

# Governing Irrigation Service Delivery in Water-Scarce Situations\*

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## Abstract

Water scarcity has become a policy issue of global importance. Agriculture is likely to be placed under increasing pressure in future to use less water more efficiently. However, how can the conflict between private and common interests be dealt with when water is scarce? A focus on "governance mechanisms" in service delivery systems may lead to solutions.

## Résumé

La raréfaction des ressources en eau est une préoccupation politique d'importance mondiale. Il est probable que l'agriculture sera de plus en plus contrainte à utiliser moins d'eau de manière plus efficace. Comment résoudre alors le conflit entre l'intérêt général et les intérêts particuliers quand les ressources en eau sont rares? Une amélioration de la gouvernance du système de fourniture d'eau pourrait contribuer à trouver une solution à ce problème.

## Introduction

The efficient management of increasingly scarce water resources is becoming a crucial issue for the future of many countries. This is bringing about a shift in conceptions of "water management", particularly with respect to water used in agriculture. In the early days of the management debate in the irrigation sector, experts firmly focused on technology and on improving management in (generally large-scale) irrigation agencies. The results were limited. The hoped-for "management revolution" in irrigation that was supposed to follow the Green Revolution failed to materialize. On the contrary, high levels of inefficiency and the run-down state of many large first-generation irrigation systems drew attention increasingly to user participation. In a context of global trends towards decentralization and privatization, efforts began to centre on passing management responsibilities on to the farmers - known as "Turnover" or "Irrigation Management Transfer". More recently, awareness of the rapidly increasing scarcity of water resources has given these efforts a new slant, but there is growing recognition of the fact that supplying farmers with irrigation water is a double-edged service. On the one hand, it is provided in the private interest of the individual user. But, as water resources become scarce, it must also be subject to restrictions in the name of the higher common interest. But what does that mean for water management?

Our thesis is that a new understanding of water management is required; one that does away with the idea that water distribution and allocation are matters that can be dealt with by a singular management unit, whether at national or local level.

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\* **Gouvernance d'un système de fourniture d'eau en situation de pénurie d'eau**

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Reviewed manuscript for publication received 17 November 1999

Instead what is called for is a concept of water supply and distribution that acknowledges the latent clash of private and public interests and promotes institutional arrangements and mechanisms that can bring about solutions to such conflicts while at the same time allowing the different stakeholders to defend their interests within the limits of the given framework.

## **Managing Delivery in Service Systems**

In the irrigation sector, numerous actors — organizations, groups, individuals - have to cooperate in order to provide the water supply service. In most cases, a whole network of different stakeholders is involved. This network will include actors providing direct services to the farmers, for instance the operations unit of an irrigation agency that supplies water to the users. It will also comprise organizations or groups responsible for coordinating the efforts of the water users, representing the interests involved and implementing various rules and agreements. These may be informal groups, associations or federations. Other members are also involved - agricultural and/or irrigation departments, planning departments, an environmental agency and legal bodies which perform important statutory and regulatory functions.

If we accept this multi-actor basis for providing irrigation service, then water management can no longer be seen as the responsibility of a single body and the term “water management” becomes misleading. It suggests that an executive management exists with the powers to direct the supply and distribution of scarce water resources. Instead, water management in a context of multiple actors with their diverse goals and interests implies endeavoring to manage “water delivery” in a way that reconciles the demands of the various potential consumers. That calls for strategies and guidelines for the “governance” of water delivery. “Governance” here is meant to designate a set of laws, rules, regulations, processes and common practices that establish and enforce the “rules of the game” which make such a complex system of many actors function. “Management” as exercised by a singular and omnipotent unit of authority is replaced by a web of governance mechanisms that bring about coordination and mutual adjustment of the parties involved. The example below illustrates how the governance of irrigation services can operate (Herder-Domeich, 1986; Huppert, 1997; Huppert and Urban, 1998).

