El Mujarilin irrigation system

Last Updated: November, 25 2020

1 Part I: Static Analysis - Collective action

The El Mujarilin Irrigation System is located in Daghara, Diwaniya Province, Iraq. El Mujarilin is one shabba (subsection of tribes) of the El Shabana. The resource appropriated from El Mujarilin irrigation system is water for irrigation. The original case was reported in 1970 but the field was done between 1956 and 1958 and catalogues an action situation involving 85 resource users. At the beginning of the study, there was a moderate shortage of biological and physical resources withdrawn compared to the number of units available.

The key resources (natural infrastructure) in the system is shared water. The key shared resource relevant to the commons dilemma faced by the community is water for irrigation (common-pool).

The success of the El Mujarilin Irrigation system is not entirely clear. However, the source document does not cite any significant challenges to the robustness of the system. Therefore, it can be considered that the system is partly successful due to an established social infrastructure for conflict resolution and irrigation water appropriation.

1.1 The Commons Dilemma

- The water supply for all El Mujarilin comes from one bada (first off-take from the jadwal, or main canal) of the Hurriyya canal, which has been named El Khurays. The water is distributed via naharan (secondary off-takes) canals to lands of the subsections. The El Mujarilin irrigation system has six naharans, and members of the shabba share the source. The water allocation system was established in the 1940s. However, sometimes the community faces a potential problem of appropriation of water for irrigation diverted through canals but mainly from one off-take of the Hurriyya canal. Another dilemma or the challenge for the community is the maintenance of the infrastructure system, basically canals and finally, another collective challenge is the management of conflicts among the resource users.

- The naharan canals are cleaned by the community in each year, usually before winter growing season (October), and summer cultivation (April). Although there are sanctions for the members who neglect their responsibility, there are still free-riding problems in the community. Most of the problems are solved within the shabbas of the tribe through the process of consensus. However, in some cases, the irrigation problems are brought to the government by petition. To file a petition is expensive and dangerous. It might result in fine or imprisonment. Therefore, people prefer to

recite problems less formally to the irrigation engineer or administrator. Generally, the engineer and administrator resist making decisions which have previously been settled on a tribal level. The regional government also does not exercise jurisdiction in relation to the type of resource appropriated by this subgroup.

1.2 Biophysical Context (IAD)

- **Natural infrastructure:** The El Mujarilin Irrigation System is located in the fertile land of Daghara, Southern Iraq, where the great Twin Rivers, the Tigris and Euphrates, have created alluvial plains over thousands of years. The process of silt deposition appears to have pushed the delta of the rivers further southward and has left a large area of marshland with shallow lakes. In addition, the temperatures in the area have a great variation, summer temperatures generally rise above 100 F., yet on winter nights frosts are not uncommon. There might be heavy rainfall occasionally in the winter months, but the winter in the region is often dry and sunny while summer days are never cool, the nights are justly famous for their comfort. Spring and Fall months are the best season of the year. During these seasons agricultural activities are very intense due to appreciable rainfall. The major source of income in this region is from agricultural activities. The principal crops in the region are barley, wheat, and rice. Irrigation in the region depends on water taken from the rivers through canals.

- **Hard human-made infrastructure:** Water is taken from the central government controlled canals, the Daghara and the Hurriyya canal, comes from the Euphrates River. The El Mujarilin cultivators get water from the Hurriyya canal. The canal was completed in 1940's. In the El Mujarilin irrigation system, water flows into a series of small canals from Hurriyya canal. The water supply of the system comes principally from one bada off-take of the Hurriyya canal, which has been named El Khurays. The entire shabba shares the El Khurays off-take, which distributes water into six naharan canals. Each naharan supplies water to a part of the landholding of the subsection via field canals and it is usually shared by close kinsmen. The cultivators also build a series of dams and weirs to force water into smaller canals. Each dam holds the water till the fields in the neighbourhood have been flooded, and water is then diverted to the next dam.

1.3 Attributes of the Community (IAD)

- **Social Infrastructure** Members of the El Mujarilin irrigation system share several social bonds, such as kinship, identification with named groups, contiguous and sometimes joint landownership, intermarriage, and often residence within the same hamlet. Common system of field canals also enables bond linking in the shabba. In some cases, a pipe may be shared by a single farmer or brothers. In most cases, users who enjoy membership in the same shabba share a single pipe.

