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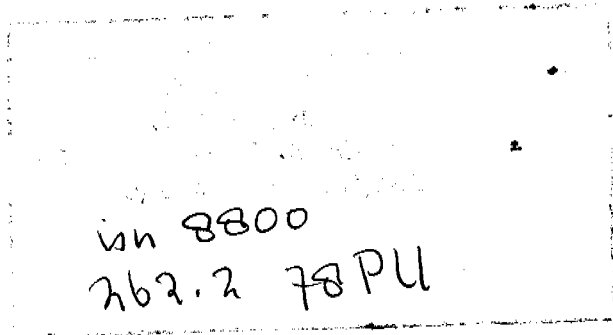
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# PUBLIC STANDPOSTS FOR DEVELOPING COUNTRIES

Proceedings of an international Expert Meeting  
held in Achimota (Accra), Ghana, 8-12 August, 1976

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# 1. INTRODUCTION

Water is a versatile natural servant of man; it is indispensable for his survival and his health, essential for his economic and industrial development, and an essential requirement for the production of his food, energy, and the material comforts that determine his standards of living. Water supply is therefore vital both for individual welfare and for community development. It is, in effect, both a consumption good and an investment good, useful for public health, economic growth, and general development.

The role of a reliable and safe water supply in the intervention of communicable diseases and in the promotion of public health is well-known. It is also established that this role is best fulfilled when every house in a given community is connected to the public water supply system. But for most developing countries this ideal is still unattainable due to financial and other constraints. For such countries public standpost systems offer the most economic and effective short-term alternative to the ideal situation. Through proper design, management, and user education, it should be possible to ensure within a reasonable time that all sections of community have convenient access to an adequate and a reliable supply of reasonably safe water.

A standpost is a suitably supported vertical water pipe terminating in a tap or faucet from which water can be drawn for various uses. When located for public use it is known as a public standpost. There can also be private or semi-private standposts.

In urban areas public standposts are generally provided for the urban poor as an intermediate step towards the ideal of direct house connections to public water supply systems. In rural areas however, they often serve as the chief means of water supply to the majority of the people, with house connection being limited mainly to the affluent minority. In either case, the effectiveness of public standpost systems depends upon several inter-related factors such as proper planning, design, construction, maintenance, and use. However, in many countries the full

potential of public standposts has not been realized. Several factors are responsible for this, two such being the wastage of water at the public standposts, and difficulty in revenue collection from the users of public standposts.

Promoted by these problems and recognizing the immense potential in the role of public standposts in meeting the water supply needs in the developing countries, the WHO International Reference Centre for Community Water Supply initiated a study of public standpost systems. The study covers the following two broad areas:

- an inventory and evaluation of public standpost systems currently in use, previously used, or suggested for use in designs, ideas, patents or models; and which could be used in urban and rural systems for dispensing water to people
- consideration of possible methods and approaches for the organization and management of public standpost systems, which rely on operational and administrative arrangements for dispensing water to the public; for instance identifying a modus operandi sufficiently flexible to allow adaptation to local socio-economic circumstances.

Comments on the preliminary results of the study were invited from international agencies, development assistance organizations and water supply organizations in several developing countries. On the basis of these comments a draft Report on Public Standposts was prepared for review at a meeting of experts, of which the proceedings are presented here.

It is planned to have the resulting publication on Public Standpost Water Supplies, in which the results of the present meeting will be integrated, published in 1978 as well.

## 2. SUMMARY OF PROCEEDINGS

The Expert Meeting on Public Standposts for Developing Countries was held in Accra from 8th to 12th August 1977. It was organized by the IRC in association with the Ghana Water and Sewerage Corporation (GWSC). Its organization provided for plenary session discussions, working group discussions, and a field visit to public standposts in Accra.

The Meeting was opened by the Commissioner for Works and Housing, Major Edward Yirimambo<sup>1)</sup>, after Mr. J. Haijkens (IRC) had introduced the Chairman and General Rapporteur for the Meeting. Following the keynote address, Mr. G.R. Hagan, Deputy Managing Director of the GWSC and Chairman for the Meeting, moved a vote of thanks and introduced the subject for the Meeting<sup>2)</sup>. Mr. Hagan presented the objectives of the Meeting as follows:

- to review and discuss in detail the draft Report on Public Standposts, as prepared under the auspices of the IRC
- to formulate criteria for planning, design, operation, maintenance and administration of public standpost systems
- to identify gaps in current knowledge and to formulate recommendations for further studies and other activities
- to comment on the proposal for the compilation of a construction manual for public standposts, and for a testing programme on suitable taps
- to advise on suitable mechanisms for the transfer of information and experience collected

Following adoption of the agenda for the Meeting, the Chairman invited participants to introduce themselves and to give a brief account of the status of public standpost systems in their

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1) The text of the keynote address by Major E. Yirimambo is given in Annex 3.

2) The text of the vote of thanks by Mr. G.R. Hagan is given in Annex 4.

respective countries. General points mentioned in these presentations were:

- public standposts are used both in the rural and urban areas of all countries represented at the Meeting
- in urban areas they are used mainly as a supplement to direct house connections; they are also used predominantly by the urban poor
- in rural areas they serve as the principal means of providing water to consumers, house connections providing an exclusive service to the affluent minority
- in some countries water from public standposts is free, in others a nominal flat rate is charged for it, whilst in others, it is sold by special contractors or concessionnaires
- in all cases some problems are encountered in the provision and maintenance of public standposts

A summary of each country presentation is given in annex 5.

The meeting continued with general plenary discussions during which consensus was reached on the definition of a public standpost system to be adopted for the purpose of the meeting. In reviewing the draft Report, the meeting was split into two working groups, namely:

- a working group commenting on and contributing to the technical chapters
- a working group commenting on and contributing to the chapters on organizational, financial, economic and social aspects

Finally, recommendations were adopted for follow-up actions and studies required.



### 3. REVIEW OF DRAFT REPORT ON PUBLIC STANDPOSTS

The following paragraphs represent the general opinion expressed during the meeting. However, many specific comments and suggestions were contributed to the improvement of the draft Report on Public Standposts; they will be directly incorporated in the reworked version, which will also be published in 1978.

#### ORGANIZATION AND MANAGEMENT

Good organization and effective management are the keys to the success of public standpost systems. Without these, grandiose public standpost schemes risk collapse when they become associated with problems such as low water pressure, irregularity and unpredictability of flow, frequent break-downs, and general malfunctioning. These, in turn, generate negative attitudes, and cause consumers to become dissatisfied and apathetic; as a result, the system becomes subject to water wastage, wilful damage, and pilfering; and revenue collection becomes difficult.

*Organization.* Public standpost systems are used in a variety of situations. They may be the only means through which consumers receive water from a community water supply system, or they may be used alongside a system of supply through house connections; they may serve either as a short-term or as a long-term solution to a community's water supply problem; and they may be used either in a rural or in an urban situation. Each particular situation is characterised by its peculiar conditions - technical, economic, financial, or social - which must be reflected in the organization of the public standpost system. Consequently, a variety of appropriate organization forms may be visualized for public standpost systems, each organizational form having

been designed to meet prevailing conditions and made sufficiently flexible to permit a timely response and adjustment to changes in circumstance.

