

# Institutional Frameworks

## Session Objectives

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- To describe the key players in the water sector and describe their roles and interaction.
- To describe how the water supply sector should be structured and emphasise the need for a clear institutional framework to be established.
- To demonstrate the need for inter-sectoral and inter-institutional collaboration at all levels.
- To describe the key elements of legislation required for effective monitoring linked to water supply improvement.

# **Institutional Frameworks**

## ***Introduction***

As the purpose of water supply surveillance is to promote the improvement of water supply services, it is important that the organisational arrangements intended to facilitate this pay due consideration to the vital and complementary roles of both the surveillance and the supply functions. It is also essential when establishing or reviewing the institutional arrangements of the sector with respect to surveillance and monitoring functions, that the most appropriate institution takes responsibility for surveillance functions.

## ***Selecting Institutions and Assigning Responsibilities***

There are a numbers of issues in deciding institutional homes for different functions and when doing this, it is important that the purpose of each function is clearly defined and matched against the overall remit of the institution. The principal functions concerned are: surveillance; supply, and; resource management.

### **Surveillance - Ministry of Health**

It is preferable that because quality surveillance is concerned with human health, responsibility is assigned to the Ministry of Health as the agency responsible for the protection of public and environmental health. This is an independent monitoring role which takes into account water quality up to the point of consumption and for all the population, regardless of the source of water. This is clearly separate from quality control monitoring of water production and supply exercised by water suppliers within their area of supply. The separation of surveillance and supply functions is desirable to prevent any actual or perceived conflicts of interest from occurring.

However, given changing political structures and responsibilities for water supply, it may often not be practical to make the Ministry of Health responsible for field data collection as they may lack the necessary staff, skills and resources. The Ministry should, however, always maintain a national profile in water quality surveillance as a key preventative health activity.

Operational surveillance activities may be undertaken by local government environmental health bodies, with the Ministry of Health playing a co-ordinating and facilitating role. In many ways, this is the preferred scenario if local government does not have responsibility for water supply. Where local government also assumes responsibility for water supply, there may potentially be a conflict of interest. In such circumstances they may be financial and political objections to a centralised system of surveillance operated by the Ministry of Health. In these circumstances, there must be clear separation of responsibility for supply and surveillance up to the most senior levels, or an alternative body established taking responsibility either for supply (which is usually the favoured course) or surveillance.

Where a government department takes overall responsibility for development of water supplies, there may be some scope for them to undertake routine monitoring if the supplies are operated by another entity, although clearly it is questionable if they can be truly independent. Alternative bodies to the Ministry of Health can take responsibility for surveillance - for instance the

environment sector - but as these are not health bodies, the Ministry of Health must retain a strong interest in the operation of surveillance networks and the data produced.

### **Quality control - Water supply agency**

The water supply usually has a responsibility to ensure that the water supplied up to the connection with a house main or connection with a standpost riser or point of exit from a point water supply is of a wholesome nature and is fit for consumption. Usually this is measured against national standards and norms of water supply. This is separate function to surveillance as it is not concerned with the quality of water as *consumed* but of the water as *supplied*.

The meeting of national standards is usually a legal requirement which is enforced through surveillance. The frequency of quality control sampling, the techniques used and methods of quality control and reporting are generally standardise where piped water supplies operated by a supply agency serve a population of consumers. Where community based water supplies are used, whether point or piped, the supplier cannot usually reasonably be to undertake routine quality control monitoring and under these circumstances it is common that either only surveillance activities are undertaken or that the agency responsible for the development of community supplies to carry out quality control monitoring in addition to the surveillance function undertaken by environmental health staff.

### **Water resources - Resource management agency**

A further complication to the institutional arrangements is when an independent water resource management/natural water quality monitoring body is established. This is an appropriate system where sufficient resources exist to fund the functioning of two regulatory bodies. The roles and responsibilities of natural and drinking-water regulatory bodies are very different and different types of qualification and experience are desirable in each. However, where resources are limited, it is sometimes found that the same body takes responsibility for both natural and drinking-water quality. This is not an unreasonable approach to be adopted, provided that a balance can be struck between the needs of both can be maintained. This is not necessarily easy, particularly where financial resources are scarce and has proven to be difficult to operate in many countries, usually to the detriment to drinking-water quality surveillance and protection.

When both forms of monitoring are placed within the same organisation there can be conflicts in approach and priority. For instance, the drinking-water quality surveillance arm, whilst recognising the need for protection of water quality in sources used for drinking, may not be sympathetic for the need to maintain water quality in water bodies exploited for other uses such as industry. Additionally, the drinking-water surveillance arm will place a higher priority on the quality of water in the supply system (i.e. during treatment and afterwards) than on raw water quality. On the other hand of course, the natural water quality monitoring arm will place great emphasis on the need to protect natural water quality and may attach little importance to post-treatment contamination on small scales. There is also a problem in that drinking-water quality standards are inherently stricter than most environmental standards and require a greater frequency of analysis. Again this may lead to difficulties in prioritising investment of limited resources.

## **Sector Structures**

There are a number of different ways the sector can be structured and it is preferable to simplify this rather than create too many institutions with similar responsibilities. This not only makes enforcement difficult, it is confusing to the public who become unsure as to whom they should approach for action in the event of a problem.

Despite the many different institutional models that are available world-wide, the mostly commonly applied (and probably most simple model) is one where there are three principal institutions:

- 1 Water supply and sanitation agency(s);
- 2 Drinking-water supply surveillance body;
- 3 Water resource management agency - this may include pollution monitoring inspectorates.

The relationships between surveillance body, supplier and water resource management body should be clearly defined from the outset and in particular the legal framework within which they operate should be simple, clear and effective. What is of greatest importance is to define the limit of responsibility of each of the two regulatory bodies.

In general, the water supply surveillance body takes responsibility for the water once it enters the water supply system (the intake) up to the point of consumption (the tap). The water resource management agency takes responsibility for the development, management and protection of natural water and therefore their responsibility is for source waters up to the point of abstraction for use and from the point of discharge of return flows of wastewater. The water supply agency is obviously responsible for the integrity of its infrastructure and effectiveness of any source protection or treatment applied to the water. Their responsibility is therefore to produce a product of acceptable quality and have a responsibility from the point of abstraction to the point of connection with a house main or standpost riser or to the point of collection in point water supplies. This situation is complicated where the vending of water supplies at communal water points is licensed to water vendors, as they also have a responsibility to maintain the integrity of the riser pipe and fittings on the standpost and for timely reporting of faults to the bulk supplier.

### **Surveillance agency**

The surveillance agency should preferably be established by national legislation and have representation at policy-making and all executive levels (such as central, departmental, regional, local or district levels).

The responsibilities of the surveillance agency should encompass monitoring of the fulfilment of water supply service standards by the water suppliers, approval of drinking-water sources (subject to specific treatment requirements where appropriate); and surveying the provision of drinking-water to the population as a whole.

Surveillance is concerned with *all* types of water used for domestic purposes by the population *as a whole*. This is a fundamental distinction to the role of the supplier who should be responsible only for the quality of the service they provide in the area in which they operate.

The area of responsibility of the surveillance agency should ideally encompass all sources of water intended for human consumption. In practice this is often difficult to achieve as many households or small communities may have individual supplies (whether a single household well or spring or a small piped distribution system). As the number of such systems may be very high, the surveillance of all such supplies may be a costly and difficult-to-achieve goal. Priority should therefore be given to:

- systems supplying water to larger centres of population;
- systems suspected of being a risk to human health; and
- to be a representative sample of other types of supply in order to identify the most common shortcomings of these.

### **Water supplier**

The above does not exclude water supply and construction agencies from involvement in surveillance and in fact it is vital that they are involved.

While it is the responsibility of the surveillance agency to generate and summarise surveillance data and to promote improvements, it is the supply agency who will carry out many of the actions for improvement.

Supply agencies also have an obligation to monitor and control the quality of the product they supply, in common with the suppliers of any other types of product. This function is often referred to as *quality control* in order to distinguish it from the health-related *surveillance* function performed by the surveillance body.

In many countries arrangements to share water quality data exist between surveillance and supply agencies. In some these arrangements are informal and instigated at local level. In other cases they are formalised and the surveillance agency accepts data generated by the supplier in place of some of the data it would otherwise generate itself, provided the laboratories of the supply agency are open to inspection and the surveillance agency maintains a realistic minimum proportion of analyses for overseeing purposes.

### **Water resource management agency**

The water resource management agency monitors natural water quality and wastewater discharges. They will also licence abstraction, monitor industrial discharges etc., but their key role within water supply is to protect source water quality so that it remains at a quality consistent with use in drinking-water supplies and for ensuring that return flows do not cause deterioration in natural water quality. They should have the power to prosecute water and sewerage agencies for failure to meet wastewater quality standards and to monitor water abstractions to ensure compliance with agreed limits.

The water resource management agency may also monitor natural water quality changes due to leakage from water supply pipes and sewers and have the power to force suppliers to carry out remedial action to improve performance in order to protect natural water quality. This is particularly important in relation to groundwaters in urban areas, where excessive leakage from sewers or water supply pipes will affect natural groundwater quality.

To a certain extent this overlaps with responsibilities undertaken by the water supply surveillance agency as they too will monitor leakage, albeit from a health related stance. This provides a good illustration of the need for strong inter-institutional links and for clear definition of responsibility. In principle, both the water resource management and the surveillance body could take enforcement action against the water and sewerage supplier, or bring a joint action. In practice, this frequently does not occur as, for instance, the surveillance body may not be interested in pursuing an action where they see no direct harm to the water supply.

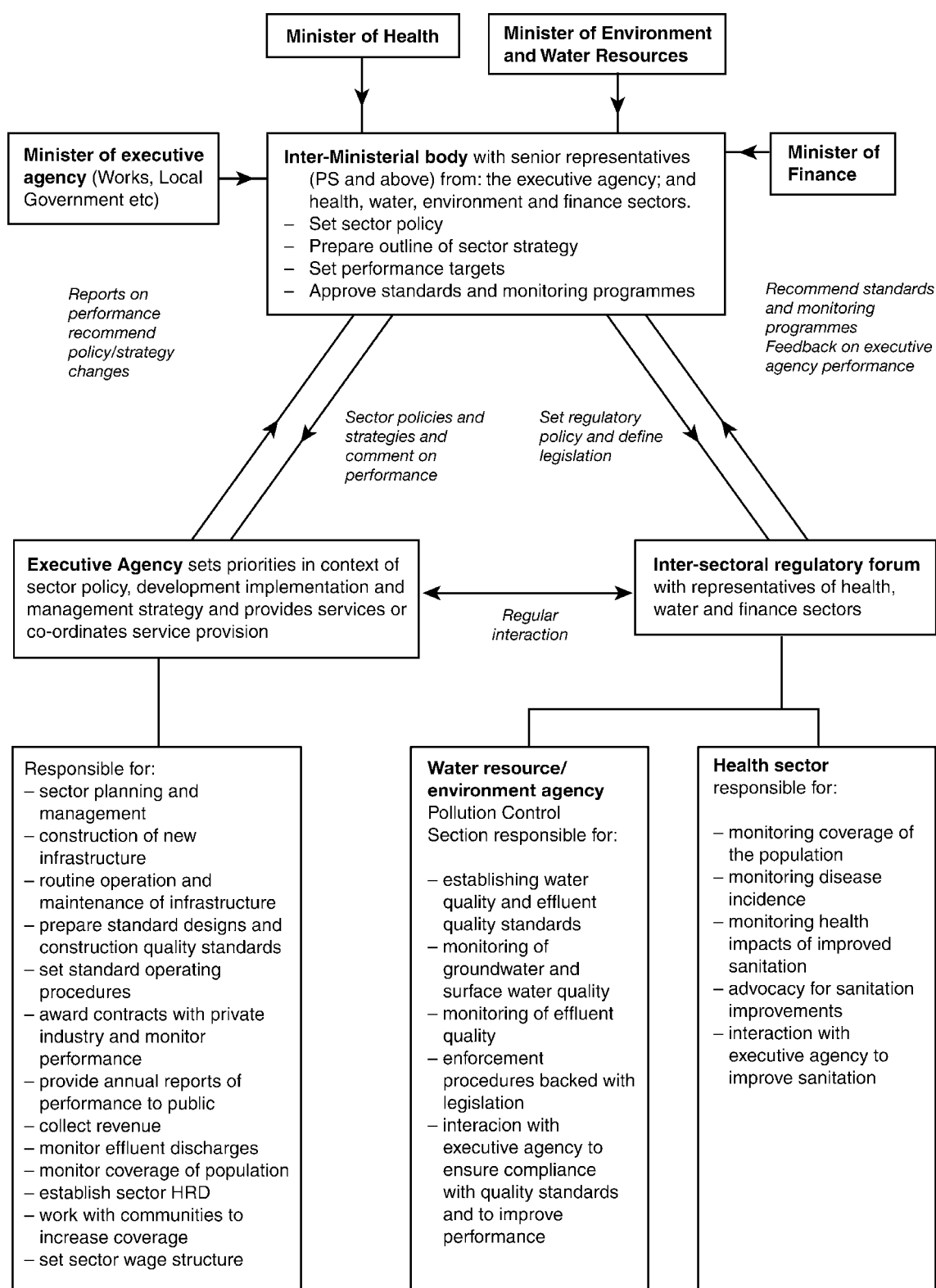
### ***Inter-Agency Collaboration***

What is clear from the above is that there needs to be strong inter-agency collaboration if the water sector is to function effectively and efficiently (See Figure 1). There are many potentially overlapping roles and conflicting interests. Many of the problems that arise within the water sector are caused by a lack of dialogue and a certain element of shirking responsibility which can only be resolved through adequate dialogue.

To provide an example, imagine a situation where the water resource management agency grants a discharge consent to a chemical company several kilometres upstream from a water supply intake. The plant is discharging halogenated organic material. Neither the water supply agency or the surveillance body are consulted and the plant starts to discharge. Some while later, the surveillance body starts to detect raised levels of halogenated organics in the water supply and therefore initiates action against the water supplier.

The water supplier, by identifying the elevated level of pollutants in the source water could ask the water resource management agency to prosecute the polluter in order to cover the costs of installing expensive additional treatment processes. As the polluter has a discharge consent and meeting the conditions of that consent they can argue that they are not liable for this. This leads to a situation where no-one will take responsibility for improving the quality of the water supplied to the consumers. In this situation the water supplier and surveillance agency could make a case against the water resource management body for negligence of duty.

The scenario outlined above may seem unlikely, but similar incidents have occurred world-wide. If a process of dialogue is maintained between all parties at all levels, these incidents should not occur as there will be thorough evaluation of impacts from all points of view. Taking the example above, the water resource management body would be expected to undertake an environmental impact assessment of the discharge. However, this may or may not include influences on the water supply itself and may not look at human health impacts of ingestion of contaminated water. If a combined assessment had been undertaken, including looking at treatment implications for the water supplier and the health impacts, a more clearly defined



**Figure 1: Institutional framework for the water supply and sanitation sector. Howard G., 1996**

picture could be built up about the discharge. This would be likely to change the terms of the consent and the cost of the consent to the industry.

### ***Laws, Regulations and Standards***

Effective water supply monitoring programmes require the support of appropriate legislation, regulations, standards and codes of practice. Important aspects which should be considered in supportive legislation include:

- functions, authority and responsibility of the water supply agency
- functions, authority and responsibility of the surveillance agency
- functions, authority and responsibility of the water resource management agency
- codes of practice regarding the notification of changes in source water quality to both supply and surveillance agencies by the resource management agency
- codes of practice regarding the construction, organisation and maintenance of facilities by water suppliers
- codes of practice regarding the construction of domestic facilities
- water quality standards and provisions for their updating
- procedures for authorisation of sources as suitable for drinking-water supply
- minimum treatment requirements according to source water quality
- requirements of disinfection and minimum residual disinfectant concentrations to be maintained throughout distribution
- procedures for approval of sampling and analytical methods for use in water quality laboratories and analytical quality control requirements of such laboratories
- requirements of water suppliers to undertake a defined minimum sampling programme
- guidelines on procedures to follow, including notifying and providing advice to the public if contamination of drinking-water occurs
- provision of legal recourse to the public and surveillance agency to initiate legal action to ensure adequate water supply service quality
- definition of 'adequate water supply service quality' with regard to parameters such as 'continuity'
- code of practice to ensure that discharge consents in a catchment are only granted after full consultation with supply and surveillance bodies.

However, it is important to recognise the limitations in a purely legislatively driven approach to water quality monitoring as a means of improving poor water supplies in low-resource situations. The development of partnership approaches and the encouragement of all stakeholders in the sector playing an active role in monitoring water supplies and identifying improvements may be more effective where resources are limited.

### ***Conclusion***

The development and optimisation of the institutional framework in the water sector is essential for effective, output driven water quality monitoring. Unless the roles and responsibilities of each player are established and recognised, then the generation of monitoring data and information may not lead to the desired improvement in water supplies.

Water quality is a multi-agency issue which requires effective collaboration from all the key stakeholders. Whilst, legislation plays a role in achieving this, it is important to note that partnerships between regulators, suppliers and consumers may be more effective in promoting good water quality, particularly where resources are limited.

### **References**

Bartram, J and Ballance, R. (1996) *Water Quality Monitoring*, Chapman and Hall, London.

Howard, G. (1996) *Urbanisation, Sanitation and Environmental Health*, Commonwealth Secretariat, London.

# Institutional Frameworks

## Presentation Plan

Section	Key points	OHP
<b>Introduction</b>	<ul style="list-style-type: none"><li>• Surveillance is intended to promote water supply improvements</li><li>• Institutional arrangements are therefore vital</li><li>• Surveillance and supply functions are distinct but complementary</li></ul>	<b>1</b>
<b>Selecting Institutions and Assigning Responsibilities</b>	<ul style="list-style-type: none"><li>• Match the requirements of each function to the remit of the institution</li><li>• Ministry of Health is preferred for surveillance as this is a health-related activity</li><li>• Separation of supply and control functions is important to reduce the risk of conflicts of interest arising</li><li>• There are risks in over-centralising surveillance through the Ministry of Health as this may replicate local capacities and increase costs</li><li>• Surveillance often best delegated to environmental or public health departments in local authorities</li><li>• Where Government takes responsibility for water supply, the same body may undertake surveillance, provided there is adequate separation between functions up to the most senior level</li><li>• An alternative approach is for water suppliers to generate monitoring data that is routinely submitted to the surveillance body</li><li>• A water resource management body may sometimes undertake surveillance</li><li>• Advantage of this approach is that it minimises replication of equipment and facilities</li><li>• However, the remit of surveillance and other activities must be clearly defined and surveillance given adequate priority</li></ul>	<b>2</b>

Section	Key points	OHP
<b>Sector Structures</b>	<ul style="list-style-type: none"> <li>● These should be simple to optimise performance</li> <li>● Most common model is based on 3 agencies: surveillance agency; water supplier; resource management agency</li> <li>● Clearly define relationships and legal framework from the outset</li> <li>● Suppliers responsibility is from intake to connection of supply main to house main and house connection to mains sewers to the point of effluent discharge</li> <li>● Surveillance agency responsibility runs from source to the point of consumption</li> <li>● Resource management responsibility is natural waters and wastewater discharges</li> <li>● Surveillance agency should be established by legislation and be represented at policy and all executive levels</li> <li>● Should monitor fulfilment of all water supply service standards</li> <li>● Should be a national body</li> <li>● When establishing surveillance programmes must prioritise activities</li> <li>● Resource management agency role is to monitor and control natural water quality and effluent quality</li> <li>● Prosecutes polluters (including water and sewerage providers) when fail to meet standards</li> <li>● Monitor all impacts on water resources and take appropriate actions</li> </ul>	3,4
<b>Inter-agency collaboration</b>	<ul style="list-style-type: none"> <li>● Inter-agency collaboration must be string for sector to function effectively and efficiently</li> <li>● Dialogue reduces litigation and is more cost-effective</li> <li>● Give an examples of potential problems resulting from poor collaboration</li> </ul>	5
<b>Laws, Regulations and Standards</b>	<ul style="list-style-type: none"> <li>● Laws, regulations and standards should cover all aspects of the water sector</li> <li>● Refer to legislative frameworks session</li> </ul>	

# Institutional Framework

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- 1 Surveillance and control monitoring are designed to promote improvement
- 2 Institutional arrangements are vital
- 3 Responsibilities must be clear
- 4 Institutional responsibilities should be compatible with wider concerns
- 5 Surveillance, supply and resource management are complimentary



# Key Sector Institutions

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- 1 Water and sewerage service provider(s)
- 2 Drinking water surveillance body
- 3 Water resource management agency  
- may include pollution inspectorates



# Institutional Responsibilities

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## **Surveillance agency:**

- Monitor water supply quality to the population as a whole
- Authority to sample from anywhere in all water supplies
- Authority to enforce compliance
- Should establish a sanitary code
- Must keep the public informed

## **Supplier:**

- Supply water meeting all national standards to consumers
- Exercise quality control and allow access to data

## **Resource Management Agency:**

- Monitor natural water quality and pollution
  - enforce standards
- Protect and manage water resources



# Limit of Institutional Responsibility

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- **Surveillance agency:**  
Source to point of consumption
- **Water suppliers:**  
Source to house connection/point of collection
- **Resource management agency:**  
All water resources



# Institutional Framework for the Water Sector

