ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

PRINCIPLES AND PRACTICES OF WATER ALLOCATION AMONG WATER-USE SECTORS

WATER RESOURCES SERIES
No. 80

UNITED NATIONS
New York, 2000

ST/ESCAP/SER.F/80

UNITED NATIONS PUBLICATION

Sales No. E.00.II.F.54

ISBN: 92-1-120002-4 ISSN: 0082-8130

IX. IMPLEMENTATION

A. Staged implementation

The introduction of a comprehensive water allocation system is an onerous task requiring considerable resources, involving costs and personnel requirements. Therefore, the implementation of water allocation systems must be approached progressively and with care and planning. Difficult elements include:

(a) **Required institutional changes** – to define the water allocation and water management functions at national level and other levels, how they coordinate and how the roles of other organizations are affected;

(b) **Introduction of coordination arrangements** (another aspect of institutional change);

(c) Obtaining approval for new **policies**;

(d) **Institutional capacity** in funds and human resources (training and human resources development);

(e) **Technical capability and facilities**, to include monitoring networks, investigation capability;

(f) **Community understanding and support** for a more clearly defined system of water rights and associated controls.

External assistance can be sought to build some of these elements, particularly at initial stages, but ultimately it is necessary for countries to establish an internal capacity for water management, based on self-sustaining sources of funding. Since the task is not small, it is necessary to consider ways to introduce changes in stages and not all at once.

Law and institutional capacity should ideally be introduced together, but in practice this rarely happens. In most cases, it is not possible to undertake the management controls for water allocation without the legislation. However, the introduction of legislation alone does not ensure that action follows. This is particularly the case where the legislative system creates general laws which require more detailed implementing statutes to become effective.

The basis for comprehensive water allocation is a law which is equally comprehensive. Little may be accomplished in the absence of legislation with the required characteristics. However, the development of legislation is only the foundation on which water allocation activities rest. The other elements are:

(a) Institutions;

(b) Policies and plans;

(c) Information and technical capability;

(d) Administrative and professional capability.

It is inevitable that a fully developed water allocation system will be costly in terms of information, technical and administrative resources. Therefore, it is unrealistic to assume that comprehensive water allocation systems can be implemented easily and in a short period of time. Methods have to be found to implement water allocation systems progressively and step by step. Water allocation must also be closely integrated with other initiatives, including public education, information systems and participation mechanisms. Important elements of the establishment of water allocation functions include the following:

(a) Developing policies;

(b) Identifying institutional responsibilities;

(c) Assigning staff at various levels;

(d) Providing training in concepts and methods;

(e) Developing coordination mechanisms for (i) inter-agency relationships and (ii) including water users and stakeholders in water allocation decision-making;

(f) Developing participation mechanisms (as above);

(g) Planning on the basis of the hydrologic unit;

(h) Defining and authorizing major rights;

(i) Defining and authorizing medium and minor rights;

(j) Establishing monitoring systems;

(k) Developing operational rules and rules for rivers and groundwater abstraction;

(l) Establishing self-reporting and management systems;

(m) Introducing compliance procedures and capability;

(n) Educating about the impacts of water use, the need for conservation, recycling, and the need for management of water rights.

A three-pronged approach is suggested, in which work is undertaken at three levels simultaneously. Work should commence on foundational policy and coordination aspects, while tackling selected rights issues "on the ground". If work is limited to general policy and planning, no practical results will be visible for some time. Alternatively, if attention is given only to resolving disputes, without a guiding framework, an ad hoc outcome is likely. Thus, work should be done to develop policy proposals to guide water allocation, for adoption at the national level and subsequently to be applied at all levels. At the same time, water rights should be tackled on the basis of key conflicts, either in relation to particular sectors or particular schemes. The sector approach involves negotiating some general principles for defining the way in which priority will be assigned between the sectors in question. An example could be the relationship between hydropower developments in general and the critical sectors affected, which might be irrigation, navigation, fisheries or others. The scheme-based approach would tackle similar issues in relation to a specific scheme or schemes where it was considered that the users and communities affected deserved priority, because of the scale of the scheme, the degree of conflict, the value of the water uses or the importance of the social impacts.

