resolve the problem by themselves. Applying the local technology and indigenous knowledge in irrigation management has been developed as a part of the process of adaptation.

Maintenance is the task of cleaning and repairing the system for smooth and efficient flow of water. In Char Tapah maintenance work is started after harvesting winter crops and before starting planting paddy. There are mainly two types of system for maintenance i.e. 'Sheer Kulahi' and 'Dhule Kulahi'. Dhule kulahi is limited within each mauja so it is also called 'Bhitri Kulahi' which is completed before starting Sheer Kulahi.

According to the constitution, the system of labour is defined as Sabik and Jharuwa as referring to one and two person per Kulahara water allocation respectively. Sheer Kulahi is conducted from May to September which involves the removal of sands and stones, making dam at main canal through village level. Sheer Kulahi is of two types i.e. 'Jharuwa Kulahi' and 'Sabik Kulahi'. In Jharuwa Kulahi each Tapah sends double Kulahara of Sabik Kulahara size. For instance, Eghar No. Tapah sends 20 Kulahara for 16 Aana water users in Jharawa Kulahi and 10 Kulahara for each 16 Aana water users in Sabik Kulahi. Similarly, Khadawa Tapah sends one Kulahara per Aana in Jharuwa Kulahi and in Sabik Kulahi one Kulahara for each two Aana water users. Every household of users has to contribute required labours. If they cannot contribute labours, then, they have to pay irrigation fee as determined by Mauja rules. All the irrigators work as one group. They accomplish the maintenance task by preparing routine. But it can be done at any time in emergency. There is also a system of maintenance which is called 'Hiude Kulahi' which occurs for maximum four days from November to February.

Vice chairman from system level, the chairman and Mukhiya from regional level and Mukhtiyar/Mukhiya/Badhghar from village level mobilize the Kulaharas from their respective command areas in proportion to the size of irrigable landholding, assist and check for proportionate the work assignment. All the decisions about organization and maintenance are made through the meeting of executive committee from system level to village level.

5.3.3 Water Acquisition

Water acquisition is the process of acquiring water from the water source which is related to the design, construction, operation and maintenance work which are mentioned above. The source of water for this system is Tinau and Danab river. Though it is challenging task for women, the women and men of lower income group are involved for monetary gains.

Water acquisition is possible through the coordination and cooperation between water users of the command area. There is the unity among the users from different Tapah. They perform different task to acquire water from main source to their fields. In the past, it was run in traditional way. But now development intervention is launched with consulting engineer and local users. Mainly natural disaster i.e. heavy flood creates problem in it. Key informants viewed that the planning should be put forward to solve this problem through the national level.

5.3.4 Water Allocation and Distribution

Water allocation is the assignment of entitlement to water for an irrigation system which comprises the access to use water and quantity of use right. Distribution is the implementation of the allocation principle agreed upon by the beneficiaries which deals with the actual delivery of water from outlet of main canals to the fields depends on the number of Kulaharas assigned to contribute. There is another Sorah-Chhattish system driving water from Tinau like Char Tapah. Sorah-Chhattish is entitled to receive 60 percent and Char Tapah to 40 percent of total flow available from the Tinau river. Char Tapah diverts its amount into Danab river and enters into two intake points at three places shared by Chha No. branch and other three, Panch No. branch and other

two, Eghar No. and Khadawa through proportioning structures which automatically divide the flowing water as per the agreed allocation principle. It was observed during the period of fieldwork. Chha No. and Panch No have right to divert 18.18/18.18 percent, Khadawa has right to divert 27.27 percent and Eghar No. has right to divert 36.36 percent.

The basis of allocation of water between four irrigation systems has been the size of their respective command area and the proportion of the number of Kulaharas to be sent for the repair and maintenance of the joint operated systems, including the headwork. The water is allocated and distributed from each Tapah to their respective maujas and each mauja to field canals of landholdings according to mauja rules providing by constitution made on the basis of landholding size and labour/cash contribution.

5.3.5 Resource Mobilization

Resource Mobilization is one of the most important functions of irrigation organization which involves the effective mobilization of labour, money, material, leadership, information for the sustainable management of the irrigation system. In this system, internally and externally available resources are mobilized in the management of water for irrigation. Internal resources such as labour, cash (i.e. irrigation fee instead of labour contribution, fines) and locally available resources like Gal, Pagaha, Kodalo, Jhala-syaula, Godikhutti etc. which are brought by Kulaharas with them as asked are used in maintenance. In the peak season of kulahi, 1000 to 1500 Kulaharas are mobilized each day for joint operation and maintenance.

There is internal fund collected at system to mauja level system on the basis of landholding size that is spent in wage, emergency maintenance, system management etc. The functionary members are paid through internal fund as determined by respective committee and they are not asked to pay labour contribution or irrigation charge. Users from system level to village level are asked to contribute labour in the form of Kulahara for kulahi and bring locally available resources with them. If they do not pay as required, they will have to pay Jhara (fine) as determined in the constitution. And there is the system of

paying annual irrigation fee in place of labour contribution and collecting absent fee, fine for the violation of rules, water theft which is collected in respective committee from system to mauja level. Within mauja annual water charge is Rs. 3000 to 3500 per kulahara. In regional level system, there is the practice of lately added maujas. For instance, Eghar No. Tapah collects Rs. 180500/- annually as water charge from maujas where they are not required to pay labour for system maintenance at regional level. Similarly, in Kailashnagar mauja of Khadawa Tapah pays Rs. 6000/- annual water charge. Basically, it is difficult to allocate labour for small mauja, in such case the water charge is asked for them.

External resource is taken through external agencies as collaborative effort by the water users with other agencies i.e. government and WB. Government has provided Rs 1crore 45 lakh for new construction where 20 percent is the labour contribution by the users. There is another project of WB providing financial support for Motipur-Khadawa Irrigation Development where they are constructing some deviser, canal within the command areas of Eghar No., Khadawa, and Panch No. Tapah but Chha No. has not got the support. The district irrigation office has been providing wire, net, rope for repair and maintenance at emergency period.

5.3.6 Decision Making and Planning

Basically, the decisions are made by the users themselves in the management of water resource to this system. It involves the participatory decision making process. They have been adapting democratic culture while making any decision. At mauja level, all the water users have the opportunity to share their views during the mauja level general assemblies and other mass meetings. The genuine voices of the users from male/female, caste/class structures are heard by the concerned functionaries and staffs then, decisions are made accordingly on the basis of their consensus. Women and disadvantaged groups have low level of participation in decision making and planning. The system itself is not as obstacle but the lack is the awareness, interest, knowledge and experience about irrigation activities.

If any genuine problems related to irrigation activities are presented in the discussion, the decisions are made immediately to solve them in a participatory way. The problems related to respective mauja can be solved at the mauja level by the functionaries and members of that level. If there cannot be resolved, this is communicated to higher level committees. Then, the functionaries of main committee resolve it. General meeting and general assembly are the powerful decision making bodies where the representatives of water users participate from each mauja at higher level and at mauja level all the beneficiaries participate in it. If any conflicting situation occurs, the meeting is called by the respective executive committee, then; the resolutions are made and passed through consensus. If they are unable to make consensus between participants, they resolve it through voting system.

The plans for irrigation management and development are formulated every year in each tier of organization. The committees prepare the routine for system maintenance, water distribution on allocation basis, mobilization of resource on landholding basis. The planning is made through consensus for development intervention as per the necessity they consult with knowledgeable, intellectual farmers and technicians. They revise it each year.

5.3.7 Conflict Management

While using the water as a common property resource, the competition between the users may occur as conflict. Sometimes the conflicts occur in the system but these are resolved and managed locally. The water users have developed their own indigenous system of conflict management. There are formal and informal laws to resolve the conflicts. Such conflicts occur at mauja to system level. The types of conflict frequently occurred in this system can be analyzed in three way i.e. inter-systemic, inter-mauja, intra-mauja conflict.

