PIM IN THE ABSHAR IRRIGATION SYSTEM, IRAN

Jaime D. Hoogesteger van Dijk and Linden Vincent[1]

ABSTRACT

Despite worldwide attention for "farmer participation" in irrigation systems, the diverse irrigation management partnerships in place and discussed as participatory approaches, and their prospects for transformation, are less frequently discussed. Most emphasis is given to water user organizations and their potential performance, while new institutions at higher scales, and processes of change in these institutions, are less frequently discussed. This paper[2] describes the institutional transformations in farmer and agency action in the the Zayandeh Rud river basin and the Abshar Irrigation System, at the basin, system and outlet level, based on field work executed in autumn 2004. It analyzes the context and social rules of participatory irrigation management of the Abshar Irrigation System and describes how participation is crafted at field level. This article analyses these practices and sets some question marks on whether and how PIM should be up-scaled within this specific context.

THE ZAYANDEH RUD BASIN

The Zayandeh Rud basin is situated in the centre of Iran and covers an area of 41,500 km^2. The basin originates in the Zagros Mountains at altitudes of around 2300 m, where rainfall and snow are abundant[3], and closes in the Gavkhuni swamp at an altitude of 1466 m (Murray-Rust *et al.,* 2000). The majority of the basin lies under an arid and semi-arid climate. The city of Esfahan, with almost two million inhabitants, and its fertile plains[4], form the main socio-economic area of the basin (Molle *et al.,* 2004).

For centuries, water from the Zayandeh Rud River has been diverted to supply the city of Esfahan with water and to irrigate its gardens and neighboring areas. The peak flows

1- Jaime D. Hoogesteger van Dijk (MSc) is presently Junior Researcher and Lecturer at the Irrigation and Water Engineering Group at Wageningen University in the Netherlands. E-mail: Jaime.hoogesteger@wur.nl Professor Linden Vincent is presently professor of the Irrigation and Water Engineering Group at Wageningen University in the Netherlands. E-mail: Linden.vincent@wur.nl Address: Irrigation and Water Engineering, P.O. Box 47, 6700 AA Wageningen T: +31 317 48 41 90 F: +31 317 48 47 59

2- This paper is based on the MSc thesis and field work (2004) of Jaime Hoogesteger that was supervised by Linden Vincent of Wageningen University and Francois Molle from the International Water Management Institute.

3- In the head of the basin at high altitudes precipitation averages at around 1700 mm a year.

4- The fertile plains are constituted by alluvial deposits flanking the Zayandeh Rud where slopes are gentle and soils have good soil moisture holding capacities (Salemi et al., 2000).

from April to June have provided the basis for widespread downstream irrigation, earlier developed using simple diversion structures called *mahdis*, to make productive use of floodwaters (Salemi *et al.,* 2000). Although irrigation has been practiced since 1500 AD, today most irrigation is characterized by institutionally-managed, large-scale canals with automatic upstream control through NEYRPIC systems and volumetric water delivery through the use of 'modules à masque'. Most traditional canals have been absorbed into the large-scale systems, while many qanats[1] have either fallen into disrepair or have dried up because of adjacent drilling of deep boreholes. In 1970 the Chadegan reservoir, with a 1,500 million cubic meter (MCM) capacity, was completed and started to function in 1971. This dam allowed the regulation of the water flows in the Zayandeh Rud River, which, coupled with the construction of modern[2] irrigation networks, allowed for the expansion of the already existing irrigated area to its present 270,000 ha (Morid, 2004).

WATER MANAGEMENT IN THE ZAYANDEH RUD BASIN

In the Zayandeh Rud Basin regulation of water resource exploitation and distribution is the responsibility of Esfahan Water Authority (EWA) that is supervised by the Ministry of Energy. This institute is responsible for surface and groundwater management in the basin. Within the irrigation sector the responsibility of the EWA extends to the outlet level. Water distribution in tertiary and lower level channel networks is coordinated by the Esfahan Agriculture Authority under the supervision of the Ministry of Jihad and Agriculture (Morid, 2004).

