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Public Standpost Water Supplies (PSWS) Project

ACHIEVING PAYMENT FOR PIPED WATER SUPPLY SYSTEMS IN RURAL AND LOW-INCOME URBAN AREAS

A Literature Review and Glossary of Terms

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FOR COMMUNITY WATER SUPPLY AND SANITATION

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ABSTRACT

Through reference to the literature, this publication reviews and discusses different aspects of setting up and running a revenue-generating system for piped water supplies in rural and low-income urban areas of developing countries. It discusses five charging systems for the collection of revenues. For each separate option the advantages, disadvantages and other characteristics are given. Comment is also given on the status of revenue collection in the literature. Gaps in knowledge and trends in the literature are pointed out.

The review re-affirms the view that practical revenue collection is significantly influenced by financial, sociocultural, economic, institutional and political factors and that the failure to generate revenue often leads to rapid deterioration of water supplies. To overcome this and to decrease the burden of government contributions more emphasis needs to be put on cost recovery by rather than only from the beneficiaries. More attention to community participation in planning, realization and continuing operation and use of projects might help to overcome some of the obstacles associated with revenue collection.

KEYWORDS:

community based management; community based organization; community contribution; cost recovery; financial management; glossary; house connection; literature review; low-income urban areas; metering; payment; piped water supply; public standpost; rates; revenue collection; rural areas; taxes; water vending; yard-connection.

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PREFACE

Finding ways to secure payment for water supply services to rural and low-income urban populations is currently one of the issues most often under discussion. Whilst most recognize the fundamental need to cover recurrent costs from within the sector and its beneficiaries, there is stil a lack of information on how this can be successfully achieved in practice and under different circumstances. This literature review attemps to assist by drawing together and comparing some if the current alternatives and experience on the subject.

The publication is the second to flow from IRC's ongoing work in the areaof community-based financial management. The first, "What Price Water", was published in 1987 and offers insights to project managers and policy makers on the opportunities to develop and apply a range of other hand is essentially a review of the current level of information on the subject in the literature and is targetted at those in developing countries wishing to do onward reading or further develop or apply the subject area in projects and academic institutions.

The available material has been organized in such a way as to enable an outline appreciation of the literature: new initiatives are indicated, gaps in knowledge are pointed out and the references used are cross-referenced with a subject and country index.

Part I, the Literature Review itself, is developed in six sections: following an introduction there is a background discussion of key issues,followed by reviews of the importance of community participation and the assisting role of government and local administrations. A revue follows of the options available in designing and selecting appropriate methods of revenue generation in conjunction with the users. A full list of references completes this part. Part 2 presents a Glossary of terms, in recognition that much of the difficulty relating to popularising financial management issues stems from a complex and sometimes contradictory set of terms. The Glossary therefore attempts to clarify a number of the commonly-used expressions.

Appendices consisting of Selected Abstracts from the literature, together with a Keyword and Country Index, complete the document.

Finally, some comments on the scope of the publication. The documents consulted by the author were mainly those in IRC's own documentation holding and the work does not therefore attempt to be a comprehensive review of all available literature. IRC would appreciate being advised of related references and new material and experiences (whether published or not) as it becomes available. Secondly the discussion has been limited to community-based revenue generation for water supply, whilst acknowledging the even greater difficulties of revenue generation to support sanitation interventions, an area much in need of future study. Thirdly, both this and the earlier document were initiated within the IRC-supported Public Standpost Water Supplies (PSWS) project, funded by the Netherlands Government. Because of their project links both papers are oriented towards piped supplies. Nevertheless much of the discussion and a large number of the references relate also to other levels of service. We hope therefore that the present document, like its counterpart, will prove to be of wider interest.

Feedback and contributions of experiences are invited to assist the ongoing work and the sharing of information in this area of growing interest and importance to the sector.

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Programme Officer

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PART I

LITERATURE REVIEW ON PAYMENT FOR PIPED WATER SUPPLY

1. INTRODUCTION

1.1 The need for payment

Review of the literature indicates that there has been little success in developing sound revenue collection systems to support the continued operation of safe water supply services in rural and low-income urban areas without losing an unacceptable amount of money (10, 32, 51, 103). And yet despite all the attention during the first years of the International Drinking Water and Sanitation Decade, few countries are able to spend more than about 4 to 6% of their annual public investment funds on water and waste disposal (10) because of other social and economic priorities and limited overall funds. This is generally insufficient to meet the recurrent costs arising from the large amounts of investment in new schemes that has taken place. Thus lack of funds for operation, maintenance, and support services, agrevated by neglect of systems and poor management and administrative structures, is one of the main reasons behind the deterioration of many water supply systems.

One way to make the water supply and sanitation sector more viable would be asking for money from the beneficiaries. But charging people for drinking water is a complex issue. In some cases, no charge is made because of the extreme poverty of the people, like in the slums in India (12). Sometimes no charge is made because governments have always considered water to be a free social service, as was the case in Sri Lanka (87). In other cases the charges often bear no relation to the real costs and are kept low for socio-political reasons. This means that in all these cases water is completely or partly subsidized, placing a heavy burden on the government's scarce resources (1, 12, 30, 37).