The conflict between irrigation systems is called inter-systemic conflict which is resolved at system level. The conflict that occurs between and among the maujas of head, middle and tail locations is called inter-mauja conflict that is resolved through regional executive committee. The conflict that occurs within mauja between head, middle and tail reached farmers is called intra-

mauja conflict which is resolved within mauja. If they cannot resolve it within mauja, they go through respective Tapah committee. Everywhere in the system the nature of conflict is the violation of water distributional turn, water theft and unjust distribution of water between the users. Inter-mauja conflict occurs sometimes during paddy nursery bed preparation and intra-mauja conflict occurs frequently during paddy nursery bed preparation and sometimes paddy and maize cultivation period.

Sometimes the conflicts occur at Kulahi between Kualharas about division of work which are solved by responsible person i.e. vice chairman at system and regional level and Mukahiya at mauja level. If they cannot resolve it, then they go through the committee meeting. There is the culture of resolving conflict through the consensus, mutual discussion, and negotiation. For example, if any mauja steals the water in the turn of another mauja, it charges Rs. 1000/- to 5000/- per day for the first time, the charge is doubled for the second time. If an individual steals the water, he will be charged Rs. 150/- to Rs. 500/- for the first, the charge is doubled for the second time and night time; it varies from one system to another, one mauja to another mauja. If they do not pay required fine the Mohada of blamed side will be blocked. Sometimes the conflicts occur about water rights which made the water users unite into a system. The conflicts about water right are resolved through the application of ‘prior appropriation doctrine’ and ‘riparian appropriation doctrine’ in this system. Prior appropriation doctrine claims exclusive use right of water of first appropriators and riparian claims first in time first in rights.

5.3.8 Graduated Sanctions

Graduated sanctions are enforced in the violation of rules as provisioned in the constitution of the system. Generally, these are penalty rules for the users, officials who violate the operational rules. In CPRs management, the users have developed certain rules to punish sanctioned behaviours in this system which are imposed in various ways. For instance, if a person breaks the irrigation rules, he will be fined called ‘Khara’ and his Mohada will be blocked if he does not pay fine on time.

The sanctions are imposed on the violation of rules: water theft, irresponsible functionaries, staffs, absentee Kulaharas, delay payment of irrigation charge, fine, dishonest Kulaharas during kulahi, non compliance of assigned work by the Kulaharas within mauja, or by maujas within Tapah, or by Tapahs within the system. The fine for the mauja and Tapah is decided by general assembly every year. The amount of graduated sanctions for individual which is decided locally by the users themselves varies from Tapah to Tapah and mauja to mauja. In the case of Chha No., if any user steals water for the first time, he will be fined Rs. 150/- per day, Rs. 300/- for the second time and Rs. 150/- at day time, Rs. 300/- at night time. If any user or mauja violate, the rules again and again, he/she will be excluded from the system.

5.3.9 Communication and Co-ordination

Communication and co-ordination of organizational activities are important for the smooth functioning of irrigation system. In Char Tapah, there is the unity in diversity among the users which is possible through consensus, co-ordination. The leaders play the important role by taking their responsibility to make the unity and build consensus among the users. For the development of this system, the leaders play role of co-ordinators with external agencies as well. Co-ordination becomes possible through communication between the same interest groups.

The organizational activities are communicated through channel. The decisions are made through committee meeting and communicated to each Tapah by the respective Tapah leaders. Then, the necessary information from main committee and the irrigation activities of respective Tapah is sent to their respective command maujas through conducting meeting between committee members and representatives of mauja i.e. Mukhiya or Badhghar and informing them about the decisions and plans. Then, Mukhiya or Badhghar or Chaukidar delivers the message to the beneficiaries at village level either orally or by sending letters or by visiting the command household. The necessary messages are delivered to external agencies such as District Irrigation Office through

delegation. Within the command area of this system, the messages/information are communicated through phone call, letters or orally.

Photo No. 4 and 5: Users Involving in Bhitri (Dhule) Kulahi at Chaa No. Tapah

5.4 The Social and Organizational Change

There are some remarkable changes in the pattern of social interaction, social relation, economy, and environment. These infrastructures have influenced the evolution and direction of human adaptive process because there is the relationship between infrastructure, structure and super structure. The change in one factor causes the changes in other factors.

The main source of water is Tinau River for this irrigation system which slowly decreases except in rainy season. It directly affects the agricultural pattern. So there are also some changes in social life and in whole system. Because of overpopulation in Butwal as well as other command side, the water source Tinau is mainly used for drinking water. In rainy season also the water source depends upon nature i.e. rain. People are less interested in agriculture. Social institutions such as family and social organizations are taking new shapes and roles. Moreover, population in rural area is increasing and the demographic fluctuation influences the irrigation system too.

There are some changes in the occupation of people. Now a day, they adapt many types of occupations and generate income from different sources which influences the human resource investment in irrigation. Some fields have been left fallow due to scarcity of water and manpower and cropping intensity has decreased. Large numbers of people are out of the village for wage labour and for education. Subsistence patterns have been changed; people have adopted different occupations like industries, large and petty business,

government and private services etc. There is high rate of social movement for different purposes.

Due to the changes in the community, some changes like contact with other societies through migration etc. have occurred in the behaviour patterns of people of this area. Changes in the social structure, pattern of interaction, shift in power, family, and education etc. influence the irrigation activities. The effect of modernization i.e. market, tourism, transportation etc. can be seen on people of the command area. They use some advanced tools (i.e. farming tools technology used in irrigation activities), political organizations, schools, or education status villagers have affected the traditional structure of irrigation system.

Table -4: Some Organizational Changes as Revealed by the Informants

In the Past	In the Present
1. No role of external agencies at all, only District Irrigation Office used to provide help occasionally in crisis and emergency that the users have to face many difficulties in O & M.	1. Now the government and WB have provided some financial and some technical support that the users are feeling some relief.
2. The system was running informally, there were neither constitution nor executive committee and members. Before 2002, there were a Mukhiya as head of the organization and a Chaukidar.	2. At the present this system is registered in District Irrigation Office and it is running through constitution and committee with more functionaries.
3. Maintenance was traditionally done that farmers had to bring Jhala-Syaula, GodiKhutti etc. from their house and repair dam from system to the field channel.	3. The local resources less used because there is the construction of cemented Intake, Iron Gate in the diversion.

4. Leadership was chosen through consensus and their duration was unlimited. 5. No equitable distribution of benefits that there was the lack of transparency and accountability in resource mobilization. 6. Decisions were made by the head of the system that there was the possibility of monopoly. 7. The functionaries were not paid. 8. The majority Tharu ethnic group were at leadership position and managing the system in traditional way. 9. The organization was informal but the users were more disciplined that they were followed the leaders.	4. Leadership is chosen through direct voting system and their duration is limited. 5. Annual expenditure is presented in general assembly meeting. 6. The important decisions are made through general assembly in democratic way. 7. Functionaries are paid. 8. Tharu ethnic group are excluded from leadership because of lack of education and dominant position of hill migrants. 9. There is the formal organization but sometimes the users do not follow the representatives.

CHAPTER – VI

EQUITY ASPECT

This chapter presents equity aspect by analyzing transparency and accountability within the irrigation system, social equity in organizational structure, equity in costs and benefit sharing, information sharing, conflict management, and wage management and participation of women and disadvantaged group in planning, decision making and implementation process.

6.1 Transparency and Accountability

The degree of transparency and accountability among and between the users and leaders is high in this system. Key informants and respondents in FGD revealed that the functionaries have to complete responsible task as their role defined. Economic affair are performed through bank. Book-keeping is transparent that reports documents, letters are registered and kept safe by filing. If someone doubts, the functionaries have to answer. The functionaries are selected in a democratic way. They are contributing to this system by taking leadership, rights and responsibilities, demanding and delivering the external support where necessary, fulfilling the needs of users. Informants revealed that the leaders can be replaced if the users are not satisfied with them. The users are also accountable to the leaders and to the system.