The organization of public standpost systems embraces not only the formal organizational structures, but also appropriate operating and maintenance procedures in relation to local patterns of behaviour.

The public standpost as such is but a part of the total physical subsystem of a community water supply system. Other parts of the physical subsystem are the source, storage, treatment, and primary distribution systems; also included are its management system, its users, and the social environment in which it is situated. Thus there is rarely an organizational system which is designed exclusively for the public standpost system. Frequently, the organization responsible for a public standpost system will also have other responsibilities such as the entire community water supply system, or other local council commitments. As a rule, whenever appropriate, specific developmental or operational activities may be delegated to private consultants or contractors, local authorities, or to village or other local committees. Involvement of the local community in the organization often brings about positive salutary reactions from the consumers. The organization taking care of a public standpost system may be a government department, a national or a regional self-accounting authority, a local authority, or a private water company. Depending upon its nature and the level of local technology, the organization may be responsible for all aspects of the public standpost system, including the planning, design, construction, operation and maintenance of the system as well as revenue collection and user education. Alternatively, it may be responsible for limited activities like operation and maintenance and/or revenue collection.

*Management.* The objective of management is to keep a programme going on its planned course with appropriate adjustments and adaptations. The planned course for a public standpost system is invariably to provide a level of water service which is adequate

in quality and quantity, dependable, conveniently located, and consonant with the means of the supporting community.

Management of such a system involves a multiplicity of technical activities<sup>1)</sup>. It also involves record keeping, reporting, consulting, budgeting, financing, and evaluating. But effective management must go beyond the formal organization. It must also involve considerations of other elements that interact with the water supply system such as the consumers, community leaders, legislators, sponsors, suppliers of materials and resources, financiers and bankers.

The factors accountable for ineffective management include the following:

- low priority of water supplies in national plans
- shortage of trained personnel at all levels
- lack of spare parts and materials
- poor fiscal management
- shortage of facilities for communication

These factors tend to result in the neglect of water quality monitoring and preventive maintenance, with the inevitable result of progressive deterioration of service and consequent public apathy. The actual factors leading to ineffective management may vary from country to country. Hence, to be effective, management must identify the peculiar constraining factors in its situation, so that planning objectives can be formulated initially to be in consonance with these constraints, but eventually to eliminate them. Thus, where lack of trained personnel is the constraint, management may initially provide facilities for basic training for both professionals and sub-professionals; refresher courses and workshops can also be organized for relevant personnel, and training materials can be prepared to serve as learning aids for planning, design, construction, operation, and maintenance.

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1) Schaeffer, M., *Administration of Environmental Health Programmes - A Systems View*, Geneva, WHO Public Health Papers no.59 (1974)

Where low programme priority is a problem, the management planning objectives may provide for continuous negotiation and cooperation with national economic planners; they may also provide for improvement in managerial capability, service quality, revenue collection, and potential for prompt loan servicing.

Lack of spare parts and materials may be due to many factors including the following:

- poor planning for the procurement and delivery of materials
- foreign exchange limitations
- limited local financial resources
- inadequate or no provision for local production of fast-moving spare parts

Some of these factors can be eliminated through managerial activities. Others must be accepted as planning constraints.

In general, two types of constraints are encountered in the management of public standpost systems, namely, those that can be progressively eliminated through managerial effort, and those that are beyond managerial effort. Whereas management should aim at eliminating the former, it should aim at formulating planning objectives that are in consonance with the latter type of planning constraints.

## **ECONOMICS AND PLANNING**

In general, community water supply systems may be divided into the following two components:

- the major component: dams, transmission systems, treatment plants, and trunk mains or primary distribution systems
- the secondary system: this system actually distributes and delivers water to consumers

The discussion on economics and financing was restricted to the secondary distribution system.

*Economics.* The design and economics of secondary distribution systems are affected by two types of variables. The first type of parameters are those which should be accepted as basic data for

the design and over which the designer has no control. Examples of such parameters are:

- the population to be served
- the growth rate of the population
- the area occupied by the population
- economic level of the community
- budgetary constraints

The second type of variables may be described as decision design variables; they concern criteria over which the designer has control. Examples are as follows:

- accessibility of water to consumers (defined in terms of spacing of public standposts and proportion of houses to be connected)
- per capita flow rate to be supplied
- minimum allowable pressure in the distribution network
- degree of system reliability (as may be provided by looping, valves, or reservoirs)
- provision for compatibility with future extensions
- phasing of project implementation and nature of investment flow
- design period

The economics of the system depend very highly on the selected values of the design criteria. Their selection must therefore take into consideration the economic level and preferences of the consumers. This can be done by explaining to consumers what options may be available and inviting them to decide on the option they can afford.

As a rule, savings are made in the cost of the secondary network if the service area is surrounded by peripheral mains. In any given case, the designer must decide on the trade-off between the cost of the primary mains and the cost of the secondary network.

The total cost of the public standpost distribution system is highly dependent upon the cost of the taps, the rising pipes, the supporting structure and base unit, and upon the cost of the service connections. Hence, there is a pressing need for the development or adoption of low-cost public standpost system designs and also for minimizing expenditure on connections to

houses and to standposts. It is noted, however, that there is evidence of prejudice by engineering agencies against the adoption of low-cost technology in the design and construction of public standpost systems. In some countries, there is also political resistance against low-cost technology.

The cost of pipelines in the system is also very much influenced by population density and the level of service. The cost is relatively less sensitive to per capita flows and headloss across the system. This should be taken into account in selecting design values for per capita flows and minimum allowable headloss in the network.

Other factors which affect system economics include the extent to which pipes are standardized and the type of measures taken to ensure system reliability (looping, number of valves, and reservoirs). Where a system intended to serve only public standposts is likely to be extended to serve house connections, the original design may have to be modified to ensure compatibility between the initial and the future system. In such cases, analysis has to be made to determine whether it would be more economical to lay the larger mains initially or not.

Where budgetary constraints are imposed, these may have the effect of reducing the service level while resulting in the selection of comparatively large diameter pipes which will facilitate compatibility with future extensions.

Although intermittent supplies are seldom designed as such intentionally, one may be tempted to design a system for intermittent supply from the beginning. Such a system will not only fail to provide satisfactory service to consumers, but also may not even result in any savings. Hence they are not to be recommended.

The World Bank has initiated a study aimed at improving upon the design of distribution systems for the urban poor<sup>2)</sup>. The study has used some pipeline cost data to develop simple equations relating variables, such as persons per standpipe, per capita

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2) Lauria, D., *Design of Low-Cost Distribution Systems*, Washington D.C., Report presented to the World Bank (1977)

water consumption, and average pipe size. These equations allow secondary distribution system designs to be made; they also allow rapid investigation of the effects of varying design criteria or of latering network staging. More data should be collected for further development and testing of these equations for general or local application.