Table 10. Three levels for implementation of water allocation systems

Develop strategy, policy and guidelines	§	work at the high level to obtain political commitment and understanding
Target resolution and clarification of water right for specific issues and schemes	§	work on specific issues to obtain practical examples of improvement
General education, training and application at basic levels	§	work at the basic level to (i) foster community support and (ii) train professional, administrative and field staff

It is necessary to consider where the priorities for action lie. Ultimately, all significant water uses should be defined and brought under a management regime. In practice, critical issues must be addressed first. These could be identified on the basis of:

(a) Water sources clearly under threat by (i) intensity of water withdrawal, (ii) water quality deterioration, or (iii) physical destruction of the water body;

(b) Important uses that are evidently in conflict (perhaps not catered for at all, such as fisheries) where rules need to be developed promptly;

(c) The application of the so-called 80-20 rule, where 80 per cent of the benefits may be achievable with 20 per cent of the effort involved in covering everything (and where the final 20 per cent of benefit consumes 80 per cent of the effort).

In selecting the issues to target first, it is important to identify those where serious conflicts or difficulties exist, which if resolved, will demonstrate obvious benefits such as clear definition of previously unclear rights, or increased overall efficiency of operation and allocation of water. It is also advisable to select issues where evident progress is possible within a reasonable period of time. If a selective approach is taken to tackle certain issues first, it is important to develop a general plan of action for all issues, which identifies the timetable for

addressing them. The timetable will help to answer criticism that important issues are not yet being tackled. Initial success in some areas will help to obtain support from the political level and also help to foster understanding among water users and the public of the benefits of water allocation and management.

The third level for attention is the education and training of operational staff, technical staff and the public, with emphasis on water users. While policy guidelines are being developed and while some high-profile issues are being tackled, the basic functions need to be established. Work can be done to develop and define minor and medium water rights and start to establish the personnel and institutional responsibilities for managing them.

Possible methods are:

(a) Pilot planning and allocation schemes;

(b) Targeting major users;

(c) Self-management schemes;

(d) Focusing on targeted areas (hot spots).

(a) Pilot schemes

Water allocation schemes may be piloted in chosen areas, both as to planning and also the establishment of mechanisms for implementing water rights and permits. For instance, a trial could be conducted to determine the practical breakdown of action by national, regional and local authorities, or the division of responsibilities between regulatory and operational organizations in information collection and other determination of water rights.

(b) Major water users

Major water users, such as multi-purpose dam schemes, may be singled out for incorporation into a water rights system. Such a scheme may require major attention in any case, as the issue could be complex to resolve. Large schemes may require individualized coordination or participation arrangements. However, in the development of a scheme-based coordination arrangement between regulators, operator and water users and interests, other schemes, both large and small, should be kept in mind, so that the model can be applied or adapted to them.

(c) Self-management

Establishing a self-management arrangement is a useful way to minimize the resources needed to oversee the use of water and according to a water rights system. Self-management by water users can involve (i) monitoring and providing information on water use, (ii) organizing the timing of water abstraction among users, and (iii) ensuring compliance. Such activities if undertaken by water users should be periodically audited to check whether they are being conducted adequately. It would be advisable to pilot self-management schemes first before applying them nationally.

(d) Target areas

Under this approach, an area or several areas are defined for the implementation of the water allocation system in advance of other areas. Reasons for choosing such areas may include the severity of water shortages and scarcity, the intensity of water use development, the degree of conflict or the high value of water uses. It should not be forgotten that measures can be taken to apply more intensive management in areas where this is warranted, while leaving the management of allocation in other areas less intensively controlled.