Before 1993 all the operation and maintenance (O&M) down to the outlet level was done directly by the staff of one of the departments of the EWA. Based on this department the EWA created a new decentralized semi-governmental organization that manages and operates all irrigation systems in the basin. This new institution is the Mirhab, which was created and contracted for the O&M of the irrigation networks in the basin in 1993.

1- Qanats consist of horizontal wells dug to reach groundwater at the base of hills, and consist of a "mother well" that reaches a water table followed by a gallery with a gentle slope that transports the water to the surface of the ground. Every 25-50 m shafts are provided for the removal of spoil and ventilation of the gallery. In Iran qanats have been used for centuries to provide water for cities and irrigations (Molle et al., 2004).

2- Halsema (2002, p.21) notes that since the 1960s, the general objectives of irrigation modernisation have been to realise a water delivery service that provides the opportunity and means to meet varying crop- and irrigation water requirements that stimulates efficiency in water use and increased productivity. In infrastructure terms, this has involved technological designs that can respond to crop choices and needs and thus deal with both variable and flexible water supply: the management structure developed also looks for such flexibility often through a central agency controlling flows upstream in combination with locally based institutions. One such approach is that described here in the AIS, with lined canals, upstream control through NEYRPIC systems and water delivery with 'modules à masque' and controlled by a central water management authority. Plusquellec *et al,.* (1994) emphasised that 'modern' schemes had: several levels with clearly defined interfaces, each able to provide reliable, timely and equitable water delivery; enforceable systems of mutual obligations; are responsive to users' needs, and are thus robust but also have communication systems to provide necessary information and control; have motivated and trained operators; and recognise the requirements of agriculture and existing social conditions.

Under the reform banner and as a result of the international and national debates on irrigation reform, the Mirhab has started a pilot project in which farmer participation is to be formally instituted in organizations for the management of the secondary canals of the modernized irrigation systems. But what are the existing forms of farmer participation in these irrigation systems and how might these shape the prospects of new institutions?

PARTICIPATION BELOW THE FORMAL INSTITUTIONS

Farmer participation takes place in a domain where the Mirhab and EWA are absent. In the current organizational vacuum that exists at the outlet level, local farmer participation dictates water control. At this level, it encompasses regulation and control of water flows and human behavior, in which processes of resource mobilization, decision making and conflict management are important and existing institutions make very effective.

The manner of participation in the water control arena is structured by traditions and socially embedded cultural values of water distribution. These are mechanisms that get shaped by the principles established in the socially embedded traditions that stem from the Toomar edict and the long history of irrigation in the area. These are generally referred to as 'the Sheikh Bahai rules' which set out a couple of rules for a fair distribution of water below the outlet.

RULES FOR WATER DISTRIBUTION

According to "the Sheikh Bahai" rules, an outlet is divided in six equal parts which are named *joughs*. Every *jough* has its own canal system, gates and sluices and is generally delimited by one 'main' canal within the outlet. These *joughs* rotate the full discharge of the water running though the canals by periods of one day. Every *jough* has one full day (24 hrs) of water at its disposition. The rotation works in such a way that the *jough* that in the first rotation gets the water first, gets, in the second rotation, the water the last - as seen in Figure 1. Such a system is also still in operation in the management of qanat rights (Molle *et al.,* 2004). At *jough* level the same rotation system works among the different users.

The water users that operate within the domain of an outlet are responsible for the operation and maintenance (O&M) of their distribution canals. The O&M of canals is organized by the users who usually establish one day on which all the users have to help with cleaning and repairing the canals. The *jough* and outlet tenders are responsible for the organization of these days. Depending on the outlet the maintenance works are done either once, twice and in some cases three times a year. Usually the work is done just before the summer season starts and at the beginning of the winter-spring season.

Every *jough* has a responsible ditch tender that has the responsibility of controlling water distribution and fee collection within the *jough*. These *jough* tenders in turn have to pay to the outlet tender - who is responsible for distributing water to the different *joughs*, collecting the fees from the *joughs* and paying the water fees for the whole

outlet to the EWA. *Jough* and outlet tenders pay the water fees for their management area in advance and collect the water fees from individual farmers at the end of the growing season. The position of 'tender' for either an outlet or a *jough* is a position which is appointed through elections among the users. It is an honorary position (unpaid) and is usually granted to individuals that are respected in the community.