*Finance.* Insufficient finance is often an important constraint in the development of public standpost systems and other community water supply systems. Finance is required for two types of expenditures, namely capital and recurrent expenditures. Both external and internal sources can be tapped for the provision of finance.

External sources of finance include several bilateral, multi-lateral, and international agencies. Two types of funds are obtainable from these agencies, namely, funds for sectoral and feasibility studies, and funds for programme implementation. The feasibility studies are normally a pre-requisite for obtaining capital loans. The UNDP and the WHO have a collaborative programme through which pre-investment studies may be carried out to assist countries obtain the necessary finance from external sources.

The most important condition to be met to secure external financing is a sound tariff and revenue collection policy. Such a policy should reflect the realistic cost of the invested capital; in principle, it should approximate long-term marginal costs; and its long-term objective should be to ensure that revenues will be sufficient to meet operating costs, debt servicing, and future development. Only large urban systems are likely to meet this condition. For most public standpost systems other criteria must be developed. In this connection cost-effectiveness criteria hold good promise for the future. Where self-financing is, at least in the initial stage of operation, impossible to attain, the financial viability of the public standpost system should be secured by use of external supplementary funds.

For internal finance there are at least three possible sources; these are revenues, government subventions and loans.

Ideally, government subventions should be limited to capital works, particularly the major components of the system such as dams, transmission systems, treatment plants, and primary distribution systems. But in many places government subvention is required to meet secondary distribution system development as well as operating and maintenance costs.

Loans are rather difficult to obtain from local sources due to high interest rates. However, when revolving funds, seeded from external or local sources, exist, they can be used as a source of local loans to supplement government subvention.

A very important objective of management should be to so improve upon its revenue collection system that it can be relied upon to finance at least recurrent expenditure which includes loan servicing, amortization, provision for extension, as well as operation and maintenance.

But difficulties are encountered in many countries in connection with revenue collection. These difficulties arise mainly from consumer apathy stemming from dissatisfaction with the services rendered. But quite often they are institutional in origin, examples being:

- ineffective administration
- irregular collection of revenues
- limited legal backing for revenue collection
- lack of freedom in determining tariff policies that are economically and financially viable.

A lot can be done to improve upon revenue collection:

- the organization and management of the water supply organization may be improved to ensure a reliable and satisfactory service
- an adequate legal framework for revenue collection may be established
- tariffs may be fixed realistically, even though for economic reasons consumer levies may be less than the tariff level, the difference being made up by the government
- inexpensive systems should be developed for revenue collection. This may involve the use of local authorities, water vendors or concessionnaires.



- where a fixed water tax is preferred, this may be based on the property of the user
- among farming communities revenue may be collected during the harvest rather than on a monthly basis
- good programme support communications may be developed to win sympathy, cooperation and participation of users in system and management and in regular payment of water rates

## **SOCIO-CULTURAL FACTORS**

Socio-cultural factors in a community relate to the community's demography, level and distribution of income, level of education, social organization and institutions, as well as to its traditions, customs, beliefs and cultural values. These factors influence the community's preferences, and attitudes; they influence what the community can afford, and the extent to which it can be mobilized for participation in community projects. For these reasons it is very important to take these factors into account in the planning, design, construction, and running of public standpost systems. Failure to take them into consideration may lead to consumer dissatisfaction with the system, thereby tending to cause vandalism, water wastage, and reluctance to pay water rates. However, when properly understood they can be exploited for community mobilization to ensure community understanding, cooperation, and participation in public standpost projects.

Traditional ceremonies, religious philosophies or practices and sporting activities may be exploited for mobilization and for inauguration of systems. The success of community participation in operation and maintenance may depend upon the extent to which local resources - human, financial, and materials - are used. Thus, local leaders could help in promoting public attitudes towards the system. Such attitudes can reduce mis-use, vandalism and theft. They can also improve willingness to pay water rates or readiness to contribute financially or otherwise towards capital works. Again, respected local personnel and institutions could be involved in user education and in modifying negative local attitudes or prejudices against specific groups.

The findings and conclusions of a recent study by UNICEF and WHO on the process of community motivation and continued participation in primary health care programmes are also relevant to public standpost systems.

## TECHNOLOGY

A public standpost system usually consists of the following elements:

- supply pipes and valves (and sometimes a meter box and a meter)
- faucet or water-flow control mechanism
- supporting structure and base unit
- waste water collection and disposal

*Supply pipes and valves.* The supply pipes, valves and other elements used for the connection between a distribution main and the public standpost support structure are basically the same as those used for a house connection. Their design and installation should be guided by normal engineering considerations, and by socio-economic factors. Stop cocks should be adequately protected from public interference. Location of supply piping should be made to facilitate maintenance and avoid possible contamination. Wherever possible low-cost systems should be used.

*Faucets and flow control devices.* Available flow control devices include the following:

- ordinary screw taps
- spring-loaded taps
- volumetric or delayed-closing valves
- systems with reservoirs and float valves
- miscellaneous types such as the Neptune, Bayard, foot-operated taps, and plastic stand systems

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2) *A Study of the Process of Community Motivation and Continued Participation.* (Report for the 1977 UNICEF-WHO Joint Committee on Health Policy Community Involvement in Primary Health Care), Geneva (1977).

Each device has special advantages and disadvantages. Their selection should be based on technical performance, initial and maintenance costs; simplicity of construction, operation and maintenance; availability possibility of local manufacture from locally available materials; hygienic consideration; low water wastage; and low susceptibility to wilful damage and vandalism.

The use of the current versions of the Siphoid and the Bedouin systems should be discouraged in view of risk of contamination of the water in their reservoirs.

*Supporting structure and base unit.* Design and construction of supporting structures should aim at economy, user convenience and at structural stability of pipes and taps. To ensure structural stability, rising pipes should be supported, for instance by encasing them in masonry or concrete, or by attaching them to pillars or walls. It is important to design a structure which serves to protect the tap from indiscriminate loading, at the same time providing a resting place from which the containers can be easily lifted.

The base unit usually takes the form of a strong, impermeable, and well-drained platform with sufficient standing room for people to wait for their turns in drawing water. Depending upon local custom, small raised platforms or grids should be provided directly beneath the taps to serve as supports for containers being filled with water. The design of such container platforms should be based on local custom. A peripheral or edge curb can be used for protection against traffic or cattle or for marking the boundary of the base unit.

*Waste water collection and disposal.* Adequate collection and disposal of waste water is necessary to avoid unhygienic conditions around the public standpost. As far as possible, waste water drained from base platforms should be collected for further use dependent on the quality of the waste water. Such further use may include channeling the water to drinking troughs for cattle or to fish ponds, or using it for irrigation of nearby gardens.

Where the waste water cannot be used, it should be disposed of

either through nearby sewerage systems or through appropriately designed seepage pits or absorption trenches; this would avoid the occurrence of stagnant waste water, which is a possible breeding ground for mosquitos and an aesthetic nuisance.

