Effective institutions produce inefficient outcomes - Experimental evidence from Pakistan

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Abstract

Many irrigation systems are special cases of common-pool resources (CPRs) where some users have preferential access to the resource due to their advantageous location. This potentially aggravates collective action challenges, such as the under-provision of necessary infrastructure as a result of unequal appropriation of water resources. In contrast to theoretical predictions, empirical evidence from around the world provides evidence for successful decentralized irrigation system governance. Many communities have devised effective institutions to encourage cooperation.

We employ field experiments based on the experimental design of Janssen et al. (2011) to analyse the effectiveness of different institutional settings (communication, traditional authority, and external sanctions) in establishing and maintaining a stable and fair CPR management system under conditions of asymmetric access to the resource base. The experiments were carried out in eight villages in Punjab/Pakistan with 176 farmers.

In the experiments, Punjabi farmers managed to provide the CPR at a level close to the social optimum, even without communication or enforcement opportunities. The equal investment in water infrastructure seems to be a strong social norm, even though those in disadvantaged positions (tail-users) earn less than those who have preferential access (head-users). At the same time, head-users restrain themselves from maximum resource extraction, which could be interpreted either as a norm or a stationary bandit strategy.

In contrast to experimental findings of Janssen et al. (2013) the players in our experiment increased their earnings over the experimental rounds. This effect was strongest under the traditional authority treatment.

Starting from a very high level of cooperation during baseline rounds, the institutional treatments did not change the group investment significantly. The presence of traditional authorities however, resulted in a redistribution of available resources from head- to the tail-users. On the other hand, the introduction of external sanctions decreased the level of individual, as well as group welfare. This finding is surprising, as head-users in particular had lower earnings under the external sanctioning treatment. This resulted in a more equal distribution of water in the groups, which should have increased group earnings. We observe, however, that head-users reduced their water extraction in the face of possible external sanctions to
a level that the remaining water could not be used productively anymore by tail-users. The introduction of external sanctions provided effective incentives for more equal water sharing. Nevertheless, the institution failed to efficiently coordinate the water extraction of the groups.

We further observe that participants with closer social relations, as well as higher social status, receive significantly higher earnings. Also, investments as well as experimental gains were significantly higher in villages which have higher records of past water disputes. We interpret this result as a sign for the constructive role of conflicts. The disputes seem to have lead to an internalisation of more efficient institutions.

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