Despite the fact that there exist different kinds of water rights, every season these are renegotiated amongst users. The renegotiations of water rights are determined by factors such as the individual land area, crops produced, the history of the water use of individual farmers and the kind of water rights. In general, in these (re) negotiations of water rights within the outlet, small holdings get priority over larger holdings and people having rights that stem from traditional water rights have preference over more recent water rights that were created with the expansion of the irrigation network.

CONFLICT RESOLUTION

All management and conflict resolution within the outlet is the responsibility of the users. Conflict resolution is done mostly in the field among users. If two users cannot resolve the conflict, more users are called upon and the decision is set under discussion in the group and eventually to voting. If this mechanism does not offer a solution, the community elder is consulted. In case a conflict cannot be solved in this manner, it is taken to court.

Oorthuizen (2003) shows how relations of friendship, kinship and personal contacts are of utmost importance in determining the degree and manner of participation in water control and conflict resolution within irrigation systems. In AIS it is also mostly family, friends, and community bonds that grease the negotiations within the outlets. All farmers know each other and through different relationships they manage to make agreements on how to share and distribute water. A very important element in all these negotiations is the Sheikh Bahai rules that set the framework for negotiation and conflict resolution. Although these rules are not formalized on paper, they are fully embedded in the culture and traditions of the users, guiding their values and personal frameworks of negotiation.

During the field work it was very common to find several farmers in the field sitting under a tree or at a water division point negotiating and talking about matters of water management, the market price of different products or the difficulties they had, but also family and community issues. These are also forms of participation, although not taking place in formally structured organizations. They are examples of the diversity of forms of participation that Sengupta (1997) calls attention to, as important for irrigation. These encounters account for most of the participation in water control on the side of the farmers through the negotiation and interaction with the other actors involved in water control. This participation brings with it several benefits for the individual users and it is common that one farmer takes care of the irrigation of his neighbor's plots, that farmers share labor, hire machinery together and help each other in the maintenance and recreation of the agricultural production system.

AN EXAMPLE OF PARTICIPATIVE CONFLICT RESOLUTION

During one field visit to the outlet, the water flow being followed ended up at a field that had just been cut off from its irrigation water. A couple of meters further a group of farmers was involved in a serious discussion. What had happened was that farmer A had cut off the water of farmer B in order to irrigate his own field. According to farmer A the turn of farmer B had elapsed within the rotation scheme. Farmer B claimed that he was entitled to a longer turn. As farmer A and B could not agree other farmers had been called to mediate in the conflict. After a short discussion and explanation of the facts with the aid of the farmer that had his turn before farmer B, the group concluded that farmer A was in his right to direct the water to his field. Upon this decision, farmer B retired shouting and cursing and the group dissolved. Nevertheless, a week later farmer A and farmer B had jointly hired a rice combine to harvest rice on some other fields. This example shows how farmers are active participants in the crafting of irrigation management and the whole agricultural production process although there are no formalized structures for participatory irrigation management.

CONSEQUENCES FOR THE INSTITUTIONALIZATION OF PIM

Although farmers are not organized in a formal institution they all participate in the social structures that give form to the practices of water control. Their actions and forms of participation are shaped by day to day negotiations and cultural rules of water management that emerged long before the state intervened in irrigation management.

The recent effort to develop farmer organizations to enhance a certain form of institutionalized participation may threaten these cultural participation practices if these follow frequently used blueprints of organization – of how officials and international donor and funding agencies think participation should be structured. Often within these new structures pre-existing forms of organization and water control are ignored (Sengupta, 1997; Coward, 1985, Ostrom 1992). This can lead to far reaching changes in the existing social structures and a disruption of the established rules that guide established participation practices.

Understanding at what level and how participation shapes water control is essential to understand why and how farmers shape their water management practices and production systems. When considering the institutionalization of new structures to "enhance" participation, firstly, present management and decision making practices should be understood and considered. Secondly it should be evaluated if, within the existing context, it would make sense to institutionalize participation. Thirdly, if participation gets institutionalized it should be based on a thorough analysis of the already existing structures. Institutionalizing participation only makes sense where there is a felt need to change the existing institutional and social water control practices and structures which result in specific outcomes in the water management arena. Therefore the question that new initiatives for participation should address is: Within the existing context, what are the objectives that want to be achieved with institutionalizing farmer participation (at different decision making levels) and how can these objectives be achieved by working with the existing social structures?

