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# A study of irrigation conflict in Khageri irrigation project

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## Abstract

*While Nepal is rich in water resources, there are also plenty of water related problems. Issues like water scarcity, improper water allocation, distribution, collection of water fees, farmers' cooperation, performance of water users association etc give rise to water-induced conflict. As there is a wide range of such issues, this article examines only the conflict of water in the sector of irrigation and its management practices.*

*This article assesses the major dimensions of irrigation management and how these dimensions give rise to conflict using a case study of the Khageri irrigation project (KIP). This study is based on the qualitative design including key informant interviews (KII), focus group discussion (FGD) and participant observation. The informants cover key stakeholders like members of water users associations, elderly farmers, local government officials, etc. Some of the major issues concern to conflict are the denial of riparian rights, repair and maintenance activities related to the canal, resource rights dilemmas, human encroachment to the canal, park control and legal restrictions etc. In addition, impact of climate change is one of the major factors that escalate conflict in the study area. Theory of co-management, Hardin's tragedy of commons -position, interest, and needs (PIN), the best alternative to a negotiated agreement (BATNA), etc. were used as a theoretical lenses to analyze the findings. Analysis through these theories have further given rise to some other new theoretical models like neo-liberal socioeconomic resource management.*

**Keywords:** Irrigation conflict, dimensions of irrigation management, conflict resolution, Khageri irrigation project and Neo-liberalism

## Introduction

Nepal is an agrarian country, despite, its agriculture is still largely subsistence-based with poor technology adoption, lack of infrastructure and low productivity. According to FAO, agriculture sector employs around 66 percent of the total population in Nepal while contributing to one-third of the nation's GDP and making substantive contribution in the national economy (FAO, 2022). According to the Global Hunger Index (2023), 25 Percent of the total GDP comes from agriculture. Chaudary (2018, p. 5) states that agricultural sector still accounts for the largest share in the GDP. But its contribution has been continually declining since the 1990s (Regmi, 2017).

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The basic component of irrigation is water. Kumar et al. (2015) added water as a basic need for society and for agricultural productivity for improved livelihoods and well-being. Water is becoming scarce all over the world and there is increasing competition for water use across sectors (Merz, et al., 2003, p.41). In the context of Nepal, most of its farmland is still depended on rain fed irrigation i.e. totally dependent on natural rain for any irrigation and water requirement. Lack of proper irrigation facility has been identified as a key factor in low productivity of Nepalese farming. According to Gajmer (2014) "major impediments to agricultural productivity in Nepal include a lack of irrigation management" wherever there has been good irrigation facility, it has contributed to a more productive farming output.

According to the UN World Population Prospect (UN Population Division, 2013; in Kogler & Soffker, 2017, p. 136) the world population will exceed 9 billion in 2050, a rise of more than 20% compared to today's numbers. This alarming population growth needs more food production for which water to feed crops and farmlands is most essential. Irrigation management is an urgent and important necessity to supplement the food production. In this context, this study is centered towards proper irrigation management for the increment of agricultural products.

There is the possibility of increased crop production if enough water is available at the required time interval. Uphoff (1986; in Pradhan, 1989, p.4) stressed the need for further research to identify factors that are important for effective irrigation management. In this regard, this study is an effort to explore the causes behind ineffective irrigation management in Nepal. Understanding the causes, and exploring various dimensions of conflict that arises in an irrigation project have significance for overall food security and national economy.

Irrigation management is the arrangement regarding the distribution of water from the source to the destined cropland through various means. It covers different dimensions. In this study, dimensions refer to the areas that include multiple components required for the effective performance of the irrigation project. Those components are water distribution practices, implementation of water resource laws, adoption of water allocation policies, decision making etc.