Nevertheless the need for safe water and better use of facilities together with new investment is evident (10). Allocation of funds should not only be directed to the financing of construction and rehabilitation of water supplies or to operation and maintenance, but funds should also be made available for hygiene education, training of personnel, project evaluation, and general support activities (100A). Governments of developing countries cannot and should not rely too heavily on outside loans and grants particularly for the ongoing operation and maintenance

costs. Large international funding agencies like the World Bank emphazise the need for more attention to cost recovery from users as a means of financing the recurrent operational and maintenance costs and of contributing to expansion (10, 103). For this, increased awareness of the benefits of a safe water supply by the beneficiaries is essential to stimulate willingness to pay. (58, 100A).

A number of plans, reports and evaluations now stress the importance of a revenue collection system, the main issues being sound tariff systems and generation/collection methods, consumer involvement and the use of appropriate and sustainable levels of technology (5, 6, 36, 82, 105).

1.2 Discussion on the review

To date, water revenue collection has been considered largely from a technical or economic viewpoint. Despite an abundance of literature, real, practical, detailed information is lacking and it is hard to translate the theoretical conclusions into workable guidelines in the field. Discussion on revenue collection concentrates on the advantages and disadvantages of stated options. There is little discussion about new alternative ideas or about which option is best suited to which situation and how this can be assessed at a practical local level. There is a real need for more case studies, experiments and comparative analyses of projects. The accent should be on finding revenue collection systems that are geared to specific local situations. Although such projects are being carried out, readily available documentation is scarce. Such practical information would be invaluable to other workers and help to broaden their insight into setting up an appropriate revenue collection system.

One serious inadequacy of the literature is the limited coverage on community participation in financial affairs. Despite this, it is now recognized that community participation is vital for a workable revenue collection system which is in turn a pre-requisite for any viable water supply programme or project. Furthermore, future papers should not only emphasize the need for active community participation but also give practical advice, guidelines and experiences.

Terminology in this field is not standardized and can lead to misunderstandings. Terms covering various sorts of expenditure in cost analyses are especially confusing to someone with no economic training. Often the word "kiosk" appears to cover a wide range of situations, either a house connection or standposts, metered or unmetered. For these reasons a Glossary of Terms is included in this publication.

Figure 1: A water vendor pays the caretaker of a tap in Burkina Faso (Photo IRC)

The questions of payment default and vandalism are virtually ignored in the literature. Although mentioned as serious problems, any practical advise on combating them is lacking. The role of women in a water supply system, particularly in financial matters is also poorly covered. Their place as beneficiaries and main handlers of water is recognized, but much has to be done to ensure that women get a greater share in responsible decision taking and/or management.

Despite the lack of practical information the importance of revenue collection is now clearly recognized. It is hoped that the published results of an increasing number of projects in future will give a better insight into the problems and produce practical solutions to meet the needs. Workable guidelines can then be evolved for setting up water revenue collection systems for a wide range of different local situations.

2. ASPECTS OF ACHIEVING PAYMENT

2.1 Costs against level of service

In many of the developing countries a new and better water supply is invariably associated with a piped system (37, 87). However, it must be recognized when considering the supply of water to low income communities that a level of service to international standards cannot be immediately achieved. The quantity of water provided and the type of systems installed must be consistent with the national situation in terms of resources available and the ability of the user communities themselves to contribute, particularly to running costs (21).

Figure 2: Metered yard connection in Bangkok, Thailand (Photo IRC)

The initial costs of a piped water supply are high, and regular maintenance is needed, resulting in high recurrent costs. With the huge backlog of water supply services in many developing countries, it is unrealistic to think in terms of 100% private connections, unless private funds cover the marginal costs involved (the additional total costs associated with producing one extra house connection) (21).

If piped water is to be installed the level of service has to be agreed upon: communal standposts, yard connections, house connections or some form of a mixed level of service. It is very important to select an appropriate level of service. The decision depends on many factors, the overriding one being the investment and recurrent costs and the ability to meet these (2, 11, 14, 72). However, when calculating the total costs involved, selection should not only depend on design and construction costs. Social, cultural, economic and environmental considerations can have implications for the level of costs and system viability and influence the choice of a certain level of service (43, 63). For example house connections might be too expensive for certain groups, either because the initial lump sum needed for obtaining the house connection is too high, or the people are just too poor to pay the subsequent costs of the water itself. The sensitivity of total system cost and the effect of such variables should be evaluated during the early stages of project planning so that rational decisions on design criteria can be taken. In some instances, for example in poorer areas of countries, it might be wise to start at a lower level of service. A supply point within 250 meters of every dwelling would not be an unreasonable design criterion for initiating publicly financed systems, allowing for improved accessibility and upgrading with time (21).

As a guide to what may be best in certain situations, a cost comparison of options available is needed. However, the problem is that there are few model cost comparative studies. Within the literature two interesting examples were ~~however~~ found. Adiga (2) compares the cost of standposts and comparative house connections for rural piped water supply in Thailand and Postma (72) compares the costs of metered yard connections and standposts with or without an attendant in urban Indonesia. Although there is a lack of comparative material, general information about the costs of piped water supplies is readily available, especially in documents related to projects and studies. Usually some distinction is made between different types of cost. Generally costs are divided to distinguish between capital (investment) costs and recurrent costs, using subdivisions such as depreciation, overhead, construction, financial and economic costs (1, 16,). The recovery of these costs will differ from country to country and depending on the level of service and area under consideration (1, 4, 16, 38, 61,).