- **Human Infrastructure** There is no mention of formal education in the case study. However, indications show that the human infrastructure in the system is incredibly high. For example, the members of the El Mujarilin irrigation system know how to do farming.

1.4 Rules in Use (IAD)

1. **Position Rules:**

   There are 3 explicit positions mentioned in the case study:

   - Members of the tribe (water users): They provide maintenance assistance for the canals to maintain water flow for the entire shabba. The responsibility for maintenance rotates among water users and the approximate amount of work required of each men is generally known among the reported people in the shabba.
   - Shayk: The key decision makers and decide how to implement decisions. Tribesmen can prefer to report problems to the shaykh if they are not able to solve it among themselves. Shaykhship can pass to the eldest son, if the tribe accepts him. There might be situations where it has passed to siblings, cousins, uncles, or any sons of the shaykh.
   - Irrigation Engineer: He exercises his duty by equitably dividing the available water from government canals. Tribesmen can voluntarily take irrigation problems related to distribution of water from government canals to the engineer. Internal distribution problems are not part of his official responsibility.

2. **Boundary Rules:**

   - Members of the system have boundary rules to distribute water for irrigation purposes. The group of farmers on naharan canals are entitled to water shares and their rights and responsibilities also defined. Tribal families are allowed to retain ownership of a certain amount of land or leasing of land in the location of the resource. The landholding is distributed among tribesmen and subject to fragmentation through inheritance. Entry rights to the land is designed by the original owner and can be given, leased, rented, sold or transferred to anyone. A tribesman, lawfully or otherwise, can own land individually or shared. However, additional land cannot be acquired due to expenditure of money which the average tribesman does not have. If the tribesman completely abandons the tribal homeland, he will give up rights and duties with respect to tribal domain.

3. **Choice Rules:**

   - Tribesman must join maintenance of the local irrigation system or he will not be allowed to take water in the forthcoming growing season.
   - Tribesman can own individual land or share with one's brothers and cousins.
   - Tribesman can sell the land or rent it to others.

4. **Aggregation Rules:**

   - Decisions regarding the number of waqts or periods of time during each agricultural season allotted to each naharan were established by shabbas (secondary section of the tribe) in the 1940s after the completion of Hurriya Canal. The maintenance and management of the local irrigation system is carried out by the cooperation of shabbas. In case of main canals, such as Hurriya Canal, the central government is responsible for maintenance and management of the canal.

5. **Scope Rules:**

   - It is possible that scope rules are not well defined in the source document.

6. **Information Rules:**

   - Number of waqts assigned to each naharan does not change from year to year and there is a rotating system among naharans. For example, the group of farmers on one naharan is allowed two days, equal to four waqts, to accumulate its total water supply, then they must close their off-take and the next group use the water. The sequence of the rotation for water distribution is decided by lot at the beginning of each agricultural season.

7. **Payoff Rules:**

   The authors have the following confidence level for the results of this section: inferred.

   - Appropriators may temporarily lose their entry or appropriation rights for breaking rules related to the appropriation of the resource.
   - Incarceration is imposed for an unstated duration, as penalty on appropriators for breaking rules related to the appropriation of this resource.
   - Severe community shunning is used for an unstated duration of time as a sanction that is consciously imposed on appropriators who break rules related to the appropriation of this resource.
   - Appropriators can obtain aid from a national (private or public) agency(s) to develop or repair their production, distribution, or appropriation resources.
   - Appropriators are not party to price support contracts or guaranteed purchase agreements for the selling of resource units or commodities produced by resource units.

1.5 Summary

Water for the El Mujarilin irrigation system is the key common use resource and there is a social infrastructure mechanism in the system for appropriation of the resource, as well as conlift resolution. The set of individuals who have rights to withdraw from this resource is well-defined. Hard human made infracture reduces variability from external shocks into the system. The judiciary system in the region is mixed - some conflicts were resolved by the traditional system and some conflicts were processed by a non-traditional system. The regional government does not exercise jurisdiction in relation to the type of resource appropriation. The quality and quantity of the units available to the appropriators are not documented as having experienced any effect of past appropriators. It is implied that the El Mujarilin irrigation system is partly successful because of its infrastructure mechanism and well-defined boundary rules.

2 Part II. Dynamic Analysis - Robustness

3 Part III. Case Contributors

- Burcu Tezcan, School of Sustainable Engineering and the Built Environment, Arizona State University.
- SY, Tang, Arizona State University.
- Ute Brady, School of Human Evolution and Social Change, Arizona State University.