



Hydro-climatic situation and water management practices in parts of trans-Himalayan region of Nepal

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General Note

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ABSTRACT

Mustang is located in North Western part of Nepal and is also known as trans-Himalayan region. This paper is made from recent observation of Jomsom, Dhakarjun and Phalak regions along with rainfall and water flow data availed from Jomsom station of Mustang. The district generally gets very less amount of annual rainfall being a leeward side in Nepal. This paper has been prepared to explore hydro-climatic conditions along with social status especially for water management found on those regions in the

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Mustang district. Annual and seasonal rainfall patterns were analyzed for Jomsom station. It is learned from this study that water management practices applied on those villages will be inspirational to water scarce regions.

Keywords: Mustang, Hydro-climatic, Social, Water management

1. INTRODUCTION

Mustang is one of the Himalayan districts of Nepal with the area of 3563.25 square kilometer and it covers about 2.42 percent area of Nepal (DDC-Mustang, 2013). Altitudinal variation of the district is from 1640 meter to 7061 meter. The district has a population of 13,452 with the population density of 3.8/km² (Wikipedia, 2015).

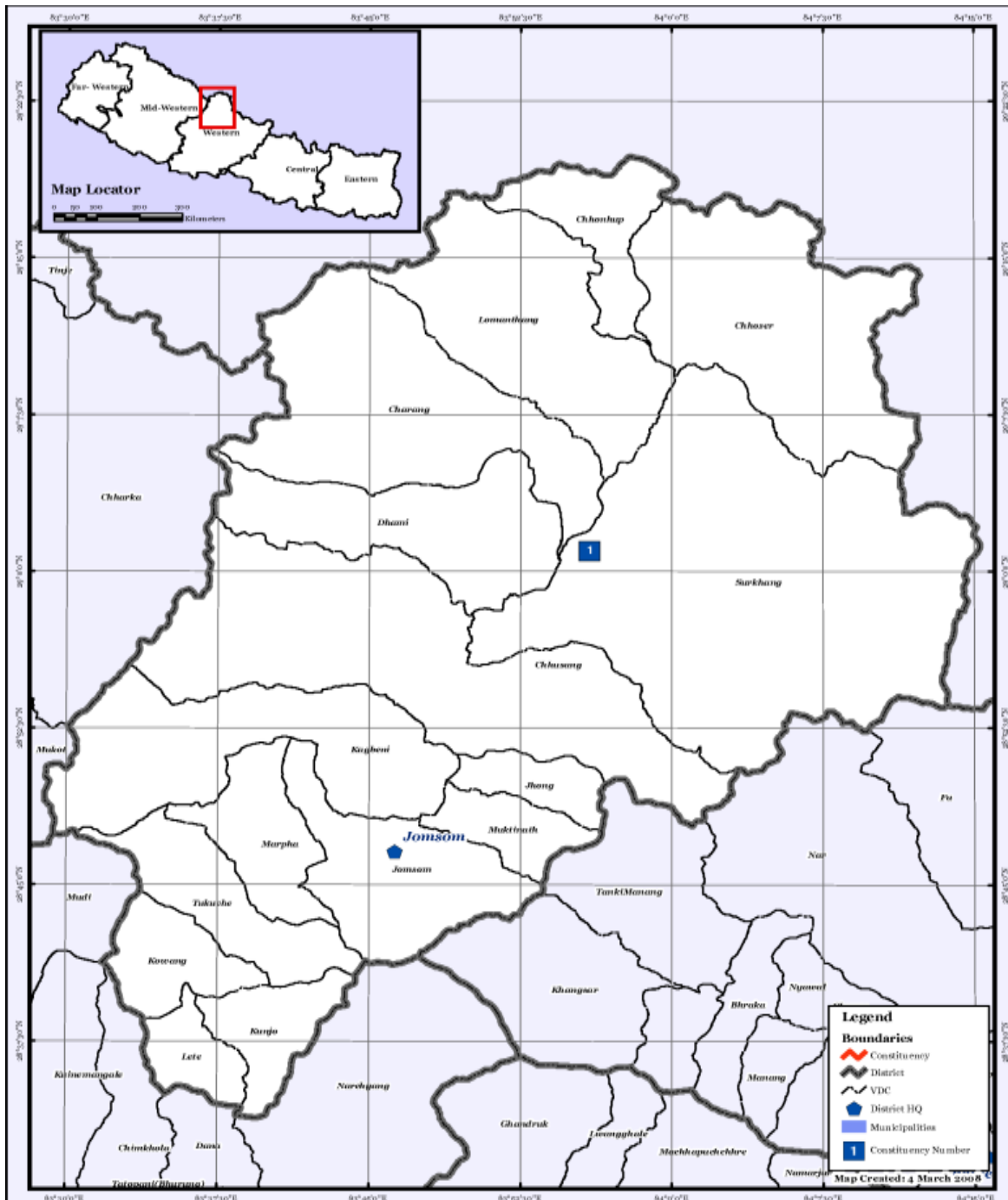


Figure 1: Mustang district in the map of Nepal (Wikipedia, 2015)

2. MUKHIYA SYSTEM IN WATER CONFLICT MANAGEMENT

One of the traditional systems, which is known by Mukhiya (*Gamba* in local language) still exists in Mustang. Mukhiya is a community based system and it is not authentic body of government though it has crucial role to enhance developmental works in certain communities of Nepal. The author was involved in interaction program at Dhakarjun and Phalak villages in Mustang with the help of Mukhiya. People consider Mukhiya to be active person in their region and his or her term is for one year. Mukhiya has key role in the region because s/he tries to manage all the local problems including conflicts. People expect Mukhiya to be aware with the modern as well traditional knowledge and due to the reason they generally choose mature person for Mukhiya.