2.2 Cost recovery

Generally capital costs are initialy borne by the governments or donor agencies, although the initial beneficiaries may provide a substantial part of the labour, land and material. Usually these capital costs are written off leaving only the recurrent costs to be recovered. At present the tendency is to endeavour to recover these operational costs from the consumers. However, it is thought by some that for sound management of water authorities full recovery of both capital and recurrent costs is necessary. In the case of long term and continuing investment, financing systems need to provide sufficient funds for more than coverage of operation and maintenance costs only (63, 104). Although many experts consider that at least a part if not the whole of the depreciation costs should be recovered (88, 89, 99), this can be argued as unjustifiable or indeed not feasible in poorer rural areas (37). Despite these different views it is generally agreed that recovery of some of the costs is desirable (5), not only on economic grounds but also to enhance the appreciation of the system by the beneficiaries. For these reasons it is vital to devise an appropriate tariff and cost recovery mechanism to enable cost recovery to be achieved (11, 61, 69, 87).

2.3 Setting of tariffs

In developing countries water pricing has to take into account large differences between areas and socio-economic sectors, while still providing funds for further expansion. It must also be in line with social objectives such as the avoidance of discrimination. Most governments also want their tariffs to be based on the principles of equality and income redistribution (12, 50). The importance of a well structured tariff system is well documented, but to date most attention has been given to developed countries or larger urban centres of the developing world (38, 57, 84, 94). It is hard to apply the same criteria to the situation at a local level in rural or low-income urban areas. The ideas formulated give an insight into the way a tariff system works but are too complicated. It is vital that the people paying the charges understand for what they are paying.

Furthermore a very detailed and complicated charging system can easily become an administrative problem. A simple system, fit for local situations, seems more appropriate (13, 32, 43, 102). An example of how to develop a tariff system for small towns and rural communities can be found in Uzin (88).

Figure 3: Women at a Kiosk
(Photo IRC)

In all literature concerning tariff setting, one major issue predominates, namely the principle of marginal costs pricing. Within this principle the idea is to move away from simply covering costs and concentrate more on the value that water has for the consumer, in particular the costs of any future increase in demand. The purpose of this system is to give consumers the chance to decide whether or not they wish to spend more of their available income on water. Here the pricing of water is not uniform for everyone, rather a system of increasing and decreasing tariffs is used. Economically it is usual that the price of a commodity decreases when larger quantities are used. However, in areas where safe drinking water is scarce and good sources of fresh water are limited, it is now more usual to adopt an increasing

tariff. This is usually done by a block system: the first block of the tariff is fairly cheap and covers the essential uses such as hygiene, cooking and drinking. Anyone wanting more water for less urgent purposes pays a higher price (12, 28, 98).

2.4 Organizational and institutional aspects

Apart from financial constraints, authorities in developing countries are also often faced with administrative constraints, insufficient and/or underqualified personnel, slow legislative procedures and political factors (40, 55,). Finding proper organizational and administrative procedures is one of the main difficulties for revenue collection. How important a well established management structure is has been shown by comparing two disimilar developing countries. In one the water authorities are well organized and revenue collection is more efficient than in the other, where lines of authority are not clear and duplication of tasks makes revenue collection cumbersome (82, 92).

Amongst others, the World Bank supports the view that for any lasting improvement in financial performance of the water supply sector, strengthening of institutions at all levels is necessary. The Bank also studied the sound administration of tariffs and effective management and operation, in cases such as Botswana, Tunisia and Singapore. Not only is poor management a burden on financial functioning, but can also have serious effects on the quality of the service provided and hence affect the health of many people. Bad management, leading to a poorly functioning system with no real health or other benefits for the consumers, will lead to an unwillingness to pay, further depleting the revenue available. This quickly becomes a vicious circle of reduced revenue leading to yet more shortages and poor maintenance (10, 103). This is seen as a manifestation of what is known as "the recurrent cost problem" (1), described in Abdalla (1) as: "the inadequacy of budgeted funds to meet the standard of operation and maintenance of government services". Institutional weakness at all levels is seen as the result of the lack of sufficient funds to meet the intended standard of operation and maintenance. Inefficient operation of institutions is not merely a question of lack of technical and management skills, but also a reflection of political influence and of power and competence struggles

within and between institutions. To overcome some of these problems new or improved institutional structures have been proposed, especially for rural areas (10, 64, 92).

2.5 Decentralization

The solution to these problems which is most cited in the literature is to develop a decentralized organizational structure dividing responsibility over several clearly separated levels of authority. However this will not solve all the problems and also creates new ones. More manpower is needed so more salaries will have to be paid, and safeguards have to be built in against misuse of power. Clear lines of communication and cash flow have to be designed to minimize the chances of overlap in tasks and possible fraud and abuse of funds (48, 73). In general decentralization is seen as the most obvious way to tackle institutional inefficiency, providing that it contains two elements, strong community participation and extensive back up services.