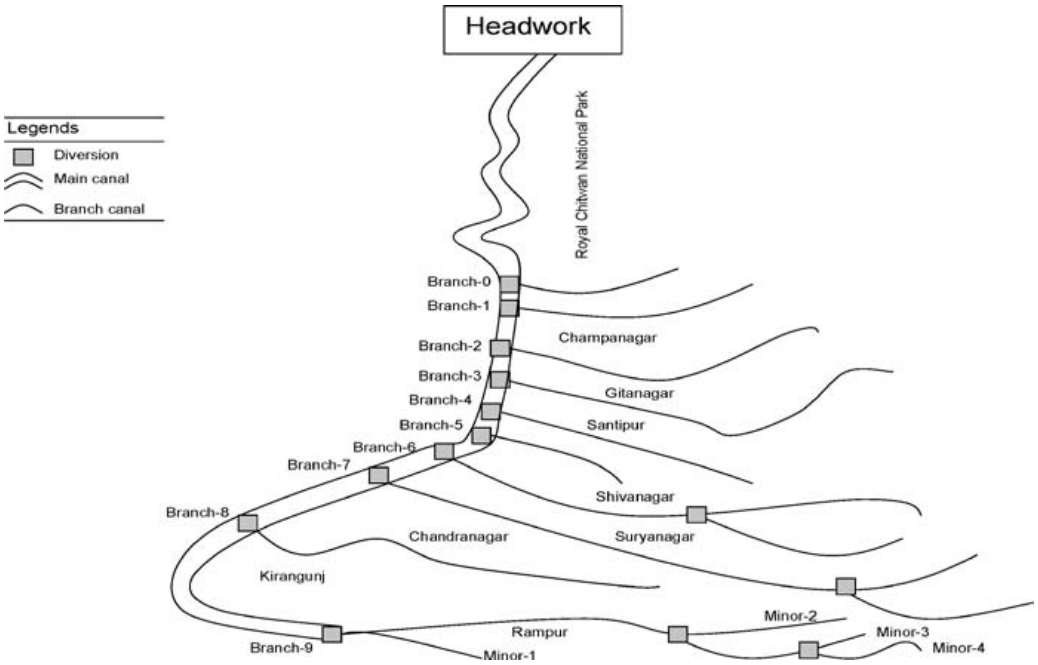
So far conflict in this study is concerned, it is a situation in which actors show their incompatibility in a certain issue. It is called a disagreement. It is Wright (1951, p. 194) who provided an etymological meaning of the word conflict as this word is derived from the Latin word '*confligere*' which means to strike together. Similarly, Ercoskun (2021, p. 4) highlighted Galtung's definition of conflict as a dynamic process in which structure, attitudes, and behaviors continuously change and affect each other. Walker and Daniels defined conflict as " an active stage of disagreement between people with opposing opinions, principles and practices manifested in different forms under grievance, conflict and dispute" (Walker & Daniels, 1997; in Upreti, 2001, p.86).

This study focuses on interlinking the notion of irrigation management with conflict. In the international arena, various studies related to irrigation management and conflict, its causes, and the effects have conducted. In case of Nepal, a few scholars have attempted to show a

nexus between irrigation management and conflict. But this has either been done in brief studies without in-depth exploration or as part of study about other components of forest, land, water, pond, etc. This study helps to fill this academic gap through a focused, extended and in-depth investigation of irrigation management and conflict.

Conflict in irrigation arises due to various reasons. It is caused due to poor maintenance of the canal, obstructions in fee collection, users' participation, power structure among users in the field, lack of effective rules and regulations. On this note, this article highlights the dimensions of irrigation management and the cause of irrigation conflict in the study area based on the following major research question. How are the dimensions of irrigation management cause conflict in the irrigation project?

**Study area**




Khageri Irrigation System

This study is conducted in the Khageri irrigation project that lies in the Chitwan district of Nepal. Chitwan district is located in the southwestern corner of Bagmati province, between longitudes 85' 55" to 85' 35" east and latitudes 27' 21" to 27' 46" north. It covers an area of 2,510 square kilometers. It lies 181.5 km away from Kathmandu, the capital city of Nepal. There are airways and roadways to reach Chitwan from Kathmandu. The route of Kathmandu to Chitwan by bus includes the Kathmandu bus station that lies in New Buspark Gongabu-Shorakhutte- Balaju. One can easily pick a bus and travel the route of Kalanki-Malaekhu, Mugling, Narayanghat via the Prithivi highway followed by Madan Ashrit

highway. The airway is of 25-minute flight distance from Kathmandu to Bharatpur airport, Chitwan.