*The kiosk system.* The technology for the kiosk system is basically the same as that for other public standposts, the only difference lies in the use of a cabin with locking facilities built in such a way that only the spouts of the taps project outside the cabin. The controls for discharge are located inside the cabin for operation only by the guard.

*The comfort station.* A public standpost can also be constructed as a part of a comfort station (a building which incorporates public toilets, showers and washing rooms). In such cases, the public standpost should preferably be located outside the outer wall of the comfort station. Other features are the same as for the conventional public standpost.

## **PLANNING AND DESIGN**

Planning of public standpost systems should begin with the formulation of planning objectives. These objectives should be in consonance with local constraints and local socio-cultural factors; they should reflect a great concern for economic and financial viability as well as for public health objectives.

Accurate information will be required on the size and growth rate of the population to be served, the boundary of the service area, economic and socio-cultural levels in the community, and legal or budgetary constraints. In addition, engineering judgement must be applied in selection of values for the following design criteria:

- location of standpipes
- per capita flow rates
- standpost and tap discharge capacities
- system reliability
- design period
- provision for compatibility between initial system and future extensions

- material selection
- use of meters

The views of prospective consumers should be taken into account in the selection of the design criteria. Selection should also take into consideration the degree of sensitivity of system cost to specific variables. For instance, it should be noted that while system cost is relatively insensitive to headloss and per capita flow rates, it is highly sensitive to the cost of materials used in constructing the public standpost system and its connection to the distribution main.

The following items are presented to assist in the determination of the order of magnitude of some of the design criteria.

*Location.* When selecting locations for public standposts, the following considerations should be taken into account:

- public standposts may be located in public places where people tend to congregate such as market places, schools, clinics, mosques, durbar grounds, etc.
- they should be located where natural drainage is obtainable and where depressions do not occur
- they should be more readily accessible than the traditional sources of water
- the selection of walking distance should be based on local conditions. A walking distance of 200 metres may not be exceeded
- the number of persons served by one public standpost should be between 100 and 250. In exceptional circumstances the upper limit may be exceeded but in any case the design value should not exceed 500.

*Per capita flow.* A range of 20 to 60 litres per capita per day may be adopted. Local climate, living standards, socio-cultural factors and ability to pay water rates are some of the factors that should be considered in selecting a design value. For guidance annex VI may be consulted.

*Discharge capacity of standposts.* The maximum required discharge from the public standpost  $q_{max}$  (in litres per hour) is determined by the number of people served by that standpost  $n$ , the average

per capita demand  $\underline{C_d}$  (in litres per hour), the peak factor  $\underline{P}$ , and the waste factor  $\underline{W}$ , as shown in the equation:

$$q = n \cdot P \cdot C_d / (1 - W)$$

The normal range of values for these factors may be as follows:

$$\begin{aligned} 100 &\triangleq n \triangleq 500 \\ 20 &\triangleq C_d \triangleq 60 \\ 2 &\triangleq P \triangleq 6 \\ 0 &\triangleq W \triangleq 0.4 \end{aligned}$$

The discharge per tap or the number of taps per standpost may be determined from the following relation when one of these two design variables is known

$$\text{No. of taps} = q \text{ max (discharge per tap} \times \text{efficiency factor)}$$

The efficiency factor may range from 0.7 to 0.9, depending upon the type of tap.

*System reliability.* System reliability is improved through looping and the use of valves. In every situation the trade-off between system reliability and system cost should be made in consultation with the consumers.

*Design period.* The choice of the design period often also indicating the redemption period, may be based on several factors such as population growth rate, budgetary constraints, and policy on introduction of direct house connections. In many situations, a design period of 15 to 20 years will be found satisfactory.

*Phasing and compatibility.* Phasing becomes necessary when future needs differ from initial needs, and when present worth analysis shows that it is more economical to phase out the construction. In such circumstances, care should be taken to ensure that the initial design will be compatible with the future extensions.

*Material selection.* Economy and reliability should be primary considerations in the selection of materials. Materials of

local origin or local manufacture are readily replaced. Low-cost materials also improve financial viability of projects. Hence as far as possible low-cost and locally manufactured elements should be selected for use.

*Metering.* Meters may be installed for the following purposes:

- revenue collection
- reduction of wastage
- data collection for future design

When meters are installed they should be read and maintained regularly. They should also be adequately protected.





## 4. RECOMMENDATIONS

Although public standposts have been used extensively in the developing countries, there are areas where present knowledge is insufficient, and other areas where action is lacking. The participants in the Expert Meeting identified the following subject areas in this regard:

- effect of individual system design parameters on the cost of the system
- trade-offs between public standpost systems and direct house connection systems
- methods for compilation and analysis of local data on cost of various components of public standpost systems
- long-term costs and field performance of different types of standposts and taps
- appropriate revenue collection systems
- appropriate methods for operation, maintenance, and general management of public standpost systems
- training at appropriate intervals of local level caretakers, supervisors, policy makers, and designers of public standpost systems
- exchange of knowledge and experiences among different countries
- preparation at local, national and international levels of guides and manuals for planning, design, construction, operation, and maintenance of public standposts
- development of positive community attitudes towards public standposts

More specifically the following recommendations for action were presented:

1. *Manual for the Design of Public Standposts*; to provide for designs of public standposts

Suggested activities:

- collection and review of existing designs and development of criteria and guidelines

- preparation of a practical manual including design calculations, working drawings and lists of materials
- dissemination of the results
- coordination at regional and international level

2. *Study Revenue Collection Methods*; to evaluate various methods of revenue collection.

Suggested activities:

- identification and study of different methods of revenue collection
- testing of selected methods in pilot areas
- evaluation and dissemination of information obtained
- coordination at national, regional and international level

3. *Workshop for Managers*; to inform and motivate managers and professionals on planning and implementation of public stand-post programmes

Suggested activities:

- organization of regional workshops and seminars for managers
- organization of national and regional workshops for professionals on planning, design, construction, operation and maintenance
- obtaining financial assistance from national governments and regional and international organizations
- coordination at national and regional level

4. *Training of Caretakers*; to provide for training of caretakers for operation and maintenance of public standpost systems

Suggested activities:

- preparation of guidelines and sample operating and maintenance instructions
- development of local instructions or handouts
- provision of on-the-job training
- technical assistance by international consultants
- coordination at national, regional and international level

5. *Training of Supervisors*; to provide for training of supervisors of public standpost systems

Suggested activities:

- demonstration of installations
- execution of case studies and transfer of field experience
- provision of training at national and regional level
- national and international assistance for health education component and instruction methodologies
- coordination at national, regional and international level

6. *Study on Economics of Public Standpost and Direct House Connection Systems*; to make a comparative study on economic viability of public standpost systems, house connection systems and various combinations of the two systems and to assess the relative merits of public standpost and house connection systems as regards to policy decisions, planning and design.