The establishment of an administrative body (including provision for beneficiary participation), which works through local institutions and organizations and can take broad responsibilities on financial and other matters has several advantages: short chains of command, a more personal management, and better opportunities for operational control and management of the budget. Furthermore it leads to a greater feeling of responsibility and improves the involvement of the beneficiaries in financial matters. It also facilitates generation of labour, material and other local resources needed (14, 25, 35,). To make community participation work at a local level, good communication between beneficiaries and the field officers of government organizations is vital. It is also necessary that there are opportunities for training, technical assistance and other back up facilities. Until now this has been hard to realize and there still exists a great shortage of well trained staff and supervisors, especially at the lower levels of organizations. However, it is believed that when an authority is decentralised and beneficiaries are directly involved and made responsible for the water supply, the chances of establishing a satisfactory revenue collection system are greatly improved. Ultimately

the overall functioning of a water supply is felt to benefit from beneficiaries participation (3, 40, 70, 106).

2.6 Motivation for payment

Whatever the overall policies and detailed methods, it is vital that the water sector takes care of its own funding and financing. To do this a greater part of the costs will have to be carried by the consumers and subsidies and grants must be limited as far as possible. Water sector policy development should therefore stress the need for cost recovery from the consumers (10, 18, 40, 66).

To be successful, consumer acceptance of payment is needed since neither a free supply of water nor perpetual subsidies are desirable options. Apart from technical aspects of revenue collection, one problem is however that in many cases, especially in rural areas, there exists a long standing tradition that water is free. Payment for water is something new. As a result people are not always willing to pay for new water supply services and sometimes the need for the new supply is not fully appreciated (11, 12, 14, 37,).

On the other hand water vendors are often a common sight in the developing countries, indicating payment potential. The challenge now for many authorities is to find ways to regulate such payments so that it will be beneficial to the whole water supply sector. This means that the money spent on water by consumers must be regained and channelled back into the water sector. It is obvious from the literature that to make revenue collection successful, and less costly approaches are needed which stimulate beneficiaries to change their attitudes towards payment for water by giving them a direct stake in the supply system, and increases their awareness of the value of safe water (14A, 17, 23, 35, 49, 58, 69, 100A).

Firstly, financial and other contributions such as labour, material and provision of land by the ultimate consumers is seen as valuable and necessary for any successful water supply system. Beneficiaries should also contribute to at least an appropriate proportion of the day-to-day

cost of water corresponding to the purchasing power of their social group. More importantly, however, is that next to these two kinds of contribution, communities should be given financial responsibility over their water supply system. The beneficiaries themselves should, with guidance, decide on issues of operation and maintenance and how payment for water should be arranged (100A).

When subsidies are inevitable, for example in some slums and marginal areas, the decision should not be based on the ability to pay, but rather the future intention to pay should be given the highest priority. Concentrating on willingness or intention to pay becomes all the more appropriate when one considers the fact that some people are already paying more for their water (for example to vendors) than they would if it was distributed through a piped supply system (60, 83, 96, 107).

3. COMMUNITY PARTICIPATION IN ACHIEVING PAYMENT

3.1 Introduction

Experience in a large number of countries has proved that direct involvement of members of a community is essential for a successful water supply project, providing that the consumers contribution is not limited only to the offering of free labour, land or construction material. The aim should be that the communities take as much responsibility for the supply system as possible, particularly in sustaining it over its working life.

To make this possible, communities as a whole should be informed of, consulted on and participate in financial matters (14, 15, 34, 48). If communities are supported to set their own tariffs, elect their own local water authorities and make joint decisions on the best system of revenue collection, they will become more willing to pay for operation and maintenance needs. This lessens the likelihood of deterioration of the systems. In a well formulated and supported water supply scheme, people should not become disinterested, dissatisfied or get a feeling that the system does not meet their needs.

Apart from financial aspects, considerations about taste, colour or water source can influence people's attitudes towards the use of and value of a water supply. Also certain socio-cultural conditions such as class, ethnicity and authority can play an important role. Lack of knowledge of these issues can cause confusion and might lead to misunderstanding between the beneficiaries and the implementing agencies. This can result in people not using the systems or not paying for them, either because they cannot afford to or because they don't see the need to (14). Quite often this unwillingness to pay can be related to the fact that people are not aware of the benefits of a safe piped water supply, especially for their health. By working with the people from the very start of a water project people can become better informed, and derive their own appreciation of the potential health, time saving and convenience value of the new scheme. Furthermore, through early discussion project staff can assemble data on the local

financial abilities and attitudes towards payment for water. Due to differences that exist between localities it is very hard to charge for water use on a general geographical basis.

Overall, it should be stressed that a cost effective programme is one where service level matches the communities needs and capacities to sustain it (3, 22, 43, 58, 108).

3.2 Ability and willingness to pay

Ability to pay cannot be based only on the level of income within a community. Income might be partly in kind and in poor areas this proportion can be substantial. Income might vary according to season or fluctuate over the years giving rise to the need for some form of saving for the periods of low income. Furthermore, income is never equally distributed over a community, which can harm the principles of equal access to water (11, 59, 71). The ability to pay is restricted by the fact that not too large a share of an income can or should be used for water. From the literature no general guidance is clear. Examples of 2 to 5% or of 5 to 10% of income are given. However, 3 to 5% is generally seen as a fair standard, providing this rate is in balance with the level payed in neighbouring areas (11, 74, 87, 105).