Among various irrigation projects in Chitwan, Khageri was an agency-managed irrigation system with a command area of 3900 ha. Covering eight VDCs, the construction work of the KIP was completed in the fiscal year 1967. This system was constructed with a design discharge of 8 cumecs. It has nine major and four minor branch canals and runs 22.5 km in length to serve the command area. It was estimated that 5038 households benefited from this system (ICON, 1993; in Bhatta et al., 2006, p, 177). This irrigation system is important for the local community because it is primarily used to irrigate rice fields. Rice is one of the major crops grown in this region, and people sometimes grow it twice a year.

It was designed by the Department of Irrigation (DOI) in 2017 B.S. and all the construction work was completed in 2024 B.S. at a cost of 7.6 million (Khanal, 2003; in Pradhan, 2017). However, the original planning was done by the Food and Agricultural Organization (FAO). The canals are designed so that they are safe from the risks of flooding and inundation. The irrigation canal was constructed mainly with two objectives: to support the livelihood of newly settled people and to supply food to Kathmandu valley. The canal has a diversion barrage, a main canal (23 km), 11 branch canals (55 km), and a tertiary canal (100 km) (Khanal, 2003; in Pradhan, 2017). 7 km of the main canal passes through the buffer zone of Chitwan National Park.

## Methodology

In this study, multiple qualitative methods were applied to the study of irrigation management and conflict. The methods include in-depth, semi-structured, open-ended interviews, participant observation and document analysis. The study was carried out by a desk study, internet searches and fieldwork with multiple visits. In-depth interviews were carried out with farmers from different sections of KIP. Beside, other stakeholders like local government officials, civil society members and local representatives were interviewed. The lengthy stay in the study area helped for participant observation of daily actions of targeted farmers. These included their day to day events in there farming field. Participant observation included attendance at various gatherings, meetings etc.

The grounded theory approach was applied to interpret the findings. Information were obtained through social action and interactions with the concerned informants. This study was qualitative in nature. QDR miner lite qualitative data analyzing software has been used to organize code according to the themes and analyze the data. QDR is a program that allows for the structuring and analysis of text through coding, word frequency searches and various presentations of the data. The transcribed interviews were imported to QDR miner lite and coded. The codes were made based on the interview guide and new codes were added where required. The interviews were reviewed for key words and recurring themes through querying frequency. Examples of these were farmers' participation, institutional arrangement, physical infrastructures, water users associations etc.

## Result and Discussion

Some of the issues that trigger conflict in irrigation within these three categories are discussed under the sub heading. All of these issues were noticed during the field observation.

### Denial of riparian rights

Ram Rajaiya (pseudo-name) who belongs to the tail end section, stated in an interview that head end farmers denying water to the tail end section was a major cause of conflict in KIP. There was recorded physical fight between Ram Rajaiya (pseudo-name) and Shyam Rajaiya (pseudo-name) who represented Subidhanagar (pseudo- name) and Silkhola (pseudo-name) section respectively. It was Ram's turn to use water but Shyam prevented Ram from diverting water onto Ram's field. This resulted in a physical altercation between Ram and Shyam.