(e) Other issues

When introducing monitoring and compliance arrangements, a useful approach may be to identify those water users or types of user which cumulatively contribute the major impacts on water sources. These are usually the larger users. It is frequently possible to choose a scale of water use below which monitoring and control is less intensive, as the impacts are likely to be minor, except in some local circumstances. Similarly, with compliance, the targeting of a small number of high profile users may bring others into line when they see examples of action successfully taken against major infringements.

River basin planning is a recommended method for guiding allocation of water at the river basin level. However, river basin arrangements may take some time to establish and resource. The production of useful river basin plans which aid water allocation will take even longer. This should be recognized in advance, and expectations adjusted accordingly. In other words, if the water allocation

authorities do not already have sufficient capability to produce plans which are useful for water allocation, the establishment of river basin arrangements will not shorten the process of developing the rules. The same applies on the scale of large aquifers where system-wide models and plans are proposed for the purpose of developing water extraction rules.

Training and professional expertise are critical to effective management of water allocation. The knowledge and application of technical qualifications, however, takes time to build up. Theoretical fields must be accompanied by experience in (i) applying the technical understanding to practical examples, and (ii) reviewing examples of water allocation systems which already exist, to see both their strengths and weaknesses.

B. Principles and guidelines

The recommended principles for allocating water, as promoted in this study are stated below. These fundamental principles reflect general guidelines and methods for water allocation among water-use sectors.

(a) Water allocation

Water allocation objectives should include economic, environmental and social factors.

It should be recognized that water allocation is undertaken at various levels, including (i) the regulatory role which involves the authorization of water rights and uses, including the relevant conditions of use, and (ii) the operational role of organizations which control the flow of water in watercourses, and the distribution of water within constructed schemes.

(b) Water allocation policy

Policies which indicate general priorities for major classes of water use, should including reference to essential human water requirements and the environment.

Policies should identify the roles and responsibilities of water sector organizations and establish the means whereby they coordinate and make decisions that affect the availability of water for all beneficial purposes.

The sustainable limits to water allocation should be identified for river basins and aquifers, and measures taken to ensure that such limits are maintained.

(c) Water rights

A comprehensive and unified system of water rights is desirable, covering both surface water and groundwater sources, and based on a law which explicitly deals with and establishes water rights.

Where water is being taken, but the extent of the water rights is not defined, attempts should be made to define such rights in sufficient detail to enable conflict among water users to be minimized.

Water rights should be defined in regard to (i) the water which may be taken and the sources, (ii) the conditions under which the water may be taken, including the timing, rates, volumes and other parameters, (iii) the system of priorities which applies the water use in question and other water uses.

Water users are entitled to legal certainty of their continuing right to take and receive water. The policies and laws dealing with water allocation should, as far as possible, provide for such certainty in the interests of stability and to encourage investment in water using projects.

Appropriate judicial or review mechanisms should be in place to enable water users and those affected by water abstraction to question and challenge decisions on the issue of new rights and the ongoing operation of schemes which determine the value of water rights.

(d) Institutions

A clear distinction should be made between organizations with regulatory responsibilities in relation to water allocation and those providing services such as water supply. Where both functions coexist within the same organizations, special measures are required to separate them and establish a coordinated and unbiased function.

The primary legal right to allocate water should rest with a regulatory authority with responsibilities at least at the level of the hydrologic unit.

Coordination is important (i) between water use sectors at all levels, (ii) between national, regional and other levels of management, and (iii) between government and non-government participants in the water sector.

Authorities and agencies which operate at a scale less than the hydrologic unit (such as provincial or district authorities) should be included in a water rights framework established at the river basin level or the sub-basin level.

Where possible activities such as monitoring, investigation, policing, should be undertaken at the local level or the level closest to the activities.

(e) Groundwater allocation

The management of groundwater and surface water allocation should be conducted together and under the one water allocation system, although possibly some difference in approach may be practical.

Where separate administration systems for surface water and groundwater have arisen for historical reasons, attempts should be made to integrate their management and where necessary to introduce coordinating mechanisms.

The physical interaction between groundwater and surface water should be recognized in water allocation.

The responsibilities of agencies which manage groundwater should include significant aquifer recharge events and actions.