People will spend a surprising amount on water once the need is felt, being readily willing to pay if a critical water problem occurs and a service is regarded as highly necessary. This means that in dry areas people might pay more readily even though they are relatively poor, whereas in higher income areas people might object to payment because the service is not adequate enough or does not match their needs. In these cases the main obstacle for revenue collection is not the ability but the willingness to pay (11, 37, 88, 105). This willingness is hard to assess since it depends on so many different factors. A sound village assessment together with the community involved will not only provide information on what is possible, but also on what is desirable (30).

3.3 Community participation and local organization

Often, as was found in Peru, a long time elapses between the community showing an interest in a water system and progress being made (69). The local community and a planning agency have to assess the possibilities and consequences of a new system for the community and a contract must be drawn up concerning construction, organization and financing. This general pattern is followed in other countries such as Colombia, the Dominican Republic and Malawi (17, 19, 69, 85). The community usually takes responsibility for a large share of the construction work. They supply free labour, and sometimes material and land. Sometimes down payment of a lump sum is asked before the construction is begun or a subscription fee is asked from those willing to participate (37, 69). However, this is not always possible.

Rivett Carnac (73) showed that because of the low degree of social unity of the peri-urban community in the project area, and the insurmountable problems of trying to devise an equitable distribution of benefits between contributors and non-contributors of labour, a system of 'pay for work' was preferred.

Although it is not always easy, mobilising free labour for communal action can nevertheless often be more easily accomplished than finding individuals willing to carry out tasks that are important for the continuing operation of the installed service, but which are not well paid and have low status. It is this aspect of continuity that has to be guaranteed by community participation (23, 43, 69) and the responsibility of these tasks should be given to local organizations. From the literature it is obvious that the importance of local institutions and committees is being increasingly acknowledged. Given the poor communication and road conditions in many areas, the good administration of local community organization is imperative for the adequate operation, maintenance and revenue collection of such systems (73).

For the community to take full responsibility for their water supply, local, water or tap committees are essential, although their ultimate form and function may differ, depending on local circumstances (36).

In Kenya water committee members consist of villagers elected by the community (69), whereas in Colombia, the Administrative Committee responsible for the water system also includes a member of the planning agency (101). In the Sudan, village water committees were established spontaneously because the people felt neglected by the government and wished to progress matters themselves (1). Sometimes water committees are newly established bodies (73), while in other cases tasks are assigned to already existing bodies as was the case for example in Peru or South Korea (69). In finding the right way to organize water committees it can be useful to follow traditional patterns of organization. This was seen in Kenya where the traditional system of Harambee was used as a basis for communal action and organization (70, 108).

The committees may also vary their tasks. In Thailand, Kenya, Malawi and Guatemala, the water committees are responsible for construction works, maintenance, operation, setting of tariffs, collection of funds and accounting and savings, whereas in the Dominican Republic rates are set at a regional level and the committee only collects and controls. (numbers ??)

The way these water committees are organized is seldom described in great detail, although the Tap-Committee approach in peri-urban villages of Malawi has been extensively studied. These lines of responsibility for operation and maintenance are clearly established not only between government agencies and the communities, but also within the communities (17, 18, 19, 45, 95, 104). Seperate layers of responsibility exist, for the village as a whole and for the individual consumers. By dividing the village into direct consumer groups, every group, through its tap committee, takes full responsibility for upkeep, operation and payment for the water. Each household pays its share of the water charge to the tap committee who then pay the water authority. As every group is directly involved in its own water supply service chances of damage, non-payment and theft are limited (17, 19, 48, 104).

Special local organizations responsible for operation and maintenance of the water supply are now becoming common and should be given recognized authority and rights if they are to be effective. Contracts and written legal agreements are necessary if these committees are to act as equals

when dealing with outsiders and institutions (15, 22, 69, 101). When starting a water committee, training facilities and educational opportunities are very important for giving local people the necessary knowledge. Proper guidance from outside might well be essential for the formation of such a committee (14, 17, 95, 100). Attention should be paid to the possibilities of essential roles and positions being filled by women (100).

3.4 Political constraints

As well as the difficulty of introducing the idea of payment for water, revenue collection systems can also be influenced by political aspects at local and national level. Often a weak revenue collection system is the result of political preference. Involving the whole community in matters concerning revenue collection can prevent local leaders and chiefs misusing the funds for their own ends or towards favourites within the community. This is especially true where different kinds of leadership exist within one community. To gain short term political benefits nationally (votes) politicians may promote the construction of water supply systems which are left to deteriorate after their campaigns and the elections are over. No real benefits are gained by the beneficiaries and money is wasted. For such reasons a number of authors recommend that political influences should be minimized as much as possible and rules strictly followed at all levels of administration (12, 37, 55, 62).

3.5 Geographical considerations

Many governments ultimately want all of their people to be supplied with a safe and adequate water system. The degree to which piped supplies can contribute to this goal, together with a number of alternative levels of service, need careful consideration. Geographical and practical as well as financial factors need to be considered.

Supplying a community with a piped water supply becomes very costly when the people who have to be served are living dispersed over a large area as in rural Kenya (24). If the need exists to supply such an area with

metered house connections the high per capita initial costs will be reflected in the rate structure. In such cases choosing a metered house connection is inappropriate unless people realy want it and can afford the high costs involved (1, 24). In such widely dispersed communities it is also very hard to promote community action. A close-knit community living in a relatively small area is more easily stimulated to organize community action such as labour for construction or the establishment of a revenue collection organization as was the case in Korea (69, 86, 108).