Transparency is seen in the organization and institutional system which ensures trust and confidence between the members and the users in the community. It plays important role for the sustainability of this irrigation system. The operational rules and regulatory roles of functionaries, leaders as well as users rights are framed democratically and preserved in constitution. Informants in interview and FGD revealed that the beneficiaries are feeling the complete transparency in this system. There is the transparency of operational rules and constitutional provisions at system level. The decisions are made by authorized committees and powerful bodies such as general meeting of functionaries, executive bodies, and general meeting and finally approved by these bodies after elaborate discussions and deliberations. And approved copies

of operational rules are distributed to the responsible members, functionaries of different layers of respective committees and interested water users. Important decisions are made by these bodies as per the organizational necessity following transparent process i.e. making consensus through elaborate discussions and approved it.

Similarly the functionaries at regional (Tapah) level have framed their own operational rules through regional level general meeting and general assembly of the members and approved by them. Transparency of operational rules is maintained at system, regional level to mauja level. Executive committees are formed in such a way that they are following democratic process in nomination and selection of members so that they are transparent to the system and users.

There is the full transparency in the whole financial system. The main committee, other regional committees, and some mauja level committees have developed an auditing system to check the financial irregularities and misappropriations. They have the practice of getting all the accounts audited yearly, and keeping accounts through account committee. They account the yearly income and expenditure and hand over the executive committee which is presented in general meeting for the deliberation and approval at regional level. At system level the financial records of annual income and expenditure are maintained by the treasurer, and the record is presented in general meeting for deliberation and approval. If any responsible functionaries of executive committee at any level misappropriates any amount, that will be taken back by the executive committee applying the institutional norm strictly. The users may fine them and exclude them from the leadership and system. The audited report is presented in the annual general assembly for approval and deliberation.

In the same way the external financial support is also accounted transparently and presented and approved it accountably that all the bills are issued. They submit it in District Irrigation Office Division no. 6 Rupandehi. Though the system is not totally manageable, there we can find more transparency in economic affairs and cost and benefit distribution i.e. resource

mobilization in repair and maintenance and equitable distribution of water resources.

The decisions are made and passed/approved by making consensus as per the necessity of the system to fulfil the users demand in each tier of organization. Rules and regulations are made to fulfil the needs of beneficiaries. Internally, it is transparent. There one can find the records of general to specific activities, kept safe by Mukhiyas or Badhghars at Mauja level, chairman at regional and system level. The economic records are registered and audited by audit committee every year.

Since last eight to ten years, they have called general assembly of each mauja every year. If necessary, they can call the monthly meeting though there is the constitutional provision of meeting held in each two months. If the functionary members and leaders work for the provision of the users' interest, equitable distribution of irrigation benefits, the users begin to lodge the complaints against them. They are expected to be impartial and honest. If they performs the task unfairly and unjustifiable way, these issues are capitalized during the time of election and they may not elected again by the users.

Internal account committee looks transparency. The main Committee is functioning through the formation of different committees reviewing the activities, taking care of the system, observing monitoring and evaluating all the irrigation activities along with construction work.

The voices of users along with woman and socially and economically disadvantaged group are heard in the meeting. They can openly talk about any issue related to this and put their voices, opinions, views in the meeting at different level. They can suggest for the improvement in the committee and in the whole system. If they question about any issue the responsible persons in the committee have to furnish satisfactory answer to them, if they fail to do so they may be dismissed by the roles and responsibility and may exclude from the system. Similarly, the users have access to information at all levels of committees and they are also accountable to their representatives, committees and follow their respective roles for the sustainable management of irrigation

systems. Thus there is the financial as well as organizational and institutional transparency and accountability of the functionaries of each layers of Water Users Organization.

6.2 Social equity

Equity consideration is more important in the sustainable development of water resources which needs to be seen in social context, norms and values. Social equity is dealt with the equitable distribution of benefit or distributional justice in the community. Here the focus is to look at the situation of distributional justice in irrigation community 'Char Tapah irrigation System' ensuring equity. To maintain equity in CPRs management, the management should go according to the organizational development but only organizational development cannot ensure social equity, there should be transparency and accountability between and among the functionaries and water users in CPRs management. The social equity is analyzed here on the basis of organizational structures and functions of irrigation system.

6.2.1 Social Equity in Organizational Structure

According to the informants Char Tapah water user' organization was developed and managed by the irrigators themselves. There was no external or government interference. The leadership is chosen from the water users' community by the users in democratic way for the sustainable management and development of water resource to fulfil the need/demand of the irrigators of the command areas. The representatives and functionaries are maintaining stability to control and manage the irrigation activities such as building and repairing water works, allocating and distributing water and resolving conflicts among the water users, dealing with other irrigation groups and external agencies, organizing group actions. The irrigation organization is governing the behaviour of the water users in the management and utilization of water for sustained irrigation. There are many layers of federal organizational structure in this system. Such as system level executive committee, regional level executive structures, mauja level committees.

In system level committee the representatives are selected from all four regional level systems. One of the key informants revealed that the representatives work for the welfare of the system; they try to provide public service as much as they can, being within the boundary of constitutional rules and regulations. Similarly the regional, sub-regional and mauja level representatives work for the welfare of their respective area and its users.

This Irrigation Organization performs many functions ensuring social equity among the irrigators such as pulling and delivering the budget from governmental as well as non-governmental agency, building deviser from head work to field channel proportionately to the size of the respective command areas, developing operational rules for irrigation activities in the constitution of each committee. The functionary members of different layers of organization play instrumental role in making the system operational by mobilizing resources, distributing water equitably as per the contribution on the basis of landholding, resolving conflicts that occur among the irrigators, making/taking decisions organization and its activities to the users etc.

The decisions are made and policy, rules, regulations are revised as per the necessity through general assembly where the representatives of farmers from all maujas participate. These issues are passed and approved after elaborate discussion among the members. The representatives of all mauja articulate their voices about the irrigation related problems point out the weakness and provide suggestions for the improvement in the general meeting and general assembly. Thus, the users directly or indirectly involve in decision making, planning and implementation. The planning is made in more decentralized way that each tier of organizational structures is federated for planning through their autonomous committees. All the planning activities are maintained, being within the boundary of the constitutional arrangement and decisions are made through general meetings. Each organizational nested enterprise formulates its plan every year and tries to maintain social equity among the users.

6.2.2 Equity in Costs and Benefit Sharing

The costs are related to money, material and labour inputs, and benefits related to water as output. The 'cost and benefit' distribution is concerned with resource mobilization not only of internal but also of external resources. Ostrom (1992) is of the opinion that those who receive the highest proportion of the water are also required to pay the highest proportions of the costs in long-enduring systems. Respondents in interview and FGD revealed that benefit is distributed in the ratio of land holding size and contribution. Each beneficiary has got their use right of water proportionate to the contribution.

In each canal, the water is distributed on the basis of how much Kulaharas have worked or how much water is used by each user on that basis the work is allocated and divided. The cash amount and labour have to be paid on the basis of how much Mohada is taken one or half. One of the key informants of Chha No. shared that water is distributed from Tol to Tol through deviser which is build in each diversion on proportional basis which divides the water automatically. Then each Tol distributes to the Kulahara on Mohada basis and the contribution is also given on that basis. The rules to mobilize resources are different in each mauja but they are developing such rules to ensure equity.

One of the informants said, "Now we are practicing scientific system in distribution i.e. preparing deviser on the basis of labour and cost contribution for water distribution". In recent years, unnecessary labour is saving because of the construction of cemented dam and canal. So that they can utilize the saved time in agricultural and other income generating tasks. An informant of Khadawa shares, "In the past we had to send 50 to 58 Kulaharas per day but last year we had sent only 19 Kulahara perday, that becomes 4 Bigha as equals to one Kulaharas per day. And the water is allocated and distributed through Uljha 'Ghante Palo' system considering the size of mauja. For instance, 1 Bigha landholder gets 6 hours in one time i.e. once a week or a couple of days according to the availability of water. Similarly, 1 Kattha landholder gets 8 minute in each 36 hours in Khadawa.

