

# Coordinating Different Levels of the Water Management Hierarchy (Vertically)

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As known, a modern water management system, especially, in the irrigation sub-sector, is a multilevel scheme of water supply and distribution that starts from a basin, mains, secondary and tertiary canals, irrigation network within water users' associations (WUAs) or the water distribution network of utilities and industrial water users (WUO) and finishes on irrigated fields of farmers (see Figure 1.2 above). Basic water losses and water supply irregularities take place owing to the lack of co-ordination between different hierarchical levels of water management and result in an overall inefficiency of the water management system. We suffer from losses owing to poor water management rather than water scarcity. Therefore, one of the main tasks of IWRM is the proper co-ordination of activities at different hierarchical levels of water management. A situation where each water agency develops its own criteria and approaches that do not correspond to the overall objective of IWRM to reach maximum water productivity needs to be removed. Provincial and basin water agencies have an interest in supplying water to consumers as much as possible, and, in their turn, water users are interested in reducing their water consumption to the minimum (if they pay money for water).

Each level of governmental water management hierarchy tries to take the maximum possible water volumes from a water source and to allocate these water resources to those persons who require more, or according to instructions from their superiors. At the same time, water agencies do not sufficiently take care of maintaining a high efficiency of irrigation systems and of preventing operational water losses. In addition, having excessive water reserves, they often dispose of unused water (considerable financial resources are spent for water delivery, especially under pumping irrigation) into the drainage system.

To create the overall interest of all hierarchical levels in minimizing unproductive losses and in uniform and equitable distribution of water among consumers, the specific goals of the government and society to develop and support a set of management measures and instruments needs to be promoted.

A basic tool needed for coordinating activities at different levels of the water management hierarchy (both according to horizontal and vertical links) is public participation in decision making of the properly established institutional structure. An organizational chart of the modern institutional water management structure is shown in Figure 1.5. There are the following levels: the upper level is a basin that can be divided into sub-basins; the next level is irrigation systems (having a common water intake and main drainage network) or an administration of single main canal; further, the level of WUAs (in the sub-sector of irrigation) or of WUOs (in case of other water consumers); and finally water users (farmer, enterprise, residential district etc.). In case of an inland drainage basin, a basin water organization (BWO), which is usually established within the framework of the National Ministry of Water Resources and can consist of territorial water management agencies, is responsible for water management in the basin and sub-basins according to the regulations of the BWO (similar to the BWO in the international basin). Basin Councils, consisting of the representatives of different "interested entities" with different rights and duties depending on national legislations (for example, with the consultative status as in Kazakhstan or the decision making status as in France, Spain, and The Netherlands where they are called "Committees" and "Boards") can be established under the BWO.

The management of irrigation systems diverting water from basin water sources is the prerogative of an organization located at the next hierarchical level, and which may be subordinated to the BWO or may be a cooperative public-and-governmental organization. In any case, at this level of the water management hierarchy, the representatives of public or public-and-governmental organizations should be involved in works of the governing body "BWO Council." WUAs, with their own administrative staff and mechanisms of public participation and with the similar proportion of rights and duties in managing of irrigation systems or single canals, are the next hierarchical level. Such a principle was applied in the governance and management of all pilot irrigation canals in the frame of the IWRM-Fergana Project. Although, it was necessary to take into account the presence of one more complex structure of the irrigation hierarchy (inter-

district irrigation canals), because in contrast to the command areas of Aravan-Akbura and Khodja-Bakirgan canals, here only some of the WUAs were supplied with water directly from the SFC, but other WUAs were supplied from the canals of the lower level.

The next element of co-ordination is contractual relationships based on the practice of applications for necessary resources that are formed according to the “bottom-up” approach with restrictions in the form of water use limits and relevant water supply schedules that are formed according to the principle “top-down.” Contractual relationships between BWOs and irrigation system administrations have to be regulated by the specific planning system in the frame of the overall state regulation, where the water rights and duties of both sides are fixed within a range of permissible deviations. A water management organization should ensure implementation of the planned parameters of water supply agreed on by both parties. Similar relations are established between the irrigation system administration and WUAs, but they are already grounded on the specific financial relations and relevant sanctions.

When the irrigation administration is a subdivision of BWO, the contractual relationship is formed only between the BWO and WUAs. In parallel with management according to the “bottom-up,” principle, participatory water management is formed in the following succession: WUA – the Canal Committee (or the Irrigation System Committee) – the Public Basin Council. Apart from institutional tools of the co-ordination, there are also management, legal, and financial tools. In the framework of IWRM, the priority functions of these organizations are not only water management itself in agricultural, industrial, hydropower, and trade sectors but also the responsibility for effective water use in those sectors. It is clear that in order to perform these functions it is necessary to have appropriate mechanisms and instruments of dialog and coordination.

#### **Management instruments:**

- Record keeping of water at all levels of the irrigation system from basin to farm; and strict water consumption rationing;
- Drafting the coordinated plans of water allocation and use at all hierarchical levels of water management that include organizational water loss control;
- The reporting system that shall provide not only annual and quarterly reports but also an operational report with planned criteria and indicators for timely adjustment of water supply;
- Improving dispatcher control to ensure equitable and sustainable water supply, upholding the priorities of eco-systems and municipal and industrial water users as well as the observance of restrictions related to water infrastructure safety; and
- Adjustment of water use plans based on tailor-made computer models in case of changes in hydrologic, climatic, economic, and other conditions.

At the same time, the above-mentioned instruments should be an integral part of the management information system (MIS) that is an important component of introducing the IWRM principles (see details below).

**Legal and economic instruments** are closely interrelated and mutually complementary. Principle instruments are given below:

- Water user rights and their protection by the State;
- Contractual relationship between water users and water management organizations, and also between water management organizations operating at different hierarchical levels;

- Legislation covering a liability for infringing water rights and contractual relationships;
- Payment for water supply and other servicing of water users (it has to be differentiated depending on water service quality);
- Penalties for water pollution;
- Fee for water as a resource;
- Government control of rights and duties of water management organizations and water users, as well as the state liability regarding the support of both parties;
- Incentives and preferential terms for water users and water management organizations to rationalize the water use; and
- Fines for surplus water abstraction.

It needs to keep in mind that public participation was, is, and will be the main instrument for coordinating water users according to their horizontal and vertical links.