The number and type of water sources that are available is of primary importance. This can not only affect the level of service, but also the revenue collection system and the maintenance services. If water is scarce the use of a flat rate as payment might not be the most advisable solution as it tends to encourage waste. The need for good maintenance in areas with scare sources is most pressing since if the systems break down and no other sources are available people will be worse off than before (1). In areas where water is abundantly available more alternatives exist, although even here the correct choices may not be as clear cut as they seem.

For example, in Thailand, after a programme to install public standposts, most of the systems were found to be not functioning or badly operated. Most of the systems were using surface water which needed more treatment and more skills to utilize than groundwater or water from mountain springs. The bad quality of the water due to wrong or insufficient operation and maintenance meant that many systems served by surface water were inoperative. This had serious effects on the revenues collected, the system did not have the intended health impact and was ultimately far more expensive than other options. Consulting the communities before starting the construction could have saved a lot of trouble and money (14).

Another problem often found in areas where other water supply sources are available is that these alternative sources compete with the piped water supply. People tend to keep on using their traditional sources, making the new installation less profitable, even though the old sources may be polluted and form a serious threat to health. For most people

the direct benefit of the new water supply is not clear. A hygiene education and training programme should be incorporated in any project to help people become more aware of the advantages, thus stimulating them to pay for the new water supply service (3, 37, 87).

In other cases, as was found in Thailand, an installation may be only used during the dry season, people prefering rainwater during the rainy season. In such cases a mixed system could be considered or perhaps a special tariff for dry and wet seasons could be applied (3).

4. THE ASSISTING ROLE OF GOVERNMENT AND LOCAL ADMINISTRATION

4.1 Introduction

In attempting to solve the problem of supplying their people with safe drinking water, governments have made financial sacrifices, paying for the construction and administration costs of water supplies, and usually also for operation and maintenance of the systems. Sometimes this financial support was vital as the people were too poor to pay themselves, as was the case in parts of India and Sri Lanka, where a water supply was seen as a social service and therefore supplied free (12, 87). However, except in special cases, this practice of free support and unlimited subsidies cannot be seen as an appropriate direction if the water supply sector is to become more financially independent. Governments and government agencies can, however, play a supporting role in mobilising community payments and guiding government funds in such a way that any financial losses are balanced out and more people eventually gain from the system.

4.2 Role of government and general support

In many countries standposts are constructed by government departments and then handed over to local or municipal authorities, who are expected to operate and maintain them (36). These authorities often have very limited resources. They may find it difficult to train, recruit and retain suitable staff to carry out the necessary operation and maintenance tasks, often leading to poor operation and neglect of the facilities.

Moreover, water agencies or other responsible authorities wishing to mobilize resources from water users, are confronted with general issues like high overhead costs, low payment capacities of population and distorted water price policies (100A).

However, government agencies responsible for national or regional water supply services can play a major role in supporting activities at the local level (59). Among the tasks that higher level authorities

could undertake, where possible in close co-operation with the communities, are planning and needs assessment, establishing a legal framework and offering assistance in design and construction of facilities. Through their different organizations the Governments can also take responsibility for other tasks like awareness campaigns, health and hygiene education programmes and monitoring of the water supply (36).

By training national teams in designing their own projects and implementing them either through their own agencies or through well-qualified and supervised contractors, national staff can gain in experience, skills and self-confidence (36, 40, 100A).

By allocating experienced personnel in project areas, government agencies can assist communities to develop a proper management structure for water supply. Government agencies can support the communities in finding the most appropriate construction, operation and maintenance procedures and administrative regulations. By providing training facilities for operation and maintenance, tariff setting and other administrative and technical tasks, members of the communities will be better prepared for their management tasks (14, 100A).

If communities are better prepared for their managerial tasks deterioration of water supply systems can be slowed down, thus providing better opportunities to use scarce government funds for other necessary activities (36, 100A).

4.3 Government support to community administration and management

Where local organizations take responsibility for the water supply, higher level organizations usually have a role of supervision, conflict mediation and other forms of assistance on the request of the community or user groups (100A).

Representatives of the water authority can for example carry out participatory evaluation with local water committees. Some types of repairs might be beyond the capacity of the community. There may be

administrative and management problems, a need to train new community workers, change the local financing system, or a need for more taps or other adaptions to the water supply. For these and similar issues, the local administration should know if and when it can call in the help of external agencies, and whether there is payment involved. Through periodic field tours agencies can visit the schemes on a fixed route and according to a time schedule. This will facilitate financial planning and control on expenditures by the agencies and gives the community some assured higher-level support (40, 59, 100A).

Another form of regular contact between communities and higher level organizations is through periodic workshops and on-the-job training sessions. During these sessions know-how and knowledge of caretakers and system administrators can be updated (100A).

Of equal importance is the regular evaluation of the performance of the system. Together with the community, water authorities or other responsible authorities can indicate problems, find solutions and discuss possible extention of the system (16, 59, 100A).