Development construction is put forward and the budget is spent considering where it is necessary on consensus. Each Tapah invests certain amount to manage and run the main committee more equally on that basis the water is distributed and devisers are being built up which automatically divide the water.

Table -5: Sharing Water and Cost among the Tapahs

Tapah	Eghar No.	Khadawa	Panch No.	Chha No.	Total
Amount invest per year in Rs.	12000/-	9000/-	6000/-	6000/-	33000/-
Water share on Aana	36.36	27.27	18.18	18.18	99.99

Field Study, April/May 2011.

The researcher made query in FGD about the distributional justice in this system. All the participants have responded in such a way that the labour contribution and water distribution is proportionate. The budget or government and other external support is mobilized and spent where more necessary. In fact, the system is running in a traditional way, needs to be scientific. They are trying to make benefit distribution more equitable. They are distributing water on prediction base. No scientific measurement is found in diversion area and field channel at more maujas where devisers are not made.

Though there are no comments at all, public are also satisfied from it and the distributional justice is maintained in this system, the representatives from different Tapah are feeling some weakness to improve the system. In comparison to head located farmers, the tail located farmers are less benefited in dry season because of the water scarcity. The process followed in distribution is traditional and the source of water is reduced because of climate change. That is why, it is necessary to improve this process. For that, it needs to collect/take actual data and follow redistribution process.

6.2.3 Equity in Information Sharing

Information sharing process comprises negotiation, consensus, open sharing of information among the stakeholders and their involvement in it. This system has developed its own system of communication within the irrigation organization, between and among the water users and other external agencies.

The decisions made by the executive committees in each tier of organizations about the resource mobilization for operation and maintenance, allocation and distribution of water resources are communicated to the users at village level. And the users' voices and mauja level decisions are also communicated to the system/regional level committees. The information is delivered through channel. For instance, main committee decisions are delivered through committee meeting to each Tapah and system level, secretary delivers messages to external agencies and Tapah representatives. In regional level, the messages are delivered through regional level meeting of executive members and all mauja representatives in each Tapah. The information about resource mobilization are delivered from system level to regional level by vice chairman and from regional level to mauja level by mauja Mukhiya and at village level, the information is shared through mauja Chaukidar to each household of the users vis-à-vis main committee.

They follow top-down as well as bottom-up approach as per necessity in information sharing. Thus, it can be said that there is equity in information sharing. For instance, the mauja level decisions, operational problems, and complaints lodged by the users at mauja level are communicated to the system and regional level executive committees. The irrigation related problems are tried to solve at respective mauja level meeting, if the problem cannot solve at mauja level then they raise it in regional level meeting and if there also unable to solved they go through system level executive meeting after negotiation, discussion they made consensus to resolve the problem. There is no doubt that the information is delivered to each household of the users in each command village but not all the messages are delivered only necessary messages are delivered to the users. All the necessary messages about meeting or other

operational task or about election etc. are sent through Chaukidar in each mauja. If he/she leaves any household to inform, he/she would be fined. Very few such cases are found in this system as shared by the informants.

In the past the messages are communicated through letters and sometimes informally through orally but now it has become easier because of mobile phone technology to give and take the messages. The reports and letters are prepared only for formal cases, for instance, to inform external agencies, to present reports on formal meetings etc. Thus, there is equity in information sharing. If any interested user, group or person wants to know about the system or irrigation activities he/she can easily get the information. If anyone makes any query about any issues, then, he/she can get answer; the functionaries of different committees make him/her satisfied.

6.2.4 Equity in Conflict Management

Conflicts occurred about water allocation, distribution and resource mobilization, water theft etc. are resolved through formal or informal mechanisms. These conflicts occur and are resolved at four levels such as: inter systemic conflict between Char Tapah and Sorah-Chhattis mauja, intra systemic conflict between/among four different Tapahs within this system, inter mauja conflict betweenand among maujas at regional level and intra mauja conflict between and among the water users at mauja level. Such conflicts are common sociological phenomena which are resolved by making consensus after mutual discussion, negotiation etc.

Such conflicts more frequently occur in water scarcity period and most frequently during the paddy nursery bed preparation and maize cultivation. More water is needed but there is low level of flow of water in Tinau river during this period. Most common issue of conflict is water theft which occurs in each tier of organizations. In such situation, there is the provision of charging them fine (those who theft water) in the constitutions at mauja, region and system level committee. They develop rules to fine on the basis of amount of water, frequency, time period etc. (for detail see also page 51/52 conflict management and graduated sanctions). All the users as well as functionaries,

members, have to equally follow the rules. The affected group are compensated by providing certain amount which is their fund that they can spend it in any emergency/crisis period for O&M. If the affected party is an individual, he can get water in another turn. But this practised are not found in all maujas of the command areas. For instance, East Mainahiya Mauja of Eghar No. has this practice but Chha No. does not have such practice. The conflicts occur about repair and maintenance in this system. If any group or person does not finish assigned work at specified time, or if they return back after attendance, or absent in the kulahi, then they are fined. In some cases, there is the culture of mutual help as well, for instance, if any user suffers from family problem either by his family members' death or sickness, then he/she will be excused according to nature of problem.

The functionaries, representative members as well in each tier of organizations have to follow all the norms and rules managed in the system. If they do not follow, then, they will be fined by the respective executive committee. Thus the conflicts are resolved through developing formal/informal mechanisms for ensuring the equity and fairness. They have developed water monitoring committee, system monitoring and evaluating committee to maintain equity in the system.

6.2.5 Equity in Wage Management

In the past the functionaries are not paid as there was no formal organization. But at the present some functionaries at different layer of organization are paid. There is no single practice of wage payment. They are paid according to the constitutional provisions. Somewhere they are not paid. For instance, in Chha No. Tapah the executive members are not paid but at mauja level the members are paid, it is so because the Tapah is small and they have not developed their joint fund of maujas, maujas are strong than Tapah. Functionaries are paid as per work load and nature of work and the size of the command area. If the area is small the work load is also low and if it is large then the work load is high. For instance, here it is tried to present general field data on wage payment:

Table -6: Wage management

	Annual Wage Payment in Each Title							
S.N	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
1.	6,000	6,000	6,000					
2.	14,000	12,500	3,000	3,000		3,500	3,500	
3.	10,000	10,000						
4.	3,500		3,000		13,000			2,000
5.	3,000		2,800		10,000			

Field Study April/May, 2011.

Code no.

1. Main committee 2. Eeghar No. Tapah 3. Khadawa Tapah

4. Panch No. Tapah 5. Chha No. Tapah

I. Chairman II. Vice chairman III. Secretary IV. Treasurer

V.Mukhiya VI. Pani Batera VII. Water caretaker VIII. Chaukidar

Thus it is found that the functionaries are paid as per their work load. For instance main committee chairman from Khadawa Tapah is paid Rs. 6,000/- from main committee and Rs. 10,000/- from his Tapah annually, similarly vice chairman is paid Rs. 6,000/- annually from the main committee and the same person as vice chair man of Eghar No. Tapah is paid Rs. 12500/- who takes all the responsibility of 'kulahi' a challenging and comlex task at system level and at regional level within the command area of Eghar No. Tapah. Similarly Mukhiya of Panch No. Tapah who also takes the responsibility of Kulahi within his Tapah is paid Rs. 13,000/- whereas chairman who is senior than Mukhiya is paid only Rs. 3500/- annually. This practice of wage payment is managed on consensus which shows equity in the system.

6.3 Participation of Women and Disadvantaged Group in Planning, Decision-Making and Implementation Process

All the users not only in irrigation system but also in other areas of natural resource management like forest, pasture, land etc. are equally

important and they have equal right to be participated in each level of organization. But in irrigation management like other areas of natural resource management, it is found that women have very limited roles in this system.

