



Chapter 5 - Analytical structure and sequence for review

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This chapter offers a structured approach to carrying out a water policy review, providing an organizing principle for material presented in earlier chapters.

Starting with an assessment of the importance of water in national social and economic life, it proceeds through a matrix of problems and critical issues, a quantification of pressures, identification of options, the formulation of an implementation strategy, and concludes with the action programme and implementation schedule.

Previous chapters contained material on likely problems, the general principles according to which they should be tackled, and some of the methods and techniques available. This chapter offers an *organizing principle* for carrying out the review, in six steps. These are listed in Box 10, and elaborated in the remainder of this chapter.

BOX 10: THE STRUCTURE OF WATER POLICY REVIEWS

1. Determine the importance of water in national social and economic life.
2. Prepare a matrix of problems and critical issues.
3. Quantify and rank pressures on the water resource.
4. Identify options for mitigation.
5. Formulate a water strategy.
6. Define an action programme and policy management monitoring plan

1. Determine the importance of water

In order to demonstrate the importance of water issues to policy-makers, the general public and key interested parties, certain broad indicators should be identified as criteria for the relative importance of the water sector. These indicators would also serve to establish the case for resources needed for the sector, in competition with the claims of other sectors and other projects.

BOX 11: MATRIX OF PROBLEMS AND CRITICAL ISSUES			
Problem type	Evidence	Source	Relative importance
Supply-demand imbalance	By sector and/or region. Future trend.	Growth in population, per caput demand, climatic change, overuse of groundwater, etc.	Use international or historical evidence. Future date when it is likely to become critical.
Level and quality of service provision	Proportion of population now and in the future with no, or inadequate, provision of safe water, affordable irrigation supplies, sanitation and wastewater disposal facilities; consumption per head; reliability of supplies; etc.	Shortage of investment funds; excessively high standards for connections; rapid growth of informal urban settlements; poor maintenance; shortage of funds for proper water treatment.	
Inadequate water quality	Water quality indicators at key sites; incidence of water-related diseases; rising cost of treatment by water users; legal actions; etc.	Growth of polluting industries; spreading urbanization; lax legislation, enforcement and penalties; poor irrigation practices; rising national and international quality standards; etc.	
Costs of future provision	Unit costs of projected schemes for supply, rehabilitation, treatment, sewerage, compared to current and past levels; future costs relative to public investment/aid budget; cost of environmental mitigation.	Exhaustion of easy options in the face of growing demand; insufficient examination of alternatives; insufficient demand management; poor cost recovery; etc.	
Inefficient use	In agriculture; performance measures such as system efficiency, agronomic norms, economic value of water; proportion of UFW in municipal systems; limited spread of water-efficient consumer devices; etc.	Absence of incentives to conserve water; poor system maintenance; low public awareness of water situation; outmoded and inefficient industrial plant; limited access to imported technology; etc.	
Growing conflicts among users	Co-existence of surpluses and deficits among regions/sectors; growing shortages in particular uses; competition for limited supplies, e.g., between farming and urban areas; growing environmental stress; litigation over water; civil unrest; development of water markets and transfers; rising price of marginal water supplies;	Growing imbalance of water supply and demand; absence of means to settle disputes amicably or efficiently (e.g., laws, consultation procedures, markets, prices); failures of planning and forecasting; etc.	

international disputes; etc.

Useful general indicators include:

- size of water-intensive sectors in the national economy; agriculture, heavy industry, processing, water-based tourism and recreation, navigation, and other sectors sensitive to environmental quality, such as health care;
- significance of irrigated agriculture to national food security, GNP and exports;
- cost to the budget and public investment programme of providing and subsidizing water services. Proportion of foreign aid earmarked for the water sector;
- relative importance of water-related diseases in national health status, and estimates of their economic and financial costs;
- balance of payments implication of water sector, e.g., debt servicing of water projects, cost of importing food due to internal water deficit, national and local food security, etc.; and
- estimates of national economic costs of water pollution.

These indicators should both present the current situation, and take a forward look to some relevant future date, say 10 to 15 years ahead. This is especially important for countries:

- with rapid population growth and/or urbanization;
- where the balance among sectors is likely to change;
- where changes in housing patterns and consumer taste are foreseen;
- where there is a large backlog of service provision to be made up; or
- where large investments in new supply, quality improvements, rehabilitation of systems and suchlike are envisaged.

2. Matrix of problems and critical issues

Drawing on the checklist of critical issues in Chapter 2, a matrix can be drawn up, containing in each case evidence of the problem, its source and relative importance. The last mentioned can be signified on a scale of 1 to 5, where 1 is relatively minor and quite easily managed, and 5 is very serious and can only be tackled with great difficulty and/or cost. Box 11 illustrates the type of information required and how it could be organized. The problems chosen here are not intended to be a

complete or even representative list, since each country will have its own.

This information, especially judgements on the relative severity of the different problems, should be used to compile a short 'hit list' of problems, with their principal causes, ranked in order of importance.