### **Warabandi : Efficient Use of Scarce Water Resources in India**

In order to illustrate this concept of governance mechanisms in a multi-actor service system for water delivery it may be helpful to have a closer look at the classic example often cited for efficient use of scarce water resources for irrigation in the developing world: the warabandi systems of northwestern India. Here, a well balanced set of governance mechanisms has been established that can cope with the inherent conflict between private and common interests in water scarce situations. It is worthwhile to look at this example somewhat more in detail :

‘Warabandi’ can be roughly translated as “fixed rotation”. The success of the system should be viewed in the following context. Irrigated agriculture in India has attained remarkable proportions. A surface area of some 77 million hectares is now dedicated to it. The problem, however, is the sharp discrepancy between the area available for irrigation and that actually irrigated.

A remarkable degree of variation has been observed between the areas irrigated using surface systems. Whereas for the majority of systems the overall irrigation efficiency is low, surprisingly high efficiency rates are recorded elsewhere. The efficient water distribution systems are essentially those where the warabandi technique and structure have been in use for generations. There are substantial variations between warabandi systems, but the question remains of how they manage to reconcile the conflicting interests of individual farmers and the wider community. And the gulf between those interests is generally wide. In the large-scale irrigation systems that apply the warabandi system, increasing farm production for the market remains a secondary consideration for the irrigation authorities. Their primary concern has always been “protective” irrigation to ensure subsistence for the maximum possible number of farm families over the annual dry season and during longer periods of drought.

This aim is bound up with efforts to distribute what water there is during these periods to a large number of users as equitably as possible. That means that the volume of water allocated per hectare in the dry season is so small that individual users can irrigate only part of their land.

In that context, major conflicts of interest between the irrigation agency and the water users are inevitable: the efforts of the agency to ensure an equitable distribution of water will come up against the efforts of individual users to obtain as much water as possible for themselves in order to optimize the yield of their respective irrigation units.

## **Governance Mechanisms of the Warabandi**

In “systemic” terms - i.e. taking the main actors, with their various interests, dependencies and stakes, as a whole - control of water delivery and distribution in the warabandi may be briefly explained as follows:

Water delivery is managed in the common interest - that of ensuring an equitable distribution of the available water to the many, instead of a supply sufficient to cover all the needs of a few - by means of a range of governance mechanisms. The first of these stems from the practical organization of most warabandi irrigation systems: the farmers' land is grouped into larger irrigation units, known as *chaks*. These units are provided with a constant flow of water, which the farmers are not supposed to alter, via a farm group outlet whose size is proportional to the surface area irrigated. Technically this is generally done using fixed “semi-modular” outlets, where the flow is dependent solely on the water level in the supply channel. The flow rate cannot therefore be altered at downstream level, i.e. by the farmers, except through illegal enlargement of the outlets. Where water reserves are sufficient to fill the feeder canals to capacity, the maximum flow rate assigned to each outlet is provided automatically, without outside intervention. During water shortages, when the water levels in the canals are correspondingly lower, the flow to all outlets is proportionally lower, again without the need for intervention. Within the *chaks*, water is rotated between farms, with time of delivery proportional to holding size.

What may at first seem a purely technical means of controlling water supplies in fact has more profound social and legal implications. The fact that the flow to group outlets and thus the volume of water provided is proportionally reduced when the water level in the feeder canal is down means that the burden of the water shortage, and thus the risks

attached, are shared evenly. In that way, each user has an entitlement not to a specific volume of water, but to a proportion of the volume available. This is an important distinction from many large-scale irrigation systems, where in times of shortage privileged users are served first and the less privileged cannot be sure of getting anything at all. In the warabandi system, the risk is spread more widely.

In addition to this important governance mechanism, another significant factor helps to regulate the provision of scarce water supplies: the fact that the rights and obligations of users have become established over generations and, at least where the larger systems are concerned, are enshrined in the irrigation legislation of the individual federal States. In Haryana, for example, they are regulated by the 1974 Haryana Canal and Drainage Act, which goes back to the Northern India Canal and Drainage Act of 1873. Infringements of these provisions are severely punished to the present day. But this statutory basis also means that a group of water users at a farm group outlet has the possibility to enforce their entitlement to water supplies from the irrigation agency through the competent legal authorities.