According to the key informants and female respondents there are various factors such as cultural factors, social system, political awareness, education etc. hindering them to be participated equally as man in irrigation activities. Moreover, women are physically weaker than man and have to face various physical problems such as ministration, delivery stage, these problems hinder them to participate equally as men. Culturally women are guided to work inside the house. To participate in irrigation activities like kulahi by women is linked with the prestige of their family. One of the informants of East Mahinaiya mauja of Eghar No. Tapah revealed that "In our culture the women are not allowed to work in kulahi if some goes there because of family problem/obligation, then, they are sent back and they are excused". He further said that each ploughing man (i.e. male above 16-18 years old who started to plough the field) had to participate in at village level kulahi in his mauja in the past. This practice is found at the present as well in its neighbouring mauja 'West Mahinaiya'. Socially and culturally women are limited within household chores and agricultural tasks. The women cannot reach at policy/decision making and implementation level because of lack of the political awareness and education opportunity. It is true everywhere whether they are male or female, elite or disadvantaged group though such cases are found more in women and disadvantaged group. To make policy, rules, and manage committee, they should be educated and trained so that they can be able to understand political norms, values and put their views, demand for irrigation development in front of political leaders, government officials.

It is revealed by the informants that the position of women and caste/ethnic people is stronger in Chha No. than other systems of the command area. Though there is no discrimination on sex, caste, class, ethnicity base, female participation is very low as a whole in this system. Women are less involved in labour contribution. They are not able to do as the men do while

digging canal to bringing Jhala, Godikhutti from the forest in kulahi. They do not spend much time in meeting and take less interest about irrigation activities. That is why their participation is low. One of the participants in FGD at Khadawa shared "Our tradition and physical structure hinder in the participation of women equally as men in each level of irrigation task. They hesitate to go forward and put their voices in the mass meeting." In recent years, the functionaries have paid more attention toward the involvement of women but the capacity building is not reached at leadership position.

The rest groups (disadvantaged groups) also have the low level of participation in decision making level and more involvement in labour contribution. These groups are less concerned and pay less attention about irrigation decisions and are unable to take leadership. They need to make themselves empowered to reach at decision making and leadership position. "They are welcomed to be in that level, no discrimination in our system, if anyone is capable farmer of having more or less irrigable land under this Tapah, he/she can reach at higher position of the organization", said by the senior vice chairman of the main committee. He further said no obstacles at all, only being within the boundary of constitution every interested farmer can compete to reach at that position.

In the committee formation, they have been trying to make 33 percent women participation in each tier of organization since last 5/6 years as it has become national issue of inclusion. Partially they are successful at system and regional level. Though focus is given to women, no woman has been elected through direct election system. At mauja level committee their participation is almost zero because mauja level performs basically the task of resource mobilization for operation and maintenance which is difficult task for women. The participation of women is found at system and at regional level is as rhetoric as mentioned by Chhetri in *'The Rhetoric and Realities of people's participation in Conservation and Development in Nepal: an Anthropological perspective'*. According to the experience of researcher during field work, it is

found that women participation is only in name, they do not involve actively in the irrigation decisions and implementation (see the case below in the box).

Case 1: Example of Rhetoric Participation of Woman

Tika Maya Gurung of 48 years old Sarita Pachhain of 34 years old both have similar story that they are selected by the main committee as female member represented from Panch No. Tapah and Khadawa Tapah respectively in 2010 December. They have not attended any meeting till 2011 May, and they do not have any idea about irrigation activities, committee meeting, decisions. Both of them are selected through political reservation. The first woman, not ready to talk with the researcher in the beginning, told "I am new in this field, cannot say anything, do not know about this system". After convincing her for 10 – 15 minute to tell whatever she knows and it is about her not about others. Then, only she became ready to talk with the researcher. The second woman has also same experience but she is somehow forward to talk and put her views and interested to work her best as woman member in the committees which is yet to see.

Key informants and female respondents shared, "Though this system itself is trying to increase women's participation in inclusive way as other group like Dalit, Janjati but women are facing so many problems that they have to look after children, household chores, livestock, agriculture." So that they cannot attend the meetings (see the case below in the box).

Case 2: Problems in Attending Committee Meeting

Mira Rana of 49 years old and Sudha Gautam of 51 years old are represented in the committee as female members since last 2, 4 years respectively. They both have the similar views about the problems in attending committee meeting where the decisions are made. They have very limited time for meeting, firstly they do not get time to attend, secondly if they attend, they have to return home fast. They have to complete household chores, so they cannot attend the meetings for a long time. Then, in such situation how can they participate equally as man?

Key informants revealed that there is no caste/ethnic discrimination in the selection of members. In this system the functionaries are more conscious about to make it more inclusive. The system itself is not as obstacle which is opened to all the users and each stakeholder are welcomed to be in leadership. Caste and ethnic participation in decision making level at main committee is not bad but low. For instance, vice chair man is elected from ethnic group, other functionaries are Brahamins. It is so because the users from low cast and ethnic group are not well educated to tackle with outer agencies and with the different interest groups within system and unite them into one system. They provide very useful suggestions, advices for the improvement, put their ideas and views in the meeting. In regional level committee, it is very good that each Tapah representatives (chairman) are from ethnic group except Chha No. Tapah (see the case below in the box).

Case 3: Participation of Dalit and Ethnic group in the committee

Santaram Tharu 59 years old from Eghar No. as ethnic representative for the main committee is the treasurer of his Tapah and Shyam Sunar of 50 years old is represented from Chha No. Tapah as Dalit group for the advisory committee. They have education qualification of up to grade eight. They raise their voices as per necessity in the committee meeting and help for the joint committee as much as they can. They are hopeful for the continuity of government help to this system. At the present, they are feeling the committee is more inclusive than in the past. They advise to the functionaries of the main committee to deal with external agencies, spend budget and mobilize resources on time on appropriate sector and betterment of this system.

Thus the participation of women and disadvantaged group is not so satisfactory at decision making level which is not only seen in this system but in other systems as well. This problem is seen at national level, it is needed to empower them along with their inclusion for the sustainable management and development of natural resources ensuring equity in the system.

CHAPTER – VII

SUMMARY AND CONCLUSIONS

7.1 Summary

This is the first study, an anthropological study of Char Tapah irrigation system of Rupandehi district. The Char Tapah Irrigation System is one of the Farmer Managed Irrigation Systems of Nepal. It was built by the local users of four different Tapahs under the leadership of late Balbikram Shah in 1983. The four different Tapahs are: Eghar No. Tapah, Khadawa Tapah, Panch No. Tapah, and Chha No. Tapah. This system covers Butwal Municipality ward no. 13 Naharpur, 14 Nayagaun, 15 Belbas, and five other VDCs i.e. Motipur, Semlar, Khadaw Bangain, Sauraha Pharsatikar and Amuwa VDCs as command areas. The source of water for this system is Tinau river and Danab river. The total command area of the Char Tapah Irrigation System is estimated to be 3500 hectare which includes 65 villages.

This study has focused on the three important factors, namely, general description of the study area, the organizational activities of the irrigation system and social equity in the irrigation organization and its activities. Common property resources an anthropological perspective on natural resources management and development perspective in equity have supported to analyze the facts. Qualitative tools and techniques have been used to triangulate the gathered data. The unit of analysis is the water users' communities.

Key informants were purposively selected after building rapport with the community for the in-depth interview. Ethnographic method involving key informant interview, participant and direct observation, informal discussion, interview and PRA techniques involving group interview, FGD and few individual cases of women and Dalit, Janjati members of the committee were used for gathering the qualitative data.

Socio-economic characteristics: The command area of this system has heterogeneous social composition of water users. There were only the water

users of Tharu ethnic community prior to 1940 AD. Since the canal was first built to deliver water to fields, the new settlements gradually expanded in the command area. The command area continued to increase with the changes of living pattern as in other parts of the terai, in-migration in the system. The people from hill district such as Palpa, Gulmi, Baglung, Syangja, Argakhanchi, Parbat started to settle within the command area. The majority of water users are Brahmins and chhetris except Chha No. Tapah. In the case of Chha No. Tapah that covers Butwal municipality ward no. 13, 14, and 15, the more water users are from ward no. 15 where the Magars are at majority (i.e. 34.86%). The Tharu inhabitants are affected by hill migrants that their lifestyle, subsistence pattern started to change for 3/4 decades.