Currently, Dhakarjun village has one Mukhiya and one Katuwal (Assistant of Mukhiya) and Phalak has two Mukhiyas and four Katuwals. Katuwal has the main task to disseminate message among villagers. So far there is no woman Mukhiya in Dhakarjun and Phalak villages. According to the villagers the reason behind lagging of women to come forward as Mukhiya is due to their busy schedule of household tasks including taking care of children. According to Mukhiyas of both villages, they are raising their village problems including projects in village development committee assemblies, district development committee and government officials try to address their concerns.



Figure 2

One of the major rivers i.e. Kali Gandaki in the Mustang and surrounding landscape on the way to Dharkarjun and Phalak (Photo by author)

3. WATER AND CLIMATIC SITUATION IN DHAKARJUN

Dhakarjun and Phalak villages are located in north eastern side about nine kilometers away from the Jomsom. Interaction program with Mukhiya and other people of Dhakarjun was conducted by the author along with some of the colleagues. We have drawn some of the conclusions mainly considering hydro-climatic situation of Dhakarjun and they are given below.

- Villagers are facing water problem for irrigation due to less availability of water. They are not producing sufficient vegetables including crops due to water scarcity.
- They usually manage irrigation channels by themselves and ask district development committee if any major problem appears.
- Dhakarjun and Phalak villages have same source of water. Dhakarjun village has 44 houses and they get two days' turn to use water in their fields. Mukhiya allocates time for each house to use the water in Dhakarjun.
- The participant from Dhakarjun informed us that they are reducing cattle due to water problem and grassland areas are also on decreasing trend.
- According to the villagers, drinking water is affected due to calcium carbonate.
- There used to be snowfalls in winter but now rainfalls occur in that period. It has created leakage problem in mud-typed houses.
- Willingness among the villagers was seen to coordinate with other villages to enhance developmental works.

4. WATER AND CLIMATIC SITUATION IN PHALAK

Similar procedure as of Dhakarjun was conducted in Phalak village to identify hydro-climatic situation. We have pin-pointed following hydro-climatic conditions in Phalak.

