

## A Water Distribution System of Traditional Irrigation Organization in Afghanistan アフガニスタンにおける伝統的灌漑組織による用水配分方式

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### 1. Introduction:

Water distribution efficiency of irrigation is important especially in the developing countries. Most of developing countries in arid area have already developed irrigation systems since more than hundred years ago, while irrigation efficiency is rather low.

Afghanistan is also under those conditions. River water has been diverted and distributed to each farmer's plot by the traditional water users' organization (WUO) named "Mirab system" for a long time ("Mirab" means water manager). The fact it has long history shows its sustainability, while its irrigation efficiency has remained low.

There are two possible reasons; a) Water distribution is not implemented rationally so that upstream farmers may get water more than they need as their vested rights. b) Poor infrastructure for conveying and distributing water such as intake works, division works, canal system, etc.

In this research, one of the large irrigation districts in Afghanistan was selected as the case study site; Charikar canal which is covering 4000 ha of field and managed by Mirab system.

The objective of this research is, 1- To clarify the actual water distribution. 2- To analyze the actual function and structure of WUO 3- To Consider the method for realizing better irrigation efficiency.

### 2. Study site and Research Method:

Charikar canal district in Parwan province locates 68 km north of Kabul city in Afghanistan (latitude 35 8 N, longitude 69 17 E). The water resource of the district is Ghorband River. Main

crops are wheat and maize that is typical cropping in Afghanistan. The irrigation system have been developed since several hundred years ago and managed by Mirab system.

The data of water use and WUO are collected by the field survey in September 2015. Main method is the interview with Mirabs, a Band Wan (intake manager), farmers and Maliks (heads of village) and the offices of WMD (Water Management District; the public organization in charge of water management in each province). Metrological and hydrological data were also collected by the records and reports of MEW (Ministry of Energy and Water) and MAIL (Ministry of Agriculture, Irrigation and livestock).

### 3. Actual Water Distribution:

Usually farmers in this area cultivated two times. First crop is wheat which starts cultivating from October and harvesting in the end of May. Second one is maize cultivated from June and harvested in the end of September.

Fig.1 shows the precipitation, the discharge of Ghorband River. As available water resources become less after July, water shortage for maize

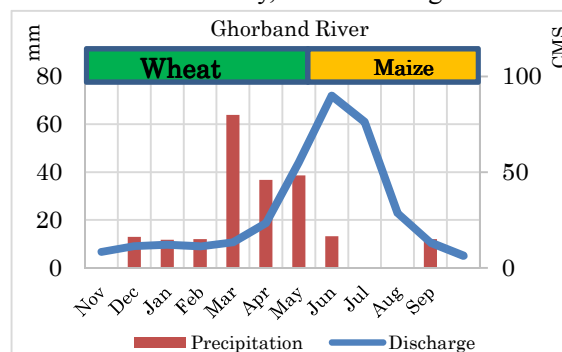


Fig.1. Ghorband river Average discharge, precipitation and cultivation time and harvesting

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has frequently happened during this season.

The canal system of Charikar consists of one main canal and 45 branch canals. Capacity of each branch canal was designed based on the acreage of its covering fields. That is, canal width of 16 barley seeds was allowed for 100 ha of field. This "Barley seeds distribution system" is quite common in this area and designed around 200 ~ 250 years ago.

Farmers are not allowed to touch each division works to a branch canal both in normal condition of water and drought. In normal season, water is distributed simultaneously and continuously to each branch canal. While in drought, rotational irrigation between upstream, midstream and downstream blocks is adopted and each block can get water for 3 days in turn.

#### **4. Structure and Function of WUOs**

##### **4.1 Mirab System**

Irrigation management has been implemented by a Band wan and Mirabs. They are both farmers or villagers and special persons for this system.

The tasks of Band Wan are; 1- Operating, maintaining and watching intake works. 2- Holding and chairing the Mirabs meeting for starting 3 days rotational irrigation system. 3- Negotiation to upstream WUOs for releasing river water to downstream. 4- Selecting Mirabs for each village.

The responsibility of a Mirab is managing water of his village. His tasks are, 1- Checking division works for their village. 2- Observing water distribution in the village. 3- Regulating water allocation among branch canals for the village. 4- Requiring to hold the Mirabs meeting to Band wan. 5- Announcement of starting 3 days rotational irrigation system. And 6- Collecting operation fee from farmers.

Farmers in middle and downstream area have to pay 3.5kg/ha/crop of wheat or corn as the OM fee. While the operation fee upstream farmers are 2 kg/ha/crop. After collecting cereal and cash

form each village, Mirabs and Band wan divided it among themselves.

This district also has punishment system. If any farmer uses water on the day when he is not allowed to use, the Mirab and Malik visit and suggest him not to use water. If he is found to use water against the rule again, the Mirab and Malik with elders of that village go to his home and they force him to buy a sheep, kill it and invite all of responsible persons for water distribution (Malik, elders of village and all Mirabs).

##### **4.2 Village -local community**

Water distributed in each village is implemented fairly among farmers. In case of 3 days rotational irrigation, water is distributed to each farmer measuring time based on the acreage of the field.

As the village is local community not only affair water management but also many issues such as defence, education, information and so on, it can force farmers to follow those fair water distribution.

Moreover, the power or authority of Band wan and Mirabs are provided by the village. For election of Band wand, Maliks of each village gather at one place and rise their hand for him. There is also recall system for changing Band wan. If the Band wan cannot manage water, then Maliks with elders of each village decided to change him.

Band wan has an authority to select Mirabs for each village, while actually, he is following each village's recommendation for the new Mirab.

##### **5. Discussion:**

Mirab system in Charikar canal district has enabled fair water distribution based on the governability of local communities. Therefore, it is supposed that main reason for inefficient irrigation in this district is poor infrastructure. In those areas, it may be possible to improve irrigation efficiency by improving infrastructure without reconstructing farmers' WUO.