The people of the command areas have adapted agriculture as main occupation along with animal husbandry as supplementary occupation. Farmers produce paddy, wheat, maize, corn, mustard, lentil, vegetables in the command area. Most water user households have raised the livestock such as buffaloes, cows, goats, poultry and pigs. Though it is their main occupation, people are less interested toward it in these days. Larger number of adult people (they are more male and some female as well) of 20 – 45/50 years old are out migrated within country or foreign country for different purpose such as education, wage, business, private/government services etc. Because of growing population and urbanization, some households are practising the small scale business such as hotel, lodge, restaurants, tea shop, fruit stall, cyber cafe, vegetable stalls, wholesale, and trade market, garage, furniture, transportation etc.

Organizational structure: This study has shown the organizational arrangements of the system which includes appropriation, distribution, monitoring and evaluation, conflict management, governance activities and collective choice arrangements have been organized in the multiple layers of the nested enterprises. There is formal and informal organizational structure for water acquisition and for water sharing among the four different Tapahs within this system. There is the Tinau Water Share Committee which is a kind of

informal organization comprising the representatives of water users of Sorah-Chhattish Mauja in the eastern side of Tinau river and Char Tapah Mauja in the western side of Tinau river. The users have been sharing the water on the traditional basis according to their decision. 60 percent of the total water of Tinau river has been allocated to Sorah-Chhatish Mauja and 40 percent of water has been allocated to Char Tapah Mauja.

All the irrigation activities are managed through different layer of organization. There are three tiers of irrigation organization in Char Tapah: at system level, at regional level and at mauja level. System level executive committee comprising 10 members, one is elected as the chairman, one senior vice-chairman, and one vice-chairman, one secretary, one treasurer, one vice-secretary, and other 4 representative of respective Tapah remain as the members. There are four different executive committees at regional level and 65 mauja level committees having 2 to 11 members. The functionaries at different level of committees take their responsibilities in the systematic management of irrigation. Membership is defined by entitlement of definite Kulahara of water to a particular branch canal. Each user is the member of their mauja, some representative members are selected among the users of respective command mauja to send at regional level organization.

In system level executive committee, the representatives of regional level committees are selected through election, nomination, selection considering caste, gender, ethnic inclusion and old experienced knowledgeable people are also included in an Advisory committee at system and regional level. The ‘general assembly’, an organizational arrangement of Char Tapah constitutes 127 members elected by members of each mauja on the basis of water allocation. For instance, one member equals per Aana water. The General Body i.e. one to four representatives per Kulara, the selection procedure is different in each Tapah. General assembly plays the important role to guide the work of executive committee. Political grouping plays important role in electing the functionaries and unaccountability and injustice are capitalized

during election time that those may not be elected again. But party politics is not played after election within the organization.

Irrigation activities: For the acquisition of water from the source, construction of canal system, operation and maintenance of the system, allocation and distribution of water, resource mobilization, conflict resolution, graduated sanctions, decision making and planning, communication and co-ordination between and among the users is needed. The equity in resource mobilization and benefit distribution, the transparency of organization decisions, policies, financial matters and accountability of the functionaries toward the community has substantial impact in keeping the users organized and made them willing to contribute to sustain the irrigation system. In this system the functionaries implement the organizational policies, rules, norms for the sustainable management of irrigation system. The operational rules and regulations roles of functionaries, leaders as well as users rights are framed democratically and preserved in constitution.

The minor constructions are performed by the participation of local users. Now the new dam, deviser, and diversion intake in different places using modern technology are constructing with the help of government and WB. Functionaries consult with the users and engineers while designing the construction.

Functionaries especially, vice chairman from system level, the chairman and Mukhiya from regional level and Mukhtiyar/Mukhiya/Badhghar from village level mobilize the Kulaharas from their respective command areas in proportion to the size of irrigable landholding, assist and check for proportionate the work assignment. They play the important role in making the system operational. Every household of users has to contribute required labours for maintenance. If they cannot contribute labours then they have to pay irrigation fee as determined by Mauja rules. They accomplish the maintenance task by preparing routine. But it can be done at any time in emergency.

The degree of transparency and accountability among and between the users and leaders is high in this system. That is seen in the organization and

institutional system which ensures trust and confidence between the members and the users in the community. It plays important role for the sustainability of this irrigation system. They follow top-down as well as bottom-up approach as per necessity in information sharing that there is equity in information sharing.

There is the very low level of women participation in the management of water for irrigation. There are various factors such as cultural factors, social system, political awareness, education etc. hindering them to participate equally as men in irrigation activities. Moreover women are physically weaker than man and have to face various physical problems that are also hindering them to participate equally as men. Culturally women are guided to work inside the house and irrigation activities like kulahi by women is linked with the prestige of their family. Socially and culturally women are limited within household chores and agricultural tasks. Lack of the political awareness and education opportunity also affect them to reach at policy/decision making and implementation level. To make policy, rules, and manage committee, they should be educated and trained so that they become able to understand political norms, values and put their views, demand for irrigation development in front of political leaders, government officials.

The participation of women and disadvantaged group is not so satisfactory at decision making level. The system itself is not biased that there is no discrimination in the selection of members in the committee. It is necessary to empower them along with their inclusion for the sustainable management and development of natural resources ensuring equity in the system. The functionaries have failed to maintain the organized records of agriculture and irrigation of the whole command area and the socio-economic data of the water users. This irrigation system was indigenously built by the Tharu ethnic community who operated and maintained the system for generation. But at the present those group have been excluded from the leadership as replaced by the dominant hill migrants.

7.2 Conclusions

Based on the findings, the following conclusions are drawn:

- Organizational activities to exploit water resource are performed by enforcing the rules provisioned in the constitution and division of labour among and between the members.
- Though this system is heterogeneous in social composition, power relation, and social identities of water users, user work together in managing water resource for irrigation in a sustainable way.
- Indigenous knowledge, local irrigation practices and the use of locally available materials for maintenance have played important role to sustain this system.
- Though there have been some changes in the irrigation community which is using external (modern) technology for infrastructure development, farmers use indigenous knowledge for it and mobilize external resources by themselves.
- Equity is maintained in costs and benefit distribution and each beneficiary has got the use right of water proportionate to the contribution made on land holding basis.
- The degree of transparency and accountability among and between the users and leaders is high in this system which has led to its sustainability.
- Though the functionaries are trying to make the system inclusive, participation of women and disadvantaged group is not so satisfactory at decision making level. It is needed to empower them for the sustainable management and development of water resource for irrigation.

REFERENCES

Adhikari B.P. 2007, Social Inclusion and Equity in Irrigation System Management: Critical Evaluation of Policy and Legislation in Nepal, Farmer Managed Irrigation Systems Promotion Trust Kathmandu, Nepal.

A Note Presented by R.B. Chhetri as a Chair Person of Forest Action Nepal for Environment, Democracy and Livelihood, Annual Report 2008.

Baker Therese L. 1998, Doing Social Research, Third Edition, Mc Graw-Hill International Editions Sociology Series.

Bernard H. R. 1990, Research Methods in Cultural Anthropology: Quqntitative Analysis Chapter-14, New Delhi: Sage Publication, India.

Bennet Lynn, 2006, The Unequal Citizens, Gender, Caste and Ethnic Exclusion in Nepal Executive Summary, The World Bank and DFID Nepal.

Berkes, Fikret and Farver M. Taghi, 1989, Common Property Resource: Ecology and Community-Based Sustainable Development, Chapter I, London: Belhaven Press.

Bhusan Udas Pranita, 2002, Gender and policy on FMIS in the changed context, Farmer Managed Irrigation Systems Promotion Trust Kathmandu, Nepal.

Chhetri, R.B, The Rhetoric and Realities of People's Participation in Conservation and Development in Nepal: An Anthropological Perspective, Anthropology and Sociology of Nepal.