Where conjunctive use from surface water sources and groundwater sources is encouraged or allowed, it is necessary to ensure that:

(a) The limits to permissible groundwater use are clearly defined;

(b) The order of priority of use by conjunctive users from both sources is determined and that this priority takes into account other users who have access to one source only;

(c) The general conditions for surface water use and groundwater use are specified.

(f) Water for the environment

The environmental requirements of all water bodies should be considered in the course of water allocation.

Water classified for maintaining instream environmental quality and for groundwater maintenance should not be allocated for human consumptive use, except under rules developed for extreme circumstances.

The water requirements for the environment should be investigated and identified in regard to (i) instream requirements for all rivers and streams, (ii) off-stream requirements for water bodies with acknowledged environmental value, and (iii) groundwater bodies and groundwater supported ecosystems.

Rules should be established for environmental water requirements, and other water uses should, in normal circumstances, be allocated water after environmental requirements are satisfied.

Water set aside for instream environmental purposes should not be tradeable to other uses, as this would imply that it is not fulfilling a necessary purpose.

(g) Reliability of availability of water and supply

It should be recognized that different water uses can adapt to and tolerate differing reliability of supply.

Management of differential reliability of supply is a management tool which can increase the overall benefit.

An overly conservative demand for reliability will limit the volumes which can be supplied.

(h) Essential social water requirements

Water for essential human needs should provide for both the quantity and quality of drinking water and water for domestic uses and sanitation.

It is legitimate to provide for essential human water needs at an affordable cost to the poor.

Essential social water requirements should be separated from other urban water demands which include commercial, amenity and industrial water usage, and residential use beyond essential limits.

(i) Prioritization of water uses

It is recommended that priorities be established by considering the relevant factors as they apply in the relevant hydrologic unit. Factors to guide in prioritizing major categories of water use include (i) the environment and the health of water resources, (ii) specific human needs (drinking water and water for sanitation), (iii) economic value, and (iv) general social benefits.

In general, this is the suggested order of priority for *factors to consider*, based on the following rationale:

(a) If the environment is ignored, water becomes useless for all other purposes;

(b) Essential human needs are regarded as the most basic of human rights and benefits from water;

(c) The economic value of production from water, if ignored, leads to the most wasteful and least beneficial use of water;

(d) The social benefits of water are considerable, and many social objectives are behind water supply schemes. These benefits are both individual (as for irrigation farmers) and general (sustaining of populations and communities). Nevertheless, in the end if little or no economic value will be derived from the use of water, the State or the people generally must bear the social cost indefinitely. Therefore, the social value of water enterprises should be weighed against the long-term prospects of profitability and economic productivity.

Priorities may be set at the levels of (i) national priority, (ii) on the river basin basis at bulk allocation (iii) for individual schemes, and (iv) at the individual user level.

When determining priorities, the physical and hydrological characteristics of river basins and aquifers, in addition to the features of the economy and nature of development, should be taken into account and national priorities, where assigned, modified accordingly.

These outcomes, where relevant, should be weighed against one another and an explicit decision made as to the relative importance to be given to each. This should further be considered as to (i) whether a general or national priority should be assigned to some sectors in relation to others, or (ii) whether priorities should be assigned on a case-by-case basis in each river basin or sub-basin or aquifer, and (iii) what processes should be used to allow for particular circumstances to determine the priorities.

(j) Water scarcity

Rules for assigning priorities in times of water scarcity should be developed prior to such conditions occurring.

Rules for assigning priorities in times of water scarcity and water emergencies may include decision-making processes, in addition to or in place of quantitative criteria.

The general rules for water allocation at the level of the river basin, the sub-basin and the aquifer system should be part of the water management planning for the hydrologic unit.

Bulk allocations of water may be determined for river basin, sub-basins and aquifers. Prerequisites for determining bulk allocations are:

(a) Knowledge of water availability and its behaviour;

(b) Understanding of the volumes of water used, the locations and demand patterns;

(c) Projections of future development.