3. Quantifying pressure on water resources

Evidence assembled in the form of the matrix in Box 11 would be extracted to produce orders of magnitude of the severity of the water problems, now and at crucial dates in a relevant planning period (between 10 and 25 years in the future). These data would indicate to planners and decision-makers the seriousness of the water situation, from various points of view, now, and how it might be expected to evolve in future.

TABLE 2 - Key indicators for the water sector

Physical and hydrological	Economic and financial	Environmental
Balance between per caput availability and use of water.	Size of water-intensive or water-reliant sectors within the economy.	Water quality indicators in critical locations.
Level (depth) of groundwater in key aquifers.	Reliance of agriculture and food production on irrigation.	Environmental costs of water provision and use (e.g., of dams, water pollution).
	Price of water in free-market conditions (e.g., from urban vendors or in auctions).	Incidence of water-related diseases, and estimates of their cost to victims and for public health services.
	Proportion of the national budget absorbed by water (e.g., operational deficits, overt subsidies).	
	Proportion of public investment programme, foreign aid, or both, accounted for by water investments.	

This information could be organized under three headings: physical and hydrological; economic and financial; and environmental. Some of the *key indicators* are reproduced in Table 2.

4. Identify options

Having identified the main problems and formed a judgement on their relative seriousness, the next step is to review options available for addressing the most important of them. The policy analysis matrix (Box 4) may be useful for categorizing actions. This matrix envisages actions at four main levels:

- *Planning and analysis*, entailing the creation of data systems and analytical frameworks, which may include strategy documents, water resource assessments, data banks, monitoring systems, modelling and research.

- *Legal and institutional reforms*, including the formation of management structures and regulations. These actions may include the reform of water and land legislation, agreeing water quality standards and passing supporting legislation, the creation of new authorities or systems of coordination, corporatizing or privatizing water utilities, empowering water user groups, setting up a regulatory framework for the private sector, etc.
- *Economic policies*, with the aim of providing a suitable enabling environment for water use. General economic policies should be examined to adjust their effects on water (e.g., farm support, food self-sufficiency, industrial promotion, new settlement). Specific incentives should be created to persuade users to treat water as the scarce resource it is, such as economic pricing, the creation of opportunities for markets and trading, and introducing pollution charges.
- *Projects and programmes*, such as public investments, information and education campaigns, and programmes to encourage water efficiency.

The choice from this 'menu' of actions should be subjected to the set of criteria set out in Chapter 3, namely:

- efficacy;
- efficiency;
- distributional impact;
- environmental impact;
- fiscal effects;
- political and public acceptability;
- sustainability; and
- administrative feasibility.

5. Formulate water strategy

The following are some of the strategic choices to be made:

- *Inter-sectorial priorities*: where a growing supply-demand imbalance is foreseen, and conflicts between water users are likely to increase, decisions will need to be taken about the relative claims of agriculture, industry, urban use, recreation, the environment, etc.
- *Self-sufficiency in food*: this may need to be evaluated for its long-term implications for water.
- *Long-term international interests*: a country's water scenario may carry trans-frontier or global implications.
- *Mode of management*:

between centralized and de-centralized, on the one hand, and public and private provision, on the other. In turn, there are various options for admitting the private sector. There is a further choice between authoritarian and participatory institutions.

- *Supply-oriented and demand-management measures*: within the latter, there is a further balance to be struck between command-and-control devices and economic incentives.

6. Define action programme and policy management and monitoring plan

This final step should be taken once it is clear from the above what the strategy is, what needs to be done, what the mixture of policies should be, and what the priorities are. The strategy then provides an outline plan for the implementation of policy at successive levels of administration. It is difficult to be prescriptive about the precise modalities of a review, which will be very country-specific. The following chapter indicates how some countries have recently approached water policy reviews, and their general outcomes.

However, water policies are projected over longer periods, have normally a wide impact which is difficult to measure, and may not be implemented as proposed but respond to current needs and priorities. It might not always be possible to assess the repercussions beforehand and policy execution may require continuous monitoring for progress, re-evaluation and at times a revision of priorities that meet obstacles.

Policy management would benefit from monitoring policy actions, with cross-references among objectives, operational considerations such as priorities, time frames, responsible level and agency. The policy monitoring plan is therefore conveying and articulating the adopted strategy, and also including EIA indicators, as constraints and conflicts in implementation are the likely sources of environmental impacts.

To facilitate positive acceptance of policy, a preventive rather than a *post facto* mitigating approach is recommended. The focus needs to be on potential sources of conflict in order to assist in understanding, anticipation and early correction of problems, rather than a focus on assigning government's political and financial responsibility to solve and mitigate. Unintended negative effects may arise from the interaction of water policy with other national policies at cross-purposes. Enunciated water sector policy objectives and policy actions result from the political negotiations needed to reconcile competing policy needs.

Direct water policy actions may also be potential sources of adverse effects. This is a more likely development if isolated policy actions rely on imported concepts that are not tested locally or where the actions are based on increased government intervention in traditional areas.

The interaction between a policy monitoring plan and EIA is shown in the Figure 3 below, based on Feld (1994).

ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT MONITORING SYSTEM FOR NATIONAL WATER RESOURCES POLICY

Figure 3 - Diagrammatic interaction between a policy monitoring plan and EIA