Chhetri, R.B. 2007, Culturally Embedded Knowledge in Irrigation: People's Ways of Thriving in a Himalayan village, Farmer Managed Irrigation Systems Promotion Trust Kathmandu, Nepal.

Ghimire Sujan 2005, Women and Irrigation in Nepal, Occasional Papers in Sociology and Anthropology, Vol. IX, Tribhuwan University, Kathmandu.

Gundogdu Huseyin and et.al, 2005, A Study Under Gap-MOM Project, on Scheduling Water Delivery Among the Farmers in a Tertiary Canalette System Operating by a Water User's Association Harran Plain, Turkey,

Farmer Managed Irrigation Systems Promotion Trust Kathmandu, Nepal.

Hardin, Garrett, 1968, "The Tragedy of the Commons," Science, 162: 1243-1248.

http://www.castwesrcenter.org, Introduction: Equity in Community-Based Resource Management.

International Network on Participatory Irrigation Management, Nepal Chapter, April 2007.

Karki Ajoy 2005, Water Sharing Between the Jhankre Mini-hydropower Plant and Irrigation, Farmer Managed Irrigation Systems Promotion Trust Kathmandu, Nepal.

Manandher Eva, 2010, Lessons from Participatory Irrigation Management: A Case Study of Khokana Irrigation System, Farmer Managed Irrigation Systems Promotion Trust Kathmandu, Nepal.

Miller, Marc L, Richard P. Gale and Perry J. Brown, 1987, "Natural Resource Management Systems," in M.L. Miller, R.P. Gale and P.J. Brown, Social Sciences in Natural Resource Management Systems, Boulder and London: West View Press, pp 3 – 32, 1987.

National Planning Commission 2010-2013, Three Years Interim Plan, Government of Nepal, 2010 June.

Osanami Fumio and Joshi Neeraj N, 2005, Farmer's Incentives to Participate in Irrigation Activities: Findings of Case Studies in Kathmandu Valley, Farmer Managed Irrigation Systems Promotion Trust Kathmandu, Nepal.

Ostrom Elinor. 1992, Crafting Institutions for Self-Governing irrigation systems California: Institute for Contemporary Studies, U.S.A.

Ostrom, E. 2010, "Institutions and Resources", Mahesh Chandra Regmi Lecture 2010, Social Sciences Baha Kathmandu, Nepal.

Parajuli U.N. et.al. 2007, Promoting Irrigation Governance: The Prospect for Sustainable and Equitable Management Transfer, Farmer Managed Irrigation Promotion Trust, Kathmandu.

Pradhan P. 2010, Eroding Social Capital through Incompatible Legal and Institutional Regime: Experience from Irrigation System in Nepal, FMIS Promotion Trust Kathmandu, Nepal.

Pradhan, P. 1989, Patterns of Irrigation Organizations in Nepal: A Comparative Study of 21 Farmer managed Irrigation System, Kathmandu Irrigation Management Institute.

Pradhan, P. 2007, Twenty Five Years of FMIS study in Nepal, Farmer Managed Irrigation Promotion Trust, Kathmandu.

Pradhan, P. 2007, Forms of Social Capital: A Case Study of Chherlung FMIS, Palpa, Nepal, Farmer Managed Irrigation Promotion Trust, Kathmandu.

Shiva, Vandana, 1997. "Resources," in the Development Dictionary: A Guide to Knowledge as Power, New Delhi: Orient Longman, pp. 276-292.

Shrestha V. And Pradhan P. (2010), Enabling Enactment and Eroding Social Capital in Farmer Managed Irrigation System, Farmer Managed Irrigation Promotion Trust, Kathmandu.

Uphoff Norman, 2003, Understanding and Utilizing the Softer Aspects of 'Software' For Improving Irrigation Management.

Uprety, L.P. 2000, Functions of an Organization in an Indigenous Irrigation System: A Case Study from a Hill Village of Nepal, Occasional Papers in Sociology and Anthropology, Vol.VI, Tribhuwan University, Kathmandu.

Uprety, L.P. 2005, Social Equity in Farmer-Managed Irrigation In the Terai of Nepal, Occasional Papers in Sociology and Anthropology, Vol. IX, Tribhuwan University, Kathmandu, Nepal.

Uprety L.P. and et.al, 2007, Nepalese Journal of Qualitative Research Methods, Vol. I, Local Initiative Promotion Trust.

Uprety, L.P. 2007, Problems of Participation and Issues of sustainability in the Public Irrigation System in the Context of Management Transfer: Some Sociological Observations from Eastern Terai, Nepal, Farmer Managed Irrigation Promotion Trust, Kathmandu, Nepal.

Uprety, L.P. 2006, Managing Water for Irrigation as a Common Property Resource: A Case Study of Sorah-Chhattis Mauja Indigenous Irrigation Systems of Rupandehi District, Degree of Doctor of Philosophy in Anthropology Submitted to Central Department of Sociology and Anthropology T.U. Nepal.

Uprety L.P. 2008, Understanding the Fundamentals of Conventional Qualitative Research, et.al. Nepalese Journal of Qualitative Research Methods, Vol.II.

The World Development Report, 2006, Equity and Development, the World Bank and Oxford University Press.

Yoder and Martin, 2007, Twenty Five Years of Change: Argali and Chherlung FMISs, Palpa, Nepal.

ANNEXES

Annex-1

Distribution of Irrigable Land, Population, and Household in Each Tapah

S.N.	Tapah	Irrigable Land in Bigaha	Population	Household
1	Eghar No.	2233	22319	1993
2	Khadawa	1471	8650	1250
3	Panch No.	738	6500	900
4	Chha No.	545	14892	2656
5	Total	4987	52361	6799

Annex-2

List of Maujas in Each Tapah

S.N	Name of Maujas			
	Eghar No. Tapah	Khadawa Tapah	Chha No. Tapah	Panch No. Tapah
1	Sankar Nagar	Lower Padampur	North Belbas	East Raniganj
2	Bhudkaiya	Belbhariya	South Belbas	West Raniganj
3	Patthargan j	Ujelapur	Belbas 3	East Naharpur
4	Raniganj	Upper Padampur	Belbas 4	West Naharpur
5	Dubauli	Kailashnagar	Salghari	South Naharpur
6	South Pokharabari	Mainapur	Banel Pokhari	Hariharpur
7	Betahani	Bagiya	Payal Bhhitta	Dhandapur
8	Betahi	Motinagar	Jholunge Pul	Motipur
9	Lalpur	Hirapur	Chha No.	Pokharabari
10	Manoharapur	Krishnaganj	Nayagaun 1	Sauraha
11	Ranibari	Binayakpur	Nayagaun 2	Saurahiya
12	Ramawapur	Shantipur	Nayagaun 3	Samara
13	Sarjuganj	Manoharapur	Nayagaun 4	
14	Mandnganj	Gopalpur	Nayagaun 5	
15	Laxmanganj	Motiganj		
16	Mohanganj			
17	East Mahinaiya			
18	West Mahinaiya			
19	Pharsatikar			
20	Jugdihawa			
21	Amuwa			
22	Motipur			
23	Janakpur			

Annex-3

Social Equity in Farmer Managed Irrigation System:

A Case Study of Char Tapah Irrigation System of Rupandehi District

Location: **Date:**

Check List for Focused Group Discussion

S.N	Name	Age	Sex	Caste/ Ethnicity	Religion	Class	Occupation	Literacy Status	Year of in-migration	remarks
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

Questions for Focused Group Discussion

1. How the costs and benefits are distributed in this system?
2. Do you think that the benefit distribution in your system is fair or unfair? Give reason how it is fair or unfair?
3. What is the situation of women and disadvantaged group's participation in decision making process and implementation of irrigation activities?
4. Does the organization maintain transparency in rules, regulations, decisions and book-keeping at all levels? If yes, how? If not, why?
5. Is there the transparency of information among the disadvantaged group? If yes, how? If not, why?
6. What do you think the functionaries of all levels of organization are accountable to the users? If yes, how? If not, why?