The contact between community and higher level organizations should, however, not be concentrated on managerial and technical issues. Proper attention for hygiene education at local level remains necessary. To ensure ongoing hygiene education activities, supporting agencies can train caretakers, water communittee members, school teachers or volunteers from the community to take care of proper hygiene within the community. Continuous attention for hygiene is not only beneficial ~~with~~ for respect to the general health situation within a community, but it also helps to improve awareness of the beneficial aspects of safe water and therefore is a stimulus to willingness to pay for a safe water supply (36, 59, 100A).

4.4 Cross-subsidies

A national water supply agency can remove itself from dependence on general revenue collection by using a system in which the richer sectors subsidize the poorer. The most common form of what is called cross

subsidy is where the revenues raised in the more prosperous urban areas are partly used to subsidize the losses or improvements in the poorer rural areas (43).

However, this is only one form of external cross-subsidy. A form of internal cross-subsidy is already in existence. In several countries the urban rich sectors and commercial enterprises pay higher rates than the urban poor (13, 61, 101). Other countries use external cross-subsidy. A number of different forms of cross-subsidy ~~are in existence~~. In Kenya a form of cross-subsidy between different project schemes is in operation and in Indonesia there exists a system between the participating cities of the Ibu Kota Kecamatan (IKK) project (provincial capital cities) (4).

Cross-subsidy can also take place between different levels of service and in this way create a kind of mixed system. This is found in Indonesia where on a local village level house connections with a higher charging rate made possible the installation and operation of a number of public standposts (4, 11, 41).

As an option for redistribution of income and a better way of dividing costs and benefits over a country the method of cross-subsidy seems reasonable. In the case of internal cross subsidy the possibility of guiding and streamlining the flow of revenues is easier to implement and organize, whereas cross-subsidy between rural and urban areas is more difficult. In a number of countries such as Costa Rica and Malaysia these kinds of operation have been tried but are so far inconclusive.

Cross-subsidy must be properly organized and in some countries such as Brazil and Tunisia this problem has been solved by one organization being made responsible for both urban and rural areas. The same sort of system has been recommended for certain parts of Indonesia (43, 105). ~~However,~~ If cross-subsidy between cities and rural areas is to be successful certain aspects have to be kept in mind (43):

(i) Urban consumers must be prepared to allow the government to impose revenue generating tariffs;

(ii) There must be a guaranteed source of urban generated revenues for subsidizing rural services. These sources should be long lasting and without too much fluctuation;

(iii) The urban poor should not be expected to generate revenue for the rural poor, and a progressive tax structure is therefore needed to ensure that the tax burden is justly spread in urban areas.

There is no general agreement where a cross-subsidy system would be the most effective, and to date these are no particular success stories. Cross subsidies are not always useful. They may have significant impact by way of raising adequate revenue on a water supply account in case of cities, but not for small and medium size town groups. This is primarily because of both less favourable income distribution (fewer prosperous people) and higher average costs of supply in the latter group (9). Furthermore, the extent to which the urban population, (often with a high proportion of poor, migratory rural workers) is willing to pay a higher rate to help other areas, is questionable (61).

The World Bank has experienced failures in cross-subsidy schemes, where, instead of being reinvested in poorer villages, the revenue collected went into the central government budget and was lost to the water supply sector (66).

4.5 Revolving funds

Historically many rural water supply programmes have been financed by national governments or development institutions. Nowadays one way of generating local capital funds is by using a revolving fund. This implies the establishment of a fund on regional or national level to finance local community water and sanitation projects. Initial credit is provided by the government, an external agency or the community. Loans made from the fund for water and sanitation facilities are recovered in time, through repayment by the benefitting communities or families. The recovered loans or the additional accumulated capital go towards financing other facilities (78). The villagers' loan obligations give them a stake in the efficient operation of facilities and helps communities to use credit for their own development. These systems work best where people contribute either directly or indirectly to the fund.

Payment can be in cash or in kind (share of the crop) but have to be on a regular basis. If a community accumulates capital from its repayment this can be used for other development goals within the community itself. In this way revolving funds appear to offer a possibility for low-cost, flexible, longe range financing of community water and sanitation projects, especially in rural areas (43, 53).

Revolving funds have the great advantage that they can significantly lower the threshold at which it is possible for poor populations to be supplied with a house connection. One of the main problems with house connections is the fact that the initial installation costs are relatively high (12). By using a revolving fund a workable alternative to immediate recovery of construction costs can be established, providing the water agency or government supply the initial capital to make a certain number of connections in the first year or two.

The consumers are billed the full costs of the connection in equal monthly installments over one or two years, including an interest charge at normal commercial rates, in addition to their normal bill for consumption. If repayment is working well, this fund becomes self sustaining without burdening the financial resources of the supplying agency or the government (28, 97). In Latin America revolving funds are quite well established, and used to finance many types of investment (74). These funds usually consist of loans from international development organizations at a low rate of interest and they make their profits from the difference between the interest paid and the revenues received (39, 74, 76).

A well known example of a revolving fund is found in the Dominican Republic. This fund was formed by contributions from the government, national and international organizations, the local communities and from income from the operation of the water supply systems of the programme. The intention of the programme was to install house-connections to be charged on a flat rate basis. Of this rate a part was used for financing additional systems, another part for the coverage of operation and maintenance costs and the rest was for the revolving fund (68, 69, 85).