Thus water provision to the group outlet is ideally ensured through governance mechanisms that balance the various interests and demands of all parties (Figure 1). The equitable distribution of scarce water resources to user groups, and thus the obligations of the irrigation agency towards the user groups, are regulated by the infrastructural mechanism of semi-modular outlets and the related proportional water rights (governance mechanism 1 in the figure). This minimizes the potential for conflict between the irrigation agency and the user groups from the outset. And should the rules nonetheless be broken, both sides can take action through the legal authorities on the basis of the relevant legislation (governance mechanism 2).

The interests of the individual users in this system, meanwhile, are chiefly focused on ensuring that their water entitlement does actually reach them despite water shortages, and at a predetermined time. The following governance mechanisms ensure that they can exert influence downstream of the farm group outlet (mechanism 3):

In the classic warabandi system, care is taken to limit the number of users to each outlet. The relatively small group size in itself has an important regulatory function. It ensures that, despite the often highly heterogeneous make-up of the groups, conflicts over scarce water are kept within limits and resolved on the basis of solidarity, reciprocity or social sanctions. It also facilitates internal settlements and ad hoc agreements on the use of existing water rights. In addition, the system of water allocation within the group is clear and predictable, as it operates by fixed rotation. This is intended to determine the duration - and hence the volume - of the water allocation to the individual users in proportion to the surface area to be irrigated (generally regardless of individual cropping patterns, soil characteristics or the social position of the user). Furthermore, each farmer's slot is determined in such a way as to make water delivery more predictable. The preference is generally for weekly rotation, with each user having access to water on the same day of the week, at the same time and for the same duration. The fact that this is all well understood means that a farmer can and will challenge the preceding farmer if he takes too long a turn. Thus social pressure based on the schedule of fixed turns is another essential governance mechanisms mediating the relationship among the water users (governance mechanism 3).

**Figure 1.** Governance of water supply services under warabandi distribution in Northern India

Another governance mechanism open to the farmers to defend their water rights is the legislation mentioned above, which is well enforced in the larger systems. Users who feel their water rights have been infringed can turn to the deputy collectors responsible for collecting the charges levied on individual sections of the canals; they are the first point of contact in resolving distribution conflicts and enjoy considerable respect and trust among the farmers (governance mechanism 4). This mechanism ensures governance of service provision below the level of the group outlet as well: there is scope for the defense of both the general interests of the group and the private interests of the individual water users.

Unlike many other irrigation systems, the warabandi systems tend to make relatively little use of water charges as a governance mechanism.

The success of the traditional warabandi irrigation system down the generations is due to these governance mechanisms, outlined here which, if locally accepted, can achieve a remarkable balance of interests. However, the example also shows the fragility of this institutional arrangement. Farmers may tamper with the outlets to get a greater share of water (governance mechanism 1), law enforcement may be

difficult to be achieved in certain circumstances (governance mechanism 2), farmers may not adhere to agreed upon rotational schedules (governance mechanism 3) and the deputy collectors may lose the trust of the farmers (governance mechanism 4). No wonder then, that some warabandi systems, especially in areas where warabandi institutions do not have a longstanding tradition, also encounter operational problems, as is the case in many small warabandi systems in Himachal Pradesh. The above account indicates that correcting such inefficiencies should not be seen solely as an engineering problem, but above all as a matter for reflection on how a new, balanced governance of the water supply service can be achieved.

## **Conclusions**

As demonstrated by the case of warabandi, problems of delivering scarce water resources of water must be addressed in the context of multi-actor governance systems. The form this governance system takes may vary widely depending on local conditions. But in all cases water scarcity requires that a balance be found between private interests and the higher interests of the community as a whole. The challenge is to analyze existing governance systems and identify their weaknesses as a basis for designing improvements. This is the only basis on which meaningful intervention and support can be developed.

## **Acknowledgements**

The author wishes to thank Dr. Mark Svendsen, Philomath, Oregon, Dr. Waltina Scheumann, TU Berlin and Dr. Ruth Meinzen-Dick, IFPRI, Washington, for comments on an earlier version of this paper.

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