- At the moment, Phalak village has 54 houses and they get three days' turn to use water in their fields and Mukhiya allocates time for each house to use the water.
- Most of the villagers want to follow the traditional practice of water allocation. However, they are willing to adopt the combined decision within their community for the improvement in water management system (Biswanath Bishoi, 2016).
- They distribute water on the basis of sunshine signal that appears on a stone placed in water source region. According to the villagers, they are following this tradition since their forefathers.
- Due to less availability of water, they are promoting apple plantation and are considering for making reservoirs to collect water.
- Concern among villagers was found regarding the occurrence of rainfalls in place of snowfalls in winter and increasing trend of diseases.



Figure 3 Some of the houses and surrounding environment in Phalak (Photo by author)

5. WATER AND CLIMATIC SITUATION IN JOMSOM

We did household survey in Jomsom and found that they are suffering from the adverse impacts of climate change. Respondents told that drinking water problem and diseases are on increasing trend. Jomsom residents also informed that they are getting rainfall in place of snowfall in October-November. They also mentioned that young people are willing to migrate to other places in order to seek better livelihoods. The latest population census of 2011 has also justified this fact (DDC-Mustang, 2013). One of the benefits brought by climate change is the growth of capsicum, tomato, lady's finger at Jomsom region which had very limited production of vegetables in the past.

The rainfall records of 1985 to 2015 were analyzed for the Jomsom station. The station is located 28°47' North latitude, 83°43' East longitude and 2744 meter above sea level. Results of the annual and seasonal rainfall patterns are depicted in figures 4 and 6 respectively. Both figures have indicated the slightly increasing trend of the rainfall pattern in most of the cases. However, overall climatic condition of the region is influenced by other meteorological factors such as temperature, evaporation and so on. Results of the annual and seasonal river flow patterns (discharge) are depicted in figures 5 and 7 respectively. Both figures have indicated the slightly decreasing trend of the river flow patterns in most of the cases. In comparing the results of rainfall and discharge, they are not showing good correlation except for post monsoon season. These results also signified possibility of indirect relationship between rainfall and discharge and need investigation of other physio-climatic parameters like evaporation, snow fall, temperature, irrigation system in the study area.