(k) Role of utilities and water suppliers in water allocation

It should be understood that utilities and water supply schemes which affect the flow in rivers have a *de facto* influence on the rights of water users downstream in such rivers.

Utilities which *de facto* determine water rights by transferring and distributing water should be subject to a water rights framework in which they and all other water users are similarly regulated.

It should be recognized that many publicly-controlled water supply schemes exist whose water rights are not formally defined, and which therefore require attention to define the relationship between the water they take and the water rights of other users.

(l) Representation of stakeholders

The development of rules for allocating water at bulk level and for assigning priorities among water user and water user sectors should take place through a mechanism which includes the representatives of all important stakeholders in the water resources.

The participation of water users and other water stakeholders should be facilitated in order to develop and obtain the agreement to all sectors to decisions which attempt to maximize the general benefit.

The knowledge of local and other water stakeholders is an important contributor to arriving at workable solutions to water use conflict.

(m) Interests in water

Interests in water are important values which water provides other than use of water in consumptive pattern. They commonly include some activities known as instream, such as fisheries and navigation, tourism and aesthetic values. Additionally, legitimate interests in water include religious, cultural and traditional interests in water and water bodies, both as regards activities and also the desire that water bodies contain water or the flow of water.

Water interests should be actively taken into account when making water allocation decisions and assigning priorities.

(n) Conflicts and conflict resolution

Conflicts may occur between water users on the basis of volumes available, but also timing of flow. Conflict and dispute resolution mechanisms should be established for dealing with:

(a) Disputes between water users concerning both water rights and water use practices;

(b) Concerns about the introduction of new uses and water rights;

(c) Disputes between water users and non-users who are affected.

All mechanisms for conflict resolution must be separated from and independent of any significant water user sector, in the interests of credibility, both in reality and perceived.

(o) Water distribution and self-management

Water users in water supply networks and at the local level should be given as much decision-making role in water distribution as is practical, so long as any external impacts of water distribution decisions are adequately managed by a suitable process.

Where water users decide, in a representative group, how to distribute and apportion water at the local level, there should be representation, in addition to irrigators, of important groups who are affected by water distribution, including women in the case of irrigation schemes which affect community well-being.

(p) Management of minor water uses

Minor water uses should be left alone, registered or more actively supervised, depending on the need. The decision should be based on the following considerations:

(a) The benefits to be obtained and the scale of use in relation to the abundance or otherwise of water resources;

(b) The administrative ease or difficulty, and the cost, of managing them;

(c) The likely value of data which would be obtained;

(d) The capability of authorities to take the appropriate action.

General criteria for exemption from water permit requirements are recommended, so that the public can easily understand which activities are regulated and which activities do not require approval. General criteria can be modified in special areas, if more intensive management is warranted.

(q) River basin management

Organization at the river basin level should include (i) coordination of water resources data from relevant data sets, (ii) planning for development and allocation of water at the bulk level.

The rules for operating large water supply schemes, which affect water users and interests, should be a matter for an authority with a water allocation responsibility, at the appropriate level.

The legal basis for all water rights should be consistent.

(r) Water trading

The exchange and trading of water rights is a logical means for improving the productivity of water use in situations where opportunities for further development of water resources are limited.

Water trading and exchanges may be introduced under a variety of mechanisms. The degree of public control and intervention in water trading may vary, and freedom for markets may be introduced progressively.

In developing water trading arrangements, the general legal framework of the country should be recognized, in particular whether it is suited to the development and protection of property rights in water.

There should be a mechanism which allows water users and water interests to ensure that the impacts of proposed new water uses, which might affect them, are investigated and that appropriate conditions are applied, including, where agreed, compensation.

The difference in reliability and timing requirements for different water users should be accommodated and where possible optimized in coordination with all uses.

(s) Implementation

Implementation of water allocation systems should be undertaken progressively and in a targeted manner.

Implementation should, where possible, be conducted simultaneously at the strategic level, at the level of major issue resolution and at the basic working level.