Suggested activities:

- assessment of unit costs of the different systems
- cost/benefit analysis
- evaluation at national level
- exchange of information at international level
- provision of financial assistance from national agencies and international organizations
- coordination at national and international level

7. *Cost/Effectiveness Study of Standpost System Designs*; to identify pertinent factors determining the economic design of public standpost systems.

Suggested activities:

- execution of preliminary desk work
- field testing and evaluation of results
- national and international financial assistance and international technical assistance
- coordination at national and regional level

8. *Functional Materials for Information Transfer*; preparation of functional materials for information to the public

Suggested activities:

- identification of appropriate media for information transfer, such as: newspapers, radio and television; audio-visual teaching aids like slides and films; public addresses, handouts and posters; local traditional methods of mass communication
- preparation of education material for each of the selected media
- exchange of results at international and regional levels
- professional consultancy on programme development and technical assistance on execution of activities - from international organizations
- coordination at national, regional and international level

9. *Field Study of Operation and Maintenance*; to determine the most economic methods for operation and maintenance of public stand-post systems

Suggested activities:

- establishment of pilot studies in various districts of a number of countries
- development of standard procedure for measurement, reporting and evaluation
- exchange of information
- financial and technical assistance from national and international organizations
- coordination at national, regional and international level

10. *Study on Field Performance of Taps*; to obtain information on field performance of various types of taps

Suggested activities:

- identification of taps to be studied
- development of checklist for the collection of information during field studies
- transmission of information to a coordinating centre
- compilation and storage of information
- publication of records at periodic intervals

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- national and international assistance for planning, coordination and financing
  - coordination at national and international level

In addition to the above-listed specific recommendations, a general recommendation was made relating to the international exchange of information at professional level. Exchange of knowledge on various elements of public standpost systems and programmes should cover experiences at district, national, regional and international level. This activity may develop into an international clearinghouse system, including among other things, the exchange of information, the organization of workshops and the development of manuals. Coordination at national, regional and international levels is considered necessary. The same applies to both technical and financial assistance.



## **ANNEXES**





## **AGENDA**

1. Opening of Meeting
2. Introduction of Chairman and General Rapporteur
3. Keynote Address by Major E. Yirimambo, Commissioner for Works and Housing
4. Vote of Thanks by Mr. G.R. Hagan, Chairman
5. Introduction of Participants
6. Country Presentations
7. General Discussion
  - definition of public standpost systems
  - organization and management
  - economics and finance
  - technology
8. Working Group Sessions
  - organization and management
  - economics and finance
  - socio-cultural factors
  - technology
9. Plenary Sessions on Working Group Reports
10. Working Group Sessions
  - adaptation of reports
  - formulation of recommendations
11. Excursion
12. Working Group Sessions
  - review of recommendations
13. Plenary Sessions
  - priority allocation and adoption of recommendations
14. Closing Session



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BOATENG, B.E.

TAMAKLOE, B.E.

## **SECRETARIATE**

WHO INTERNATIONAL REFERENCE CENTRE FOR COMMUNITY WATER SUPPLY,  
THE NETHERLANDS

HAIJKENS, J.

HESSING, E.L.P.



## KEYNOTE ADDRESS BY MAJOR E. YIRIMAMBO, COMMISSIONER FOR WORKS AND HOUSING

Mr. Chairman, Ladies and Gentlemen,

I feel highly honoured to have been invited to address you this morning on this memorable occasion. I am even more pleased that the organizers of this conference, the WHO International Reference Centre for Community Water Supply, chose Ghana as the venue. This is a most welcome gesture as well as an honour to my country, and I stand here, on behalf of the Head of State and Chairman of the Supreme Military Council, to thank you for this and to welcome you all to Ghana. You must feel completely at home, for you are among friends.

It is a truism that water is one of the essentials of life and also the most abundant as well as one of the most useful substances on earth. In fact, it covers more than 70% of the earth's surface and exists as vapour in the earth's atmosphere; consequently, a conference like this, convened to discuss an important aspect of this element should arouse considerable interest.

As you are all aware, man has from time immemorial taken water wherever he could find it and has used it to maintain life and for other advantageous purposes; but, in spite of its abundance as a natural phenomenon, not all people can reach water so easily and a considerable percentage of the world's population still thirst for water.

Unlike people in the developed countries where good drinking water is in almost every home in sufficient quantities, thousands in the developing countries have to walk long distances in search of water, if they can find any - regardless of its quality. This situation has been the cause of the high incidence of water-borne diseases in the developing parts of the world. The Governments of all developing countries are therefore engaged seriously in finding and supplying good drinking water to their people,

sometimes with the assistance of United Nations agencies such as the World Health Organization (WHO) and the United Nations Development Programme (UNDP); through their assistance, water is being brought within reach of many communities through standposts installed at vantage points.

In Ghana, the Water and Sewerage Corporation has been charged with the responsibility for the collection, treatment, transmission and distribution of potable water, as well as the disposal of community sewerage. The Government, recognising the problems of inadequate potable water supply, especially the contribution it makes to the health of the people, has for the past few years, spent annually about 6% of the total capital budget on the provision of potable water.

In spite of the progress made in water supply since 1966, only about 55% of the total population of the country is supplied with potable water to date but the bold steps being taken by the Government of the Supreme Military Council, will see this percentage rise to 75 - 80% by 1980. There is moreover imbalance in the distribution of potable water to the advantage of the urban population. My Government is determined also to correct this imbalance and, as an initial measure towards achieving this purpose, it is envisaged that all the rural areas surrounding an urban supply will be connected. In other words, schemes for the urban areas will always be planned to cover a district. Where areas lie far away from urban areas, an intensified programme of rural water supply will be pursued. Initially, emphasis will be given to communities with populations between 500 and 2,000. The problem of the high per capita cost of production will be met by grouping people into viable communities of 2,000 to be supplied with pipe-borne water and those with population below 2,000 will be supplied with wells equipped with mechanised or hand pumps. Communities which lie near existing pipe lines will, irrespective of their size, be connected. Existing urban water supply schemes will also be expanded to meet the rapid increase in economic activity in these areas. To meet the problem of shortage of trained professional staff, a comprehensive training programme aimed at developing the requisite skills for water supply and



waste disposal will be carried out to ensure less dependence on foreign expertise.

Mr. Chairman, Ladies and Gentlemen, I have thought it necessary to spell out for you, my Government's policy on water supply during the 5-year plan period in order to focus attention on the determined efforts of my Government to make water available through standposts and other means to as large a proportion of our population as possible. The Government of the Supreme Military Council has done a lot for Ghana in this area among others since its assumption of office and will pursue the policies enunciated above with the same revolutionary zeal and dedication.

It is for this reason that we are anxious that this conference should succeed in mapping out areas for the development and utilization of our water resources which will be of benefit to our people. Any suggestions you could make, through detailed and scientific analysis to ensure the most efficient means of water distribution and any other recommendations which will help to improve upon the quality of the service we render to the public in this regard will be highly appreciated. We are anxious to learn from the experience of others and to make available our own experience to our colleagues from other countries.