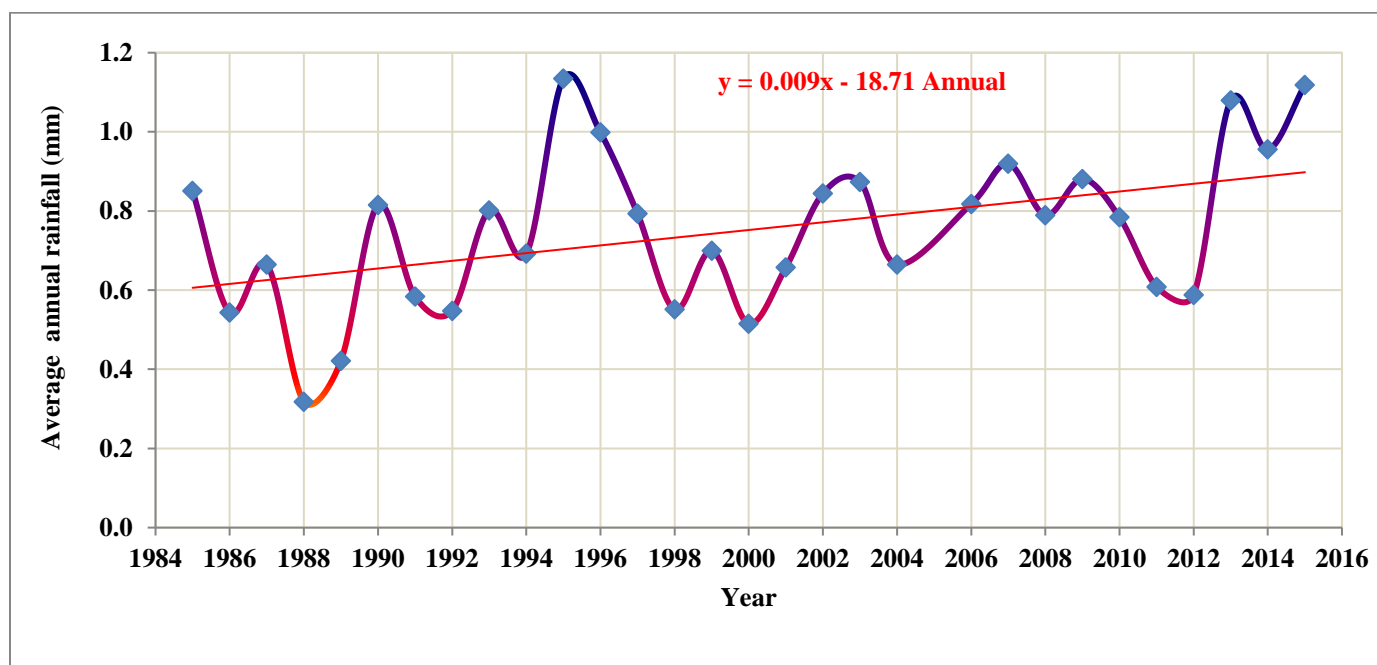


Figure 4

The annual rainfall trend found in the Jomsom station

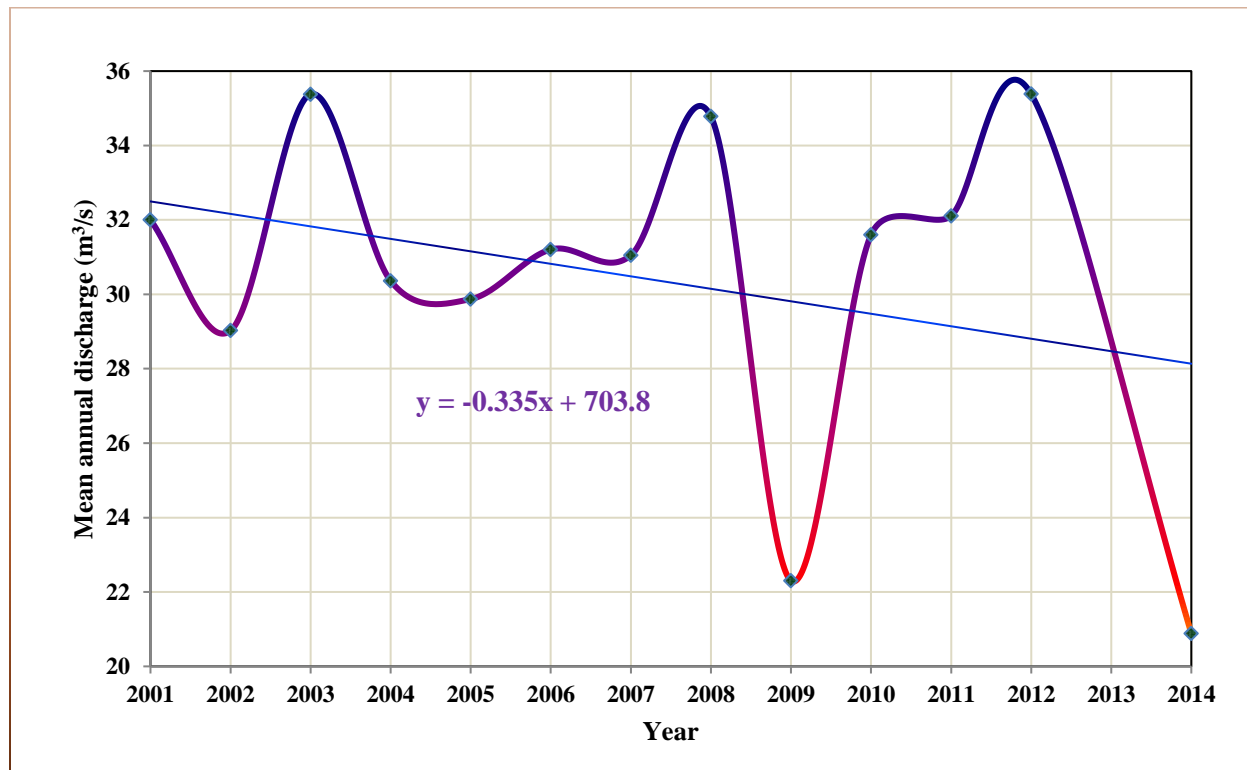


Figure 5

Mean annual discharge trend found in the Jomsom station

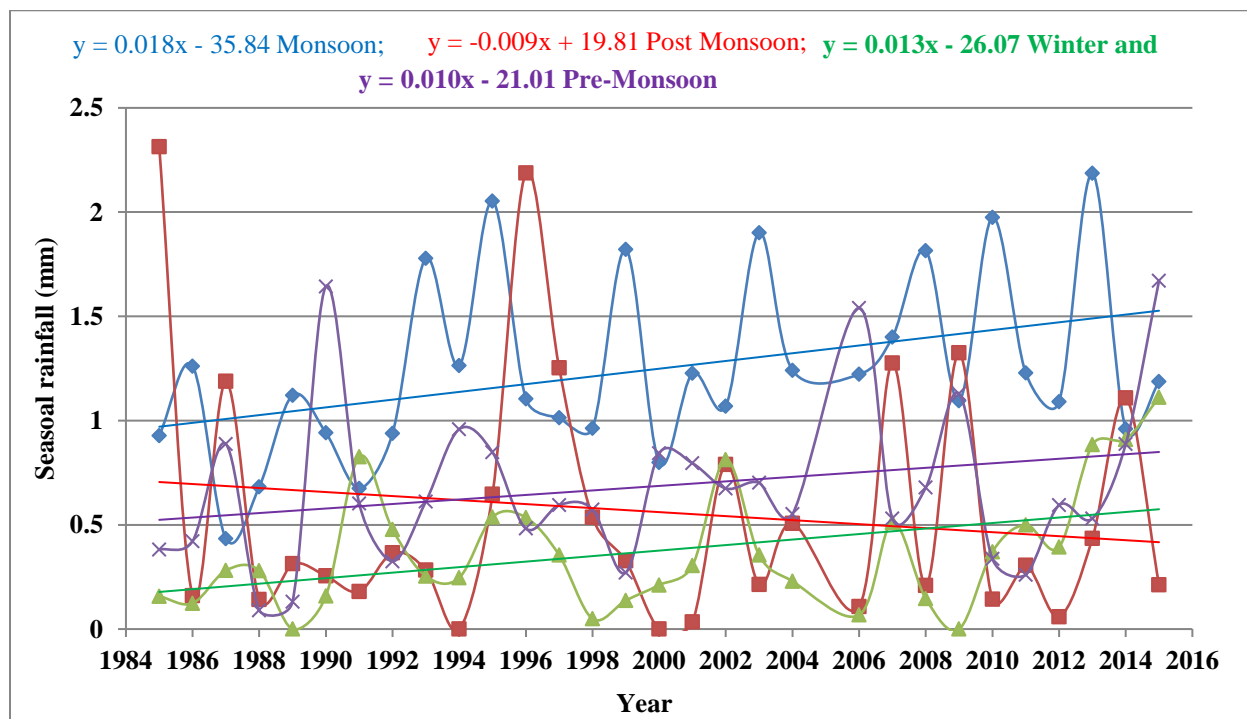


Figure 6

The seasonal rainfall trend found in the jomsom station

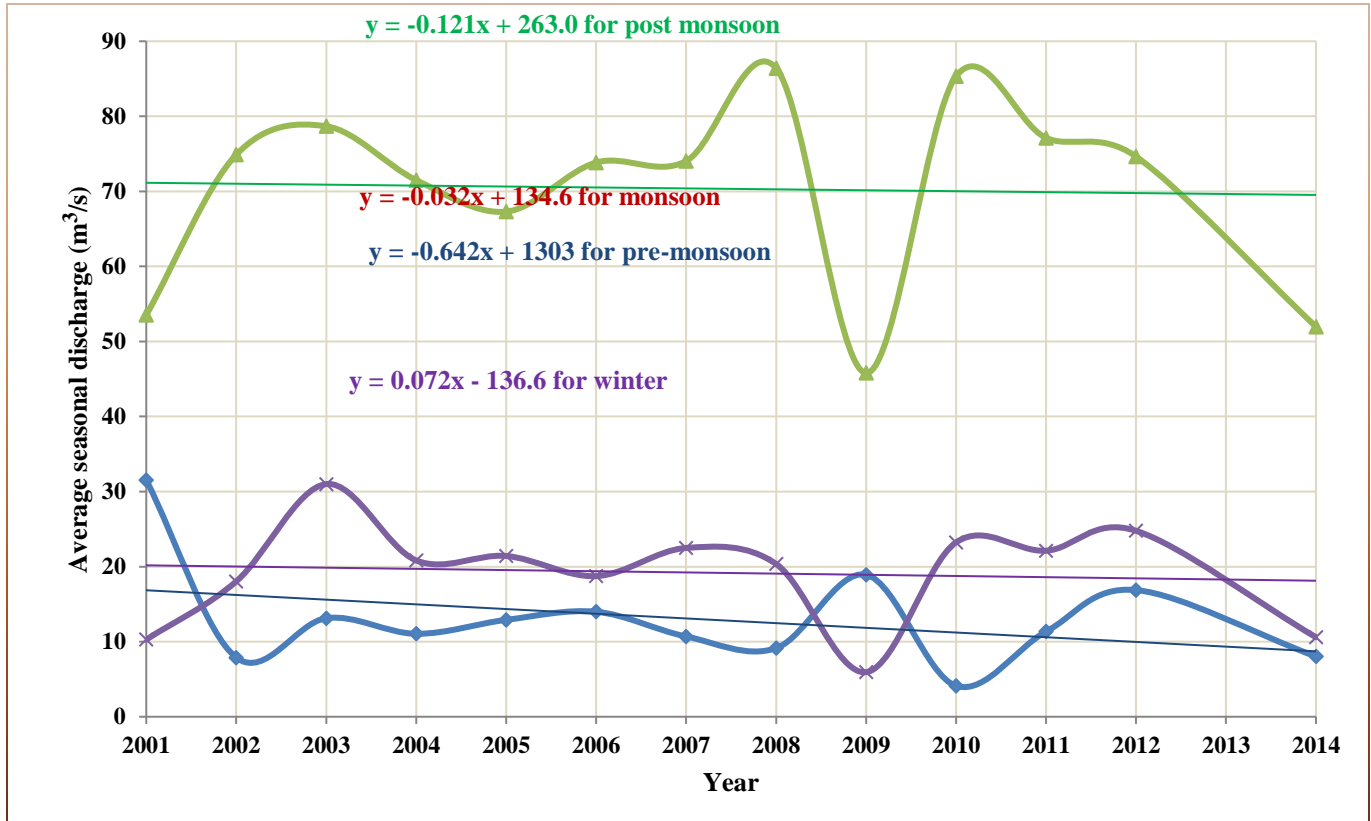


Figure 7

Seasonal discharge trend found in the Jomsom station

6. CONCLUDING REMARKS

It is found that all the villages mentioned above have been facing water scarcity. Dhakarjun and Phalak villages are promoting apple farming in consideration to changing climatic conditions. All the above mentioned communities have shown great concern on future availability of water.

Their concern is very genuine scientifically because earlier there were snowfall and those snowfalls were slowly melted down. Beyond it, the land remained in wet condition for longer duration and they manage the melted water for irrigation. But due to present climatic condition, i.e. global warming, they are getting rainfall in place of snowfall and snow melting is occurring rapidly including the increasing chances of evaporation. The earlier statement is quite significant by nominal increasing trend of rainfall amount found in Jomsom station. However, it is difficult to justify exact reason without analyzing other meteorological parameters. Due to the pattern as getting rainfall in place of snowfall, land became dry for longer duration. Such phenomenon has created less availability of water for agriculture purpose. This kind of situation has brought very worse situation on availability and management of water resources on those study areas.

It is recommended that all the communities in those study areas should apply some of the modern techniques as drip irrigation system in farming, use pipes in water supply, plantation, construction of reservoirs and water harvesting system in order to optimum use and conserve the availed water in those study areas.

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