Gopal Rajaiya (pseudo-name) revealed in an interview that common farmers were deprived of water access in their field but powerful or "elite" farmers who were in power and authority enjoyed water access in their fields. Such kind of biased practices during the time of water distribution induced a situation of conflict in irrigation management. He mimicked a situation between two farmers to show the problem of water distribution, *"Ma yo pani lagauchu pahila, aaja mero palo ho; arko le pheri bhancha mero khet ma asti ropeko dhan marisakyo aaja maile lagauna parcha; kaha huncha testo aaja mero palo ho"*. Translated, here the first farmer is saying that I want to plant my field today and it is my turn today to get water. But another farmer says that it is not possible because the paddy he planted in his field some days ago is already dying and he needs water that day. And the first farmer says that's not possible, and that it is his turn today. These kinds of conversations and tussles are common in KIP, according to Gopal, and source of much conflict because instead of following the rules or turns of distribution, it is more about personal fight or power tussle. Atma Rajaiya (pseudo-name), member of main canal committee, added that conflict in KIP was observed during the time of water distribution among riparian farmers.

### Scarcity of water

Sundar Rajoiya (pseudo-name) said farmers created dispute all the time in the name of water use and limited water availability. Even at times when farmers were in urgent need of water, either there was shortage of water or they needed to wait in a long queue. He, as a member of main canal committee, talked about a situation in the past. There was such a big scarcity of water in KIP. The Irrigation Office sent three representatives of WUA in each section of KIP to try to ensure fair and peaceful water distribution.

Hari Rojaiya (pseudo-name) was sent to Mangalpur, Rara Rojaiya (pseudo-name) was sent to Shibanagar section and he himself was sent to Gitanagar section. But the situation was not resolved. Farmers from every section were furious because of shortage of water. All the farmers united and they descended upon the Irrigation Office. They started breaking window glasses and pounding on walls of the office.

He narrated the incidence, "*we, along with the protesting farmers, went to Narayani Lift Irrigation and Water Project (NLIWP) Office in order to demand more water to KIP to solve the problem of water scarcity. The Narayani Lift and KIP are located close to each other. But, the officer of NLIWP office denied this request. The farmers were furious and they were about to tie that officer on a pole and beat him. We intervened and urged the farmers not to carry out such a misconduct. We told them that if they went ahead with this wrong conduct, they would have to bear so many problems. We would not get water now or ever in future if they carried out this act."* (Fieldwork, 2022*).* And so, Hari and others were finally able to pacify the agitating farmers.

Nakul Rojaiya (pseudo-name), another member of main canal committee of KIP, said that due to limited water source, farmers in tail end section hardly get water. The water scarcity situation was so dire that at one point, the WUA nearly gave up its responsibility because it could not manage the situation. Nakul stepped in to handle the situation. He assigned four days of water access for each section. He said that it was really hard to manage the situation during that time.

**Resource rights dilemma after federalism**

Dil Rojaiya (pseudo-name), one of the main canal committee members who represented Geetanagar section, stated that once Ratnanagar municipality, one of the municipalities of Chitwan, denied providing water of Khageri River to Bharatpur in West Chitwan claiming that Khageri lies in Ratnanagar municipality. They said that it was only the right of people who live in Ratnanagar to consume and utilize water of Khageri River. It brought a situation of conflict between the farmers of Ratnanagar and Bharatpur. Later on, Dil and others negotiated the situation explaining that if Ratnanagar denied to provide water to Bharatpur, Bhartapur would deny Ratnanagar people to come to their area. This was a conflict observed in KIP when a local government unit tried to impose their authority over the irrigation management.

Lava Rojaiya (pseudo-name), a farmer who represented branch no 6 of KIP shared a dreadful event that once the farmers of Ratnanagar, who belonged to the upper section of the KIP, blocked water to the farmers of Bharatpur, the lower riparian water users. Many farmers of Bharatpur then went to confront the farmers of Ratnanagar with household weapons like Khukuri, sword, stone, bhala etc. A violent confrontation occurred between the farmers from these two sections, and some members from both sides were also harmed. This event escalated so police came and arrested some of the farmers. This is another example of violent conflict between these two municipalities in the name of water use.

Himal Rojaiya (pseudo-name) stated that conflict related to irrigation often occurs between east and west Chitwan farmers. He said that east Chitwan or Ratnanagar farmers deny supply of water to west Chitwan or Bharatpur farmers claiming that they belonged to the head end section and head end section had the right to use water first.

**Human encroachment of the canal**

According to Bill Rajaiya (pseudo-name), many people have constructed their house or barn without following legal provisions of the irrigation canal. He further added that some squatters with no legal ownership of land had settled near the bank of irrigation canal area. Such constructions and settlements blocked the free flow of water in the canal. These impede the flow of water and also causes shortage of water. So, they are also inducing factors of conflict.

Dil Rojaiya (pseudo-name) pointed out that the plotting of land that takes place to open any area for development is also a source of conflict. In the name of plotting, the original canal structures are either damaged, misaligned or destroyed completely.

Himal Rojaiya (pseudo-name) cited an example of a person who once denied to obey the legal provision while building a house. He was about to construct a house by the side of canal which could potentially block the free flow of water. Himal, being a member of main canal committee of KIP, held a meeting with the person and some other farmers. Only after vehement opposition and protest by the farmers did the person agree to leave required space between his house and the canal.

**Chitwan National Park (CNP) control and legal restrictions**

One of the major inducing factors of conflict in KIP observed was the restriction to enter inside the Chitwan National Park (CNP). It required various legal procedures if one had to enter CNP. Almost 8 km long main canal of KIP falls inside CNP. Many farmers complained that they are restricted or made to face hassle from entering the CNP when they are doing their regular sanitation, repair and maintenance of canal. This has also created a big problem for the farmers.

Dil Rojaiya (pseudo-name), member of main canal committee, revealed that one of the major inducing factors of conflict was not having easy accessibility to enter inside CNP for cleaning the canal. He added that the water is already in short supply in KIP, which gets further reduced due to major obstructions blocking the canal in the forest section. When farmers want to remove the obstructions as fast as possible to ensure optimum water flow, the national park makes them go around circles to fulfil long legal procedure. Many farmers are not happy with CNP. This has also been an inducing factor of conflict in KIP.

**Raising of water fee *'Paani Pot'***

Daniel Rojiya (pseudo name), a member of main canal committee of KIP, stated that the participation of water users during repair, maintenance and cleanliness activities have been half-hearted (Field Study, 2022).

Khem Rajaiya (pseudo-name), chairperson of section 1 (pseudo number) canal committee, expressed his dissatisfaction over the nature of farmers. He told that many farmers are reluctant to pay the levy. Most of the farmers do not pay it yet were using the water. According to him, they are rent seekers and free riders. Other farmers also echoed the same

sentiment. They said that farmers who refuse to pay *pani pot* have caused financial burden in KIP.

## Conclusion

From this study, it is concluded that there is the need of either a single individual, firm, or business organization to take ownership of this project for a fixed period of time by fulfilling all legal provisions with the government of Nepal. It helps to protect the common pool resources from being misused by the public. According to the theory of the tragedy of commons, usually, such resources do not have private ownership. It means everybody wants to consume as much as they can but refuses to protect it for its sustainable use. This theory deals with a bitter reality that common pool resources are owned by all, but the paradox is that nobody wants to use such resources rationally. To solve this dilemma, there is the need for a neo-liberal approach or political-economic perspective required for the protection and long-term sustainable consumption of such resources. Every farmer needs to pay money for the use of water which will systematize the proper use of water. It helps to make users sincere and solves the problem of "free-riding and rent-seeking." In case poor people cannot pay money, a system of equitable use of water from different approaches like poverty identity cards or quota system etc. may be established. The theory applied to analyze the situation and condition in this study was found to be effective and meets the essence of each theoretical idea. For example, the application of theory of co-management to study the KIP is valid, on the other hand, it assesses how it could have a better management system. The arrangement between government and community to manage resources seemed to be a failure in the particular case of KIP. Overall, a theoretical underpinning has been noticed after the study of this KIS which is the neoliberal socioeconomic form of irrigation management. It targets more privatization with due consideration for socioeconomic aspect of living. In case any farmers are found to be in a difficult financial situation for example if they cannot manage money to buy water for use in their fields, the socioeconomic dimension would consider those issues either through giving subsidies or providing soft loans, etc.

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