We are grateful to the World Health Organization and other international agencies for the assistance they have given us so far. The achievements we have made to date have been due to the help of the United Nations agencies already mentioned, in preparing master plans and feasibility studies as well as assisting us to obtain international loans for our water schemes. In addition to all this, the World Health Organization has, for many years, offered fellowships to Ghanaians to study overseas and to specialize in water engineering and environmental health; this scheme has strengthened the staffing position of the Ghana Water and Sewerage Corporation.

At present, the United Nations Development Programme and the World Health Organization are carrying out a project in this country on rural water and environmental health which is aimed at providing water to the rural population both on short-term and long-term

basis. I believe that the United Nations agencies are also carrying out similar programmes in your respective countries and as such you are quite familiar with the invaluable assistance all of us are receiving from these agencies. We are grateful to the United Nations agencies for this.

It is noted in this connection that the main theme of this conference relates to public standposts. Despite the fact that there is an appreciable increase in domestic water supply connection in Ghana, the public standpost continues to play an important role in Ghana's water distribution system. In cities and large towns, each standpost is provided with at least four "waste not" taps to prevent congestion, whereas in small villages, one or two taps to a standpost are considered adequate. Public fountains are generally provided in areas of communities where distribution mains are inadequately provided or where residents cannot afford separate connections to their premises and, therefore, depend on standposts for their daily requirement.

It has been found from experience that great care has always to be taken in selecting sites for standposts and the gradient of the surrounding ground has also to be considered. The nearness of a drain is also a factor to be taken into account in preventing stagnant water forming pools where flies and mosquitos can breed easily. I am making mention of this because sometimes one is not too happy to see the location of standposts in the cities, towns and villages.

There are three main modes of standpost construction in Ghana, namely, the single standpost, the two, three or four-branched standpost and the third type which is constructed on a reinforced concrete wall with a flat top with three or four nipples passing through the wall and a "waste-not" valve provided at the end from which water is drawn. The advantages of a standpost in an area with limited network of water mains may be enumerated as follows: it saves cost of mains extensions, and minimizes metering in private dwelling houses. The disadvantages, however, weigh heavily against the advantages, in that, there occurs much wastage or misuse of water; then, there is the incidence of pollution during collection and cartage. Installation of standpipes also discourages the provision of water service in dwelling

houses and, finally, wilful damage and careless use of the fixtures frequently occur. You may wish at this meeting to consider ways and means of minimizing these disadvantages. The idea of organizing a meeting like this in a developing country like ours underscores the fact that the World Health Organization and the United Nations Development Programme and other world organizations are highly conscious of the needs of the developing nations, with special reference to the provision of water. It is therefore, your duty to make this conference successful by contributing effectively to the discussions and being able to exchange ideas and experiences.

I understand that you will discuss technical reports on the various ways of construction, financing and managing public standposts in developing countries. You will then be given the opportunity to examine common problems and to coordinate your efforts in the operation and maintenance of public standposts. The nature of the programme before you augurs well for the success of this conference.

Mr. Chairman, Ladies and Gentlemen, these are, in a nutshell, some observations about public standposts which you are going to discuss in detail during this meeting. It goes without saying that standposts play, and will continue to play, a major role in supplying water to our people in the developing countries where the need for more such standposts, being erected to make distribution of water adequate cannot be over-emphasized.

It is a matter of interest that costs of erection and maintenance of standposts are encountered in providing good drinking water in a developing country. The irony of it all, however, is that the man in the street does not understand why he should pay for the water he consumes. In the circumstances the provision of water for the people in a developing country has always become the Government's sole burden, with the people themselves contributing very little to it individually. It may, then, not be out of place to suggest, at this juncture, that apart from discussing at this meeting new and simple techniques which can make public standposts more durable and easier to operate, you may find time

to consider how best we can educate our people to pay more readily for the water they consume themselves and thus help to generate sufficient funds for the continuous provision of good drinking water to everybody.

Mr. Chairman, Ladies and Gentlemen, I should like to end by wishing you every success in your deliberations. I also wish you all a happy stay in Ghana.

Thank you.

## VOTE OF THANKS BY MR. G. R. HAGAN, GHANA WATER AND SEWERAGE CORPORATION

Mr. Commissioner, Distinguished Guests, Ladies and Gentlemen. It is a source of considerable pride and encouragement that so many eminent and leading personalities in our community should show such a direct and deep interest in the field of water supply.

I am even much moved by the willingness of our honourable Commissioner, who, at this time would be very busy dealing with other more pressing matters of state, to accept our call to grace this occasion by delivering the keynote address. This shows clearly the keen interest which the Government of the Supreme Military Council of Ghana has in the provision of good drinking water to the rural population.

I think that we all agree that the presence of the Commissioner in this auditorium is a clear indication that our humble work as "water men" is well recognized and appreciated by our national leaders. This alone is a great inspiration to all of us. We therefore thank the Commissioner that in spite of the very grave demands on his time at the present moment he has made it possible to be with us this morning. This Campus, this already well-known and famous Institute is to me a most appropriate venue for a meeting which is going to discuss amongst other things, planning, design, operation, maintenance and administration and the financial aspects of public standpost systems.

This Institute after all trains managers and administrators and the bulk of the country's administrators have once passed through it. It may also be recalled that in July 1968 the Ghana Water and Sewerage Corporation held its first annual conference here and the theme of that conference was "Water for Social and Economic Progress". Now, the Institute has once again offered us another opportunity to use its ample and well-appointed facilities for yet another conference. This time it is an "Expert Meeting on Public Standposts for Developing Countries" which is being

organized by the WHO International Reference Centre for Community Water Supply in association with the Ghana Water and Sewerage Corporation. For this, we are heartily grateful to the Director and his staff.

I would also like to thank the participants and all those who have contributed to the organization of this meeting for spending their time and energy to make this function a success.

The main objectives of this Expert Meeting are to review and discuss a draft report on public standposts which has been prepared under the auspices of the WHO International Reference Centre for Community Water Supply, as well as detailed proposals for the compilation of a construction manual on public standposts. In addition to this, the meeting may also wish to recommend further studies and activities in planning, technology and management aspects of public standpost systems and to advise on suitable mechanisms for the transfer of information and experience collected on this subject to the field.

The organized public water supply in Ghana was started in 1917, by the Public Works Department with commencement at the Weija Waterworks serving Accra. During the years the number of people supplied with safe water has constantly increased. In 1967, the total population of Ghana was estimated at 9,920,245 and at this time 4,206,189 people were provided with pipe-borne water, which represents 42.4% of the total population.

Actually the Government is making very big efforts to provide the population with safe and good water and it is expected that 100% of the urban population and 54% of the rural population will be provided with safe water by about 1982.

Mr. Commissioner, Distinguished Guests, Ladies and Gentlemen, a vote of thanks is not the occasion of delving into technicalities, and therefore I would now like to end here by thanking you all once again, especially the Commissioner for Works and Housing, for sparing your precious time to be with us this morning.

Thank you.