Annex-4

Check List for Key Informants Interview

Name: Age: Sex:

Address: Literacy: Occupation:

Organizational Issues

1. When was this system constructed?
2. Who are the initial contributors in the construction of this system?
3. How the irrigators of upstream, midstream and downstream are contributed in smooth functioning of the system?
4. How frequently the meetings are held? Who calls? Where When in each tier of organization?

Levels of organization	frequency	Who calls?	Where?	When?	Who takes decision?
Tinau water share committee					
Joint committee (Char Tapah)					
Regional level committee:					
1. Eghar No. Tapah					
2. Khadawa Tapah					
3. Chha No. Tapah					
4. Panch No. Tapah					

5. Why are the meetings held?
6. Who attends the meeting?
7. Can we find different caste, ethnic, age and gender consideration in the formation of committee? Whether their participation is remarkable or not? If not, why?
8. What are the hindering factors for them to be participated in the committee?
9. Do their voices are heard in the committee or not?
10. How the women and disadvantaged group are contributing in this organization?

11. Is there any caste/ethnic group contributing most to the development of this system? If yes, who? And how?
12. Who takes decisions related to irrigation activities in your system? How these decisions and planning are made?
13. How the information of the irrigation decisions is communicated?
14. How much the disadvantaged group and women are accessible in information sharing and taking?
15. What are the processes of passing the resolution in the committee meeting?

Institutional Issues

1. What is the total number of members of command area?
2. What are the criteria of the membership of organization?
3. Trace the operational rules or regulations to administer the system.
4. How the rules are developed, modified?
5. How the rights, roles and duties are defined for operation and management to the local users?
6. Does your organization have written document of rules and regulations for sanctioning to those who violate the irrigation rules? If yes, specify.....
7. Is there the transparency and accountability in rules, regulations and book-keeping? If yes, how these are maintained? If not, why?
8. How are the functionaries nominated in each tier of organization? How do they contribute for sustainable management of water for irrigation to this system?
9. Is any amount paid to them for their contribution? If yes, specify it.
10. Are there any changes in irrigation organization over a long period of time? If yes, what are these changes?

Irrigation Activities:

A. Water Acquisition

1. How is the diversion structures of irrigation system made of up?

2. What types of materials are used in the construction of main canal to field channels? How they are available?
3. What is the source of water of this system? How do the irrigators contribute in the construction activities?
4. What is the length and width of main canal?
5. What is the capacity of main and branch canals?
6. Are there any problems in water acquisition? If yes, what is the nature of the problem? And how can they be solved?

B. Water Allocation and Distribution

1. How much water is received by whole system? And how much is shared by each system?
2. How water is allocated and distributed from the main canal to the field channels?
3. Are there any caste /ethnic group having special use rights of water? If yes, on what basis such rights are given?
4. What do you think the benefit distribution is equitable or not? If yes, how? If not, why?
5. How the water is allocated and distributed in water scarcity period?
6. What are the main problems seen in water allocation and distribution? How these problems can be solved?

C. Resource Mobilization

1. What is the basis of resource mobilization i.e. cash, crops, labour, local resource contribution?
2. How often the human resource is mobilized?
3. Who collects the irrigation fee, fine etc.? When? And how they are used?
4. How equitably the resources are mobilized?
5. What are the sanctions for not contributing?
6. What is the accountability of irrigation officials in mobilizing human and material resources?

D. System Maintenance

1. What are the customary practices of operation and maintenance of this system?
2. How often the maintenance work is done?
3. Who takes the responsibility for maintenance work?
4. How the emergency maintenance is done? Who makes decisions for emergency maintenance?
5. How the farmers are penalized if they are absent in the maintenance work?
6. What are the problems in operation and maintenance of the system? How these problems can be solved?

E. Conflict Resolution

1. Do irrigators violate the irrigation rules? If yes, how can they be punished?
2. What kinds of disputes are found among the irrigators? Or what are the causes of disputes?
3. How often the conflicts are occurred? And how are they solved?
4. Is there the problem of water stealing? If yes, when? Who? Also go to 5 and 6.
5. How the farmers are punished if they theft the water?
6. How the affected sections are compensated?

<u>Others</u>

1. What are the social norms and values of community in maintaining social solidarity, consensus, co-operation and altruism for irrigation development?
2. What is the cropping pattern of this area? And what are the main crops?
3. Does the cropping affect in water allocation principle in this system? If yes, how?
4. Do the irrigators raise different types of animals? If yes, specify..... How they contribute in the local economy?

5. Do you think the political factor affecting in irrigation decisions and planning? If yes, how it is affecting?
6. What do you think the politics is necessary or not in bringing changes needed for irrigation management? Whether the farmers have consciousness about the politics or not?
7. Has the present system been successful in fulfilling the demands of water of the farmers? If not, why? What are the problems?
8. What are the major problems of your organization?
9. What can be done to improve the existing system and institutions?
10. Is there any assistance from the government to this system? If yes, go to ques. no.11 and if not go to ques. no.12.
11. Specify the type of assistance. Are you satisfied with it?
12. Whether the effort was done or not toward it?

Annex-5

Check List for Case Study

Name:	Age:	Sex:
Address:	Literacy:	Marital Status:
Caste/Ethnicity:	Religion:	Type of Membership:

1. What type family do you have? How many members are there in your family?
2. What are the cultural norms values of your family?
3. What is your main occupation? And your family occupation?
4. What is the main source of your household economy?
5. What is your land tenure status?
6. Which crops do you cultivate in your field/farm in different season?
7. What is the cropping intensity of your land? Which crop contributes more in your household economy?
8. Have you raised any types of animals? If yes, what are they? How they contributed in agricultural production and economic activities?
9. Is your family self-sufficient? If yes, how do you fulfilling the everyday needs of the family? If not, how do you maintaining it?
10. What is your role in your family?
11. Who takes the decision in your family?
12. Who is the owner of land in your family?
13. Which positions do you hold in the committee? When and how were you selected?
14. What are the criteria of membership?
15. What is the enabling factor to bring you in a particular position?
16. How much are you successful in doing desirable contribution to the committee?
17. Are you facing any kind of problem being a member of committee?

18. Have you got any kind of encouragement from others? If yes, what/who encouraged you? And how?
19. How do other members of the community feel/think about you and your role?
20. Whether your life partner is supporting you on this or not? If yes, how he/she is supporting you?
21. Are you satisfied with your role to the irrigation committee?
22. Are there any family member migrated outside? If yes, go to ques. 16 and 17.
23. Who is out-migrated? And why?
24. After his/her migration, do you facing any kind of challenges? How he/she is supporting in your household economy?
25. What are the cultural norms values of your family?
26. What is your religion?
27. Is cultural factor affecting you to be participated in irrigation activities? If yes, how?
28. What should be done for you to be participated?
29. Who takes decision about irrigation activities in the committee? How decisions are passed? Do you have any role on decision making?
30. How do you react upon irrigation decision made by committee? Do you agree? If yes, why? If not, why? Give reason.
31. Do you have membership of any political parties?
32. What is politics in your understanding?
33. What do you think political activities affect in irrigation decision making or not? If yes, how?
34. What kind of political role would you like to prefer for the development of irrigation?
35. Do you find distributive justice in your committee? If not, what should be done for this?
36. Do you have any idea about the irrigation policy? If yes, what do you know?
37. Lastly, do you have any suggestions for your committee or government

Annex-6

Socio-Economic Check List

Name of the Mauja:

Address:	Ward:	VDC:
Total population:	Male:	Female:

Temperature:

Rainfall:

Forest condition:

Water resource condition:

Other natural resources:

Total command area in hectares or bigha:

The irrigated area:

Changes in command area:

Caste/ethnic group distribution:

Settlement pattern:

Land tenure system:

Family structure:

Agricultural system:

Cropping pattern:

Cropping intensity:

Types of animal husbandry:

Division of labour:

Employment opportunity:

Educational facility:

Access to road:

Basis of water allocation and distribution:

Basis of cash, crop, and labour contribution:

Rules for repair:

Nature of disputes: