GUIDELINES FOR SUSTAINABLE COMMUNITY WATER SUPPLY AND SANITATION PROJECTS

R.A. Chantler
Department of Water Affairs and Forestry, Pretoria, South Africa

Keywords: Water supply, groundwater, water conveyance systems, bored water wells, wastewater disposal, sanitation

Contents

Summary

A brief overview is given of a sustainable systematic approach toward water supply development and its management at the local community level. The various phases of project development, planning, implementation, and operation, and policy and legislation attached to water services, are outlined. The responsibilities of the different levels of democratic government are defined.

1. Introduction

The implementation of a community water supply project has to take place within the context of national policy and prior defined institutional arrangements. It is important to ensure that all relevant parties (public and private sectors) are involved at the outset of the planning of every new community water supply project.

Planning that is not instructed by local governments, or where appropriate by water boards and local water communities, and that does not intimately involve the regional authorities, is bound to be rejected and to lead to wastage of both time and money. With this in mind, the following set of guidelines or ground rules for developing a community water supply project has been developed.

In following these guidelines, the project should be seen as a multifaceted process driven by a local water authority representing the interests of all the participating and affected parties (farmers, private entrepreneurs, professional services, commerce, and the local populations).

1.2. Scope of the Guidelines

These guidelines toward the effective establishment of sustainable water services are directed at various levels, from the individual water user to large commercial and industrial establishments. The water requirements of hospitals, factories, laundries, abattoirs, power stations, and other establishments serving the public at large are also to be considered. These guidelines are directed at various levels of local and central government, and

- are intended to give guidance to planners and designers;
- are not intended to replace professional expertise and engineering judgement;
- give only high-level guidance and cannot be used as a replacement for specifications; and
- should be used together with recognized standards, codes, and acts.

2. Project Development Cycle

The following are steps toward the realization of a typical community water supply project and its development program.

2.4. Planning

The planning phase should be carried out meticulously and circumspectly over a period of several years.

- Perceptions of shortcomings in water and sanitation services should be made by consulting engineers appointed by the local authorities for the purpose of identification of needs.
- Formation of a core of participants representing interested and affected parties to discuss issues involved is the next step in addressing all relevant matters.
- Contact with the local water administration organizations should then be made.
- Discussions with core participants regarding procedures and initial investigations are then held.
- Prioritization by area and local representatives with reference to funding availability and allocations is the final step in planning.

2.5. Implementation

The implementation phase starts with the knowledge that funds will be made available for carrying out the envisaged project.

- On approval of the project as planned for the community, a constitution and formation of a representative project steering committee shall follow.

- An investigation of the scope, the options available, and the costs is then carried out by consultants appointed upon recommendation of the steering committee.
- Various options are then considered and the selected choice is recommended to the community.
- The approval by the community of the accepted option, including the cost implications, then would normally result in a draft agreement between the community and the funding organization to establish the basis for redeeming the capital investment by the levying of water tariffs.
- The preparation and submission of a business plan and a framework of an agreement with the community should then follow.
- On approval by the funding authority, the appointment of a project implementing agent, as recommended by the steering committee, can then be made.
- The implementation of the project is then commenced, involving the design, construction, testing, and commissioning of the entire project.
- The transfer of the completed project is then made and entrusted to an appropriate local authority.

2.6. Operation

The operation and maintenance of a community water supply project may be entrusted to the existing water service authority that may then subcontract a specialist service-providing organization designated for this purpose.

3. Policy and Institutional Arrangements

An overview of some aspects of typical government policy relating to institutional arrangements is provided below. It is strongly recommended that planners of community water supply schemes procure copies of relevant original statutory documents for study. It must be borne in mind that water utilization policy is evolving all the time and that it is the planner's duty to remain abreast of developments. Nevertheless, whatever is decided upon and implemented has to be maintained and be sustainable. It has to be cost effective, purposeful, and adaptable (see *Steps to Sustainable River Water Uses in Industrialized Regions*).

3.3. Typical Constitutional Decrees

The following are some extracts from a typical national constitution regarding water rights and local government. These types of prescriptions would necessarily have to be considered when drawing up community water supply policy.

- Everyone has the right to have access to sufficient food and water and a safe environment.
- The local government consists of municipalities, established for the entire country.
- A municipality has the right to govern, on its own initiative, the local government affairs of its community, subject to national and regional legislation.

- The national or regional government may not compromise or impede a municipality's right to exercise its power or perform its functions.

The objectives of local government are the following:

- to provide democratic and accountable government for local communities
- to ensure the provision of sustainable services for communities
- to promote social and economic development
- to promote a safe and healthy environment
- to promote the involvement of communities and their organizations in local government matters

A municipality must therefore structure and manage its administration, budgeting, and planning processes so as to give priority to the basic needs of the community, to promote its social and economic development, and to participate in national and regional development programs.

3.4. Water Services Protection Legislation

The main objectives of protecting water services by legislation are the following:

- protection of the right of access of all persons to adequate water supply and sanitation in an environment that is not harmful to health or well-being
- setting of national standards and norms for tariffs for water services
- preparation and adoption of water services plans by development authorities
- provision of a regulatory framework for water service institutions and intermediaries
- establishment of water services boards and their empowerment
- monitoring of and intervention in water services by the relevant higher authority
- provision of financial assistance to water service institutions
- gathering and distribution of information on a national basis
- acquisition of a water service development plan for each local governmental area

4. General Remarks

These guidelines were drafted to clarify the responsibilities of the different levels of government regarding the establishment of sustainable water supply projects. The object of having a policy on water supply and sanitation is to define the governmental role regarding these services, considered essential for the development of a striving and progressive community.

The framework of a government may undergo massive transformation from time to time. To ensure that adequate institutional capability for water supply and sanitation provision is continuously maintained in the *short term*, and that foundations for a sound institutional structure are laid for the *long term*, the following institutional goals may be set:

- *In the long term*, the basic provision of services to consumers should be seen as the function of a competent, democratically elected local government, supported by regional administrations. Where necessary and appropriate, third-tier organizations (such as water boards) are to provide regional water supplies and wastewater disposal services to local authorities under the supervision of the national authority.
- *In the medium term*, the objective of government is to support institutional development at local level as well as to provide financial and technical assistance for the physical and sustainable development of water supply and sanitation services.
- *In the short term*, the immediate goal is to maintain reliable service delivery, i.e. water supply and sanitation, and to transform and democratize hierarchical water authorities, (formerly known as water boards) to gear up to achieve the medium-term goals. Local water boards are considered the primary agents of national water authorities in the development of regional water supply and sanitation services. At the local level, it is this section of the community administration that has the constitutional responsibility to provide water and sanitation services to the general public.

After the initial planning stages of setting the main objectives have been attended to and the extent of these guidelines has been observed, suitable projects have to be implemented. This emphasizes the need to identify the correct techniques to follow and the equipment to be utilized for carrying out the project. Furthermore, this implies the drawing up of an *action plan*, which should be backed up by sound production, operation, and maintenance plans. As an example, in the establishment of a community water supply project utilizing underground water, exploratory borehole drilling is a vital preliminary phase. Together with production water-well design and construction (see *Appendix 1. Borehole Drilling, Water-Well Design, and Construction*), the project provides a means of accessing and tapping generally prevalent groundwater resources (see *Groundwater Investigation Methods and the Siting of Bored Water Wells*).

This is a good example of a community water supply project. In addition, water conveyance systems, which are essential in surface water supply systems, are reviewed in general in Appendix 2 (see *Appendix 2. Water Conveyance Systems*). More specific information regarding the philosophy behind regional water supply projects of this kind may be found in another topic (see *Water Supply: Dams, Reservoirs, and Water Transfers*).

-
-
-

Bibliography

Colenbrander H.J. (1986). *Water in the Netherlands*, 70 pp. The Hague: TNO Committee on Hydrological Research. [A broad-spectrum coverage of the management of water in terms of quantity and quality, with specific reference to the activities of Dutch experts abroad in water research, management, and project development.]

Di Meana C.R. et al. (1990). *Aquatic Pollution and Dredging in the European Community*, 184 pp. The Hague: Delwel. [Aquatic systems, particularly those common to a number of countries, with emphasis on sediment pollution and prevention and environmental management to maintain the balance between prosperity and preserving the natural heritage.]

Engineering Week (1994). *Water for All*, 32 pp. Craighall, Johannesburg: Systems Publishers. [Survey of water-related projects and prospects and strategic planning for the benefit of all, particularly developing communities; briefly reviews the Lesotho Highlands megaproject and puts this and other large projects into perspective together with many other social upliftment projects.]

Fournier R.O. (1988). *Water 2020, Sustainable Use for Water in the 21st Century*, 40 pp. Science Council of Canada Report 40. Ottawa: Publications Office, Science Council of Canada. [The need for maintaining a balance between the environment and economic development, especially as applied to a water-rich country; extensive bibliography.]

Kabbel T.C. (1989). *Dams of Zimbabwe*, 53 pp. Harare, Zimbabwe: ZIMCOLD. [The role of 8000 dams in Zimbabwe, 104 of which are classified as large dams by ICOLD (including Kariba, then impounding the largest artificial lake in the world), serving communities in rural areas.]

Lund K., ed. (2000). *Conserving and Sharing Water Resources in a Water-Scarce Environment*, 298 pp. (Proceedings of the Fourth Biennial Congress of the African Division of the International Association of Hydraulic Engineering and Research). Windhoek, Namibia: Lund Consulting Engineers. [Reports on topics surrounding groundwater, surface water, conserving and sharing limited water supplies; how to augment them using the sea as a source; technical and environmental issues.]

SANCOLD (1994). *Large Dams and Water Supply Systems in South Africa*, 256 pp., South African Committee on Large Dams. Pretoria, South Africa: J.P. Van der Walt & Son. [Contains several chapters useful to planners and decisionmakers involved with regional water supply projects in water-scarce countries.]

Stengel H.W. (1963). *Water Affairs in South-West Africa*, 465 pp. Windhoek, Namibia: Afrika-Verlag Der Kreis. [Pace-setting monograph clearly setting out the challenges of providing potable water for an arid to semiarid region with a diversified sparse population.]

Biographical Sketch

R.A. Chantler holds the degrees B.Sc. (Hons.) in mechanical engineering (Manchester) and electrical engineering (Wits) and is a chartered engineer (UK) and professional engineer (RSA). His professional experience includes 5 years as design engineer on nuclear power plants in the UK and 35 years as professional engineer (mechanical and electrical) with the Department of Water Affairs, South Africa. His publications include the proceedings of a conference on early flood warning measures, reports on flow metering, and guidelines for equipping dams with flood gates.