Felderin Irrigation System, Torbel, Switzerland

Last updated:

October 26, 2018

1 Static Analysis - Collective action

The Felderin irrigation case was part of the original CPR database developed in the 1980s by Edella Schlager and Shui Yan Tang at Indiana University. The original CPR report is available from the main case page under the CPR tab under Institutional Analysis. The common pool resource appropriated was water from a perennial stream delivered by Feldrin irrigation. The Felderin system was the smallest of the three irrigation networks in Torbel, Valais, Switzerland. It was regulated without central authority or official mechanisms for adjudication. Data of this case study was collected from Nettings work in 1974. Subsequent to the previous document, one follow-up has been found on the canton of Valais.

1.1 The Commons Dilemma

The common pool resource was water for irrigation delivered by the Felderin system, which was constructed, managed and used by the local association of farmers in Torbel. In general, the villagers were able to maintain this small-scale irrigation system successfully and solve the commons dilemma of water sharing. This goal was accomplished by creating an intricate water sharing schedule that enabled farmers to self-correct each other's water use. Inconsistent water delegation is difficult to prove and often go unresolved leading to monitoring issues. These issues are further complicated with a lack of resource appropriation monitors. Due to a lack of a monitoring system, there are no punishments for water overuse. When conflicts do arise, they are settled privately by buying water from the Church or bargaining water with neighbors. Overall, conflicts within the community appeared to be small compared to the general level of cooperation within the Felderin system. The degree of dependence of the local mixed farming on the Felderin irrigation was unknown. Despite a poor monitoring system the factors the Felderin system has sustain over centuries.

1.2 Biophysical Context (IAD)

Torbel is a small, remote village situated in high, steep Alpine region, Switzerland. The regional arid climate severely limits agriculture and herd activities. Restricted by the annual precipitation of 500 mm, crop yield and grazing heavily rely on irrigation. The Felderin system is one of the oldest among the three irrigation networks in Torbel, irrigating 19 hectares of land. Most Torbel farmers have their land widely scattered at distant meadows within the village. One meadow often consists of plots from several farmers. While plots vary in size, smaller plots may receive more water based on long-standing agreements between users. The amount of water delegated per plot is determined based on the movement of the sun and shadows created on the landscape (basically functions as clock).

Hard infrastructure. The water source is locally controlled. The Felderin system takes one third of the water from the nearby perennial stream, Torbelbach. The system is built of stone-lined channel and soil ditches, with wooden sluice and stone plates to control the flow of water. It grows essentially without planning. Maintenance is provided by a half dozen men working communally one day in the spring. The system is then left to run itself over the entire year.

Social Infrastructure. The system is maintained through a series of interpersonal relationships. Those who consistently steal water from the irrigation system may be formally confronted by other community members.

Human Infrastructure. Human infrastructure in the Torbel community is high. Literacy in the community is general and community members are able to perform complex bookkeeping despite the lack of standardized administration.

1.3 Attributes of the Community (IAD)

Torbel village is a closed corporate community with a total population of 583. The remarkable continuity of many local family lines is related to rules of village citizenship and accompanying property rights (Netting, 1981). Within the village, literacy is general and most adults can perform quite complex bookkeeping and bureaucratic chores.

The Felderin system is managed by an uninformed, voluntarily cooperative association of users. It is regulated without central authority or official mechanisms for adjudication. Each individual can supply information on when and where he is entitled to water. But there is no unified knowledge or administration regarding the entire schedule of water sharing. Women do a great deal of irrigating and may be better informed in irrigation schedule than men.

1.4 Rules in Use (IAD)

Boundary rules

- Appropriation of water is associated with land ownership of local residents.

Choice rules

- Farmer can use water during his allotted period for any plot he owns in the area served by the irrigation network.
- Neighbors may trade water, often in return for help at plowing or harvest.
- Farmer can purchase additional water from the church, which has all water right on Sunday.
- When conflict arises on watering schedule, confused farmers may consult older farmers who are reputed to have a good head for these intricacies.

Scope Rules

- The annual irrigation period is from April to September during weekdays.
- Within a meadow area, which usually contains plots of several owners, the sequence of watering within a day rotates every 16 days.

Information Rules

- Voluntary organizations maintain detailed records of local land ownership dating back to the medieval period. It is unclear if this information is available to all users.

Payoff rules

- Farmer who breaks the schedule and steals water repeatedly may receive warning or have their stone plate thrown away by the injured party, which result in sanction as loss of water.

1.5 Summary

The Felderin irrigation is an example of a successful solution to the commons dilemma. Netting argued that this acephalous system of ordered anarchy illustrates that small-scale irrigation systems can function on the basis of an intricate series of water sharing agreements. While the loose schedule led to unequal water share, users refused to plan reorganization of the water schedule and agreed that successful change could only occur with the installation of a pipe and sprinkler system. This however, would radically alter the amount of water and the amount of work exercised by each individual within the watering system. The lack of sanctioning calls the importance of the system into question. It is expected that scarce resources or those that are heavily relied upon for individual livelihoods would have strict rules of use and sanctioning. As these are not apparent within this system, it is assumed that locals are either not heavily dependent on the resource or it is not scarce. Despite a lack of central authority, the self-organized system has been maintained for hundreds of years.

2 Dynamic Analysis - Robustness

The original Felderin system is a successful resource management case that embedded in the larger stable social-ecological system of Torbel. There is no exact follow up studies available on this case. However, updated research was found for the canton of Valais, which contains 143 municipalities, Torbel being one of these municipalities. It is predicted that Torbel is likely to experience similar social-economic change and shift of water use regimes as seen in Valais.

2.1 Shocks, Capacities, Vulnerabilities

Competition from low land intensive farming following the Second World War, was the driving force behind the social and economic shift away from a predominantly agricultural society to one with a industrial and service based economy. The major shocks came from technical and economic development. Mountain farming experienced strong pressures to stay competitive with intensive agricultural practices in the Central Plateau, as well as abroad(Kissling-Nf, Volken, and Bisang, 2002). This had a significant effect on the demise of the traditional self-sufficient farming system.

Changes in attributes of the community include population growth and the rise of industry in the post-war era shifted the focus of the economy. Agriculture became less prevalent and community members emigrated out of the area due to the growing scarcity of productive land plots. Farmers began to work - initially part-time and later full- time - in industry and

tourism sectors. Those who continued to farm in addition to holding a industry or service sector job were labeled as 'leisure farmers'. This marked the end of large-scale livestock raising (Kissling-Nf, Volken, and Bisang, 2002).

Changes in hard infrastructure include the development of the irrigation system in Valais in the 20th century, traditional irrigation systems were replaced with underground irrigation systems and sprinkler systems. The modern sprinkler systems do not depend on the strict monitoring and sanctioning and do not require maintenance work by the co-operative(Kissling-Nf, Volken, and Bisang, 2002). Because of the changes in the hard infrastructure, voluntarily cooperation among users decreased, which was critical to the operation of traditional irrigation system.

3 Contributors

Yujia Zhang, Emma Laurens.