## COUNTRY PRESENTATIONS

1. AFGHANISTAN
2. CAMEROUN
3. GHANA
4. INDIA
5. INDONESIA
6. NIGERIA
7. SUDAN
8. SURINAM
9. TANZANIA
10. TURKEY

## 1. AFGHANISTAN

The report of Afghanistan was presented by Mr. N.M. Sarij. He informed the meeting that there are two separate organizations for respectively urban and rural water supplies in Afghanistan. The responsibility for urban water supplies is with the Ministry of Public Works and the Ministry of Finance. In the rural areas, the planning, implementation and maintenance of water supply systems are undertaken by local rural organizations under the supervision of the Ministry of Health, and with the Ministry of Finance providing funds.

Public standposts have been used in Afghanistan for about half a century. Today there are some 370 public standposts in Kabul, the capital city, and 2100 in the provincial towns and villages. On the whole, 34.5% of the total urban population and 6% of the rural population have reasonable access to safe water supply.

Public standposts are provided either to the poor or to areas with inadequate water supply. Where they are provided for the poor, the installation is permanent. In areas of inadequate water supply, they are treated as temporary measures to be phased out as conditions improve. Water derived from public standposts is free. Current problems include the following.

- misuse of water for gardens
- wastage of water
- difficulty in procuring imported spare parts
- poor facilities for communication and transportation



## 2. CAMEROUN

Mr. J. B. Agborsangaya informed the meeting that there exists in Cameroun a National Water Corporation which has concessions in the urban areas of five out of seven provinces in Cameroun. The responsibility for urban water supply in the remaining two provinces rests directly with the Ministry of Mines and Power which also has ministerial responsibility for all urban water supplies. Rural water supply is however under the Ministry of Agriculture.

In the urban areas, municipalities are responsible for the selection, location and the capital cost of public standposts. The cost of water consumed through such standposts is paid by the municipalities from funds derived from local taxes. Public standposts in the urban areas are metered to provide a basis for billing, for water control and for the compilation of statistical information. The principal types of standposts used have been the Siphoides and the Bedouin. But a new and more satisfactory type of tap is now being installed in all new public standpost systems. As a rule, the walking distance to public standposts is limited to a range of 200 - 500 metres.

In the rural areas, water supply projects are executed as self-help projects under the supervision of the Department of Community Development and the Swiss Association for Technical Assistance. Maintenance cost of rural schemes is sometimes met from voluntary donations and revenue from private connections; otherwise water from rural public standposts is free.

### 3. GHANA

Mr. K. Osei-Poku informed the meeting that there is one national organization responsible for both rural and urban water supplies throughout Ghana. This organization undertakes the planning, design, construction, operation and maintenance of the water supply systems.

The long-term policy of this national organization is to take water to all consumers through direct house connections. However at the moment water is supplied not only through house connections, but also through public standposts and hand pumps installed on shallow wells.

In the urban areas, water is supplied through both house connections and public standposts in economically viable areas. To this end legislation has been requested for compulsory house connections in specified areas.

As a rule, rural communities with populations below 14,000 receive pipe-borne water through public standposts; otherwise they depend on shallow wells equipped with hand pumps.

For communities less than 2000, each public standpost is fitted with two taps. For larger communities they are fitted with four taps. Public standposts are distributed on the basis of one for every 350 - 500 consumers provided that no house is farther than about 200 metres from the nearest public standpost and that the maximum distance between public standposts is about 200 metres. In addition public standposts are located in places like local markets, near the house of the local chief, lorry parks, clinics, and community centres. Users of public standposts pay a nominal rate of \$ 1.00 per household per month in both urban and rural areas. This rate is to be reduced by 50% for rural consumers. The principle constraints are manpower problems, revenue collection and shortage of foreign exchange.

## 4. INDIA

The presentation on India was made by Mr. A.K. Roy. He informed the meeting that water supply activities for the 22 states in India are coordinated by one national organization. Each state exercises the responsibility for the planning, design, and construction of both urban and rural water supplied, leaving the operation and maintenance to the urban and local authorities. Whereas urban supplies are financed through government loans, rural supplies are financed through government grants-in-aid.

The 1975 urban population in India was 134 million. 56% of these were served with water through direct house connections, and 24% obtained their water through public standposts. Based on the belief that financial viability of water undertakings requires the phasing out of public standposts, it is the general policy in India to encourage individual metered house connections in the urban areas. Measures adopted include reduction of house connection costs to the urban poor through reduction in the length of the house connection pipe, waiver of house connection fees, supplying meters on rent, and supplying inexpensive pipes and fittings at concessional rates. It is claimed that by encouraging as much house connections as possible, there would be reduction in water wastage and material squandrage; there would also be unit cost reduction thereby making possible the extension of house connections to the urban poor.

In rural areas only 18%, or 86 million people, had access to safe water supply by the end of 1975. It is estimated that about one third of these (or about 28 million people) were served through public standposts. Here too, house connections are being encouraged as a means of getting the more affluent to subsidize the operation and maintenance costs.

In the urban areas, distribution system designs assume total coverage of the community through house connections. In the rural areas designs are based on total coverage through public

standposts, assuming an average demand of 70 litres per caput per day, for a few house connections.

Public standpost taps are designed to discharge at 10 litres per minute in urban areas and at 5 litres per minute in rural areas. Operating pressures vary according to the size of the community. But in the rural areas, the pressure range is 6 - 7 metres.

In rural areas public standpost water is either free or is heavily subsidized by the government. In urban areas, the cost is met partly from house connection revenue and partly from a general water tax paid by all, whether they have house connections or not.

Finance constitutes the major constraint to water supply development in India.

## 5. INDONESIA

The report on Indonesia was given by Mr. E. Budirahardjo who said that about 20% of Jakarta's total population of 4.5 million is served by public standposts.

A principle consideration in the provision of public standposts is the ability to pay for the water. All public standposts are metered and water is sold to the consumer directly by public standpost holders through a contractual arrangement, or through the thousands of water vendors in the country.

It is estimated that the water consumption rate from public standposts is 15 - 20 litres per caput per day.

Water supply in Indonesia is the responsibility of four Ministries, namely Health, Interior, Finance and the Ministry of Public Works and Electricity. The Government is responsible for the installation and running of urban water supplies. In the rural areas the central government provides grants for installation, leaving operation and maintenance to the local rural organizations. Both in the rural and in the urban areas the cost of operation and maintenance is met from revenue.

Design considerations include the following

- discharge capacity per tap: 0.25 l/sec
- number of people per tap: 250
- maximum distance between public standposts: 100 metres

Major constraints in Indonesia are finance, manpower and inadequate supply of water materials and equipment.

## 6. NIGERIA

Mr. A.O. Olodude who reported on Nigeria focussed attention on Lagos State. The first standposts in Lagos State were installed in 1915 when Lagos City commissioned its first public water supply system. At that time 300 heavy cast-iron standposts were installed. Today most standposts are made of galvanized iron stands and appropriate taps.

In Nigeria, public standposts are seen as a provisional solution to the problem of supplying water to every house in a community. Mr. Olodude gave full details of current designs and specifications for public standposts which now cost about \$ 1350.00 each. As a rule each public standpost has two taps.

In Lagos City, public standposts are not metered; the city council pays the Water Authority a fixed annual rate for water supplied through standposts. Outside the city boundary, Water Selling Stations are built and run by the Water Authority.

In rural areas, public standpost water is free; but with the introduction of recent Local Government Reforms, local authorities will pay for water consumed through standposts and take over from the Water Authority the responsibility for their maintenance.

Problems encountered in the operation and maintenance of public standposts include the following:

- unintended use of public standposts as a venue for washing clothes and cooking utensils
- vandalism
- wastage

## 7. SUDAN

Mr. Siddig told the meeting that in Sudan three government bodies have responsibility for water supply. They are the Public Electricity and Water Corporation, Rural Development Corporation, and the Gezira Irrigation Board.

There are about 70 water supply systems serving the 40% of the total population that lives in urban areas. 80% of these are served through metered house connections; the remaining 20% are served through public standposts. Funds for planning and construction of urban water supplies are provided by the central government. But the cost of extensions, operation and maintenance is from revenue collection only. A flat rate is charged for water drawn from house connections and from public standposts. Revenue from public standposts is collected through water contractors.

Rural water supply is the responsibility mainly of the Rural Development Corporation. As a rule rural communities are supplied only through public standposts; house connections are made, however, if the extra cost can be met from local sources.

The Gezira Board is responsible for water supply to small communities of workers engaged on the Gezira irrigation project.

The rural communities are responsible for operation and maintenance of their water supply systems.

In urban areas, each public standposts has two taps, and there is one public standpost for every 350 people or at 400 metre intervals.

Problems encountered in the operation and maintenance of public water supply systems include the following:

- high foreign exchange component (about 60% of total cost) of system costs
- high percentage of water wastage (40% in some places)
- wilful damage to water meters
- shortage of spare parts and fuel
- lack of trained personnel for operation and maintenance

## 8. SURINAM

Following a brief account of the geography, health, education economy, and government of Surinam, Mr. G.D. Soerdjoesingh reported that the first public water supply system in Surinam was built in 1930. At present there are 30 water supply systems with 9 more under construction.

In the urban areas 76% of the people have house connections while the remaining 24% have easy access to water. By 1981 the percentage with private house connections is expected to rise to 95%. In the rural areas, 17% have private house connections while 37% have easy access to water. It is hoped that by 1981 50% of the rural people will have private house connections while 32% will have easy access to water.

The public standpost system is one of five methods of supplying water in Surinam, the others being private house connections hand pumps installed on shallow wells, and the use of water carriers who use trucks, trains, or boats for conveying water to users.

The most common type of tap used in public standposts is the 12.5 mm ordinary screw tap. The 1972 estimate of water use from public standposts was 30 litres per caput per day.

As a rule, public standposts are installed to serve the poor; consequently no charge is levied for their use. The use of water supply in such systems is borne completely by government. Prior to 1973 the Surinam government paid the Surinam Water Company for the initial installation costs, the cost of water delivered, and the cost of repairs of damage caused by users. After 1973, however, the government decided to pay only for the cost of initial installation and the cost of exceptional repairs. Since then, service has deteriorated and the company has been reluctant to install more public standposts.

The principle problems encountered with public standposts in Surinam are high level of wastage and frequent damage to the standposts.



## 9. TANZANIA

Mr. Rugeiyamu Mustasingwo reported that 30% of Tanzania's total population of 15 million people have access to public water supplies. It is hoped that by 1991 everybody in Tanzania will have access to public water supplies.

There is a single national organization responsible for both urban and rural water supplies. In the urban areas the activities of the national water organization included planning, financing, construction, operation and maintenance. In the rural areas the operation of water supply systems is done by the local people under the supervision of the national organization which also takes direct responsibility for other aspects of the systems.

Design is based on 15 litres per caput per day in rural areas and 45 litres per caput per day in urban areas, allowing for a peak-factor of 3. As a rule, there is one public standpost for every 200 people.

Current constraints include foreign exchange limitations, lack of materials like pipes, stopcocks and taps, and shortage of skilled manpower.

## 10. TURKEY

The presentation on Turkey was made by Mr. T. Engin. He informed the meeting that three different national organizations are responsible for the planning and construction of water supplies in Turkey. As a rule, planning and construction are financed through government loans in the case of urban supplies, or through government grants in the case of rural supplies. Operation and maintenance are the responsibility of municipalities or village councils.

All towns with populations exceeding 3000 have public water supplies. But about 25% of the present demand is met through intermittent supplies. Squatter districts without house connection permits are supplied initially through public standposts; otherwise all public supplies are made through metered house connections.

Rural areas are supplied through public standposts or through house connections. 53% of the 88000 rural settlements are supplied with piped water; 25% have inadequate water supplies, and 22% have no formal water supplies.

For populations below 750, supply is limited to public fountains (the public fountains are public standposts provided with reservoirs designed to store about 25% of the estimated demand), except in places where reservoirs maintenance is likely to be a problem, in which case public standposts are used. For populations between 750 and 2000, house connections are allowed provided the additional cost can be paid by the community; however, where the total water demand or the possible discharge from the source is less than one litre per second, no house connections are considered.

Prior to 1975, each public standpost was designed to serve 250 to 300 people, provided the distance between standposts did not exceed 700 metres. Practice after 1975 allows for one public standpost for 150 people, and location of public standposts at not more than 400 metres apart.

Waste water from public standposts is drained through seepage pits located after stock troughs.

Major problems encountered in Turkey include:

- lack of manpower for supervision
- lack of water quality surveillance and laboratories
- wilful damage and theft of materials
- poor facilities for waste water drainage from old fountains
- ill-defined boundaries of responsibility of the three national organizations concerned with water supplies.



## COMMUNITY WATER SUPPLY DAILY WATER CONSUMPTION IN LITRES PER CAPUT <sup>1</sup>

WHO Region	Urban			
	House Connection		Public Standpost	
	Min <u>2/</u>	Max <u>2/</u>	Min <u>2/</u>	Max <u>2/</u>
Africa	65	290	20	45
Central & South America	160	380	25	50
Eastern Mediterranean	93	245	30	60
Europe <u>3/</u>	65	210	25	40
Southern Asia	75	165	25	50
Western Pacific	85	365	30	95
Average	90	280	25	55

WHO Region	Rural	
	Min <u>2/</u>	Max <u>2/</u>
Africa	15	35
Central & South America	70	190
Eastern Mediterranean	40	85
Europe <u>3/</u>	20	65
Southern Asia	30	70
Western Pacific	30	95
Average	35	90

N.B. Requirements of livestock are not included in these tables.

1. World Health Organization, *World Health Statistics Report*, Geneva, Vol. 26, No. 11 (1973)
2. Averages rounded to nearest 5 litres
3. Algeria, Morocco and Turkey only