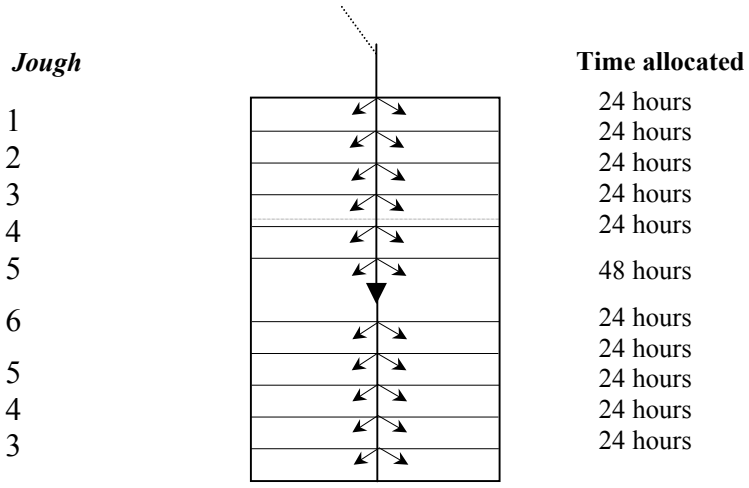

Figure 1 Water distribution system among *joughs*

REFERENCE:

1. Coward E.W., 1985. Technical and social change in currently irrigated regions: Rules, roles and rehabilitation. In *Putting people first: Sociological Variables in Rural Development,* ed. Cernea, M., Oxford University Press.
2. Halsema, G. van, 2002. *Trial and retrial: the evolution of irrigation modernization in NWFP, Pakistan*. PhD thesis, Wageningen University, The Netherlands.
3. Hoogesteger van Dijk, J.D. 2005. *"Making do with what we have" Understanding drought management strategies and their effect in the Zayandeh Rud Basin, Iran.* MSc Thesis. Wageningen University, Wageningen, The Netherlands.
4. Molle F., Mamanpoush A., Miranzadeh M., 2004. Robbing Yadullah's water to irrigate Saeid's garden: Hydrology and water rights in a village of Central Iran. IWMI Research Report No. 80..
5. Morid S., 2004. *Adaptation to climate change to enhance food security and environmental quality; Zayandeh Rub Basin, Iran.* College of Agriculture, Tarbiat Modarres University, Teheran, Iran.
6. Murray-Rust H., Sally H., Salemi H.R., Mamanpoush A., 2000. *An overview of the hydrology of the Zayandeh Rud Basin.* IAERI-IWMI, Iran.
7. Oorthuizen J., 2003. *Water, works and wages.* Ph.D. Thesis, Wageningen Agricultural University, Wageningen, The Netherlands.
8. Ostrom, E., 1992. *Crafting institutions for self-governing irrigation systems.* Institute for Contemporary Studies, San Francisco, California, U.S.A.

9. Plusquellec, H., Burt,C., Wolter, H., 1994. *Modern water control in irrigation: concepts, issues and applications.* World Bank Technical Paper 246, Irrigation and Drainage Series, Washington D.C. The World Bank.

10. Salemi H.R., Mamanpoush A., Miranzadeh M., Akbari M., Torabi M., Toomanian N., Murray-Rust H., Droogers P., Sally H., Gieske A., 2000. *Water management for sustainable irrigated agriculture in the Zayandeh Rud Basin, Esfahan Province, Iran.* IWMI-IAERI, Iran

11. Sengupta, N., 1997. Diversity in participation, p. 75-81 in Shivakoti, G. et al (Eds.) op. cit.

12. Shivakoti, G., G. Varughese, E. Ostrom, A. Shlukla, and G. Thapa, (Eds.) *People and participation in sustainable development.* Bloomington: Workshop in Political Theory and Policy Analysis.