Revolving funds like the one in the Dominican Republic are very large, but financing such systems can be initiated at local level either through development funds or co-operation funds within a community (43). Revolving funds are certainly seen as a useful mechanism, but much depends on how they are used (76, 78).

5 OPTIONS FOR ACHIEVING PAYMENT

5.1 Introduction

Once it is appreciated by the consumers that water cannot be delivered free of charge, the question remains how payment for water will be organized. A decision has to be made, preferably in the planning stage, on the method of collection.

To ensure the implementation of a successful cost recovery mechanism, close co-operation with the communities involved is necessary. Communities should show interest and willingness to co-operate. By stimulating village participation, both through financial contributions and contributions of labour, members of the community will get more involved in the developments of water supply. The final result of such an approach would be that villagers are able to propose and carry out methods to enable the proper operation of the system and the collection of fees.

From the literature it becomes clear that decision-making on the actual collection methodology is most viable when it has been developed in close co-operation with the community.

Few examples can be found of the way an option for achieving payment actually works. In general, collection of revenues is not discussed thoroughly and only some technical details are provided. Options are usually discussed in combination. If a division were to be made, five specific options can be distinguished:

(i) community fund-raising;
(ii) regular charges: flat rates and graded rates;
(iii) the installation of meters
(iv) direct sales of water
(v) taxation

Although the correctness of this division of options can be disputed they will be reviewed here as seperate entities. This is to facilitate

the indication of typical features of the different alternatives. In a seperate chapter of this review special attention will be paid to some typical combinations of options.

The review does not aim at a detailed description of each option. Rather, the options are discussed to highlight how the degree of community involvement and government policies may influence the choice for one option rather than another. Ideally several alternatives would be selected for onward discussion and refinement with the users during the planning stages.

5.2 Village organization and financial management

It has to be recognized that village organization and financial management are important for any development programme. It is through village organization and its financial management that community developments which require community participation can be achieved. Existing organizations or a newly established group can be used to organize the management capacity of the community to participate in all phases of its development (59).

By this, the community makes a more conscious choice between what it would like and what it can afford, how to serve all with the existing means, how to operate and maintain the system for its self-sufficiency.

However the community needs some funds either originating within the community or from outside sources to start and develop financial management skills through practice.

5.3 Community fund-raising

A common option for financial participation is community fund-raising. Here families or households do not pay regular contributions towards the cost of the community water system. Instead money is periodically accumulated in other ways. Funds collected in this way can be used to cover part of the construction costs and/or recurrent costs (100A).

Specific activities directed towards generating funds for the operation and maintenance of water supply systems compared to other general goals are hard to find. However, some communities may partake in activities directed towards making money for water supply service. Such activities can link activities with traditional community work, such as are often found in many developing countries, especially in rural areas. In Tanzania a water project was promoted by the community growing cotton in common fields, the money raised by the sale being used for improving the water supply system. Though there were difficulties generally it was thought a feasible way not only of stimulating people to get interested in safe water, but of starting other communal activities (49).

Communities may start selling water from their community water supplies to areas not served and use the money for covering recurrent costs. The brewing of beer or the watering of either private or communal vegetable gardens are other well documented options (54). In other countries communities engage in activities such as staging shows and plays or loteries (43).

In the IRC Occasional Paper "What Price Water? (100A), a number of options for community fund-raising were recognized: voluntary funds, general community revenue, community revolving funds and productive cooperatives.

In brief these options entail:

Voluntary funds: Incidental fund-raising activities for repair and/or expansion fo the community water supply. Funds are collected at public meetings, bazaars, or festivals or through lotteries or by door-to-door collection.

General community revenue: Here communities jointly own and manage communal enterprises, such as a communal field for cash crops (49), a village shop (34) or a flour mill. The profit made on these enterprises, or community funds generated by other means, are used to pay for community expenditures such as maintenance and repair of a water system.

Community revolving fund: An initial sum of money brought together by donations from outside the community and/or the issue of shares to individual households forms the starting capital of the fund. This initial capital is used to give loans to individual households or groups to improve sanitation, housing or to start small enterprises. Repayment of loans plus interest are used to give new loans to others. In this community income grows until it becomes possible to finance basic services such as safe water (34).

Productive cooperatives: Sometimes an improved water supply is established and run by a group of households rather than a community as a whole. The group can be a production cooperative: Its members contribute regular payments in cash or kind, or buy shares. The resulting fund is used to finance cooperative enterprises or give loans to individual members. Funds also can be used to pay all or part of the construction costs, or to establish a maintenance fund for an externally financed system.

Community fund-raising is particularly suitable in systems with standposts or communal water points. This is because it is difficult in these circumstances for an administrative organization to decide who are the users and who are not (100A).

Although the link with drinking water is not always clear such activities are worth considering where community actions are institutionalized and there are possibilities for marketing a product. This may be particularly true in the future if other options prove unsatisfactory.

Although the idea of promoting community fund-raising activities, especially those based on the economic productive capacity of a community, is interesting and usually desirable, there are however some cautions. Linking water supply with future economic development means that speculations are made for possible improvements which in the end could mean larger losses than if a lower level of service had been offered.

Relying on general community capital, or voluntary contributions means that the availability of funds for the water system depends on the income and profits from other enterprises. These enterprises may fluctuate considerably in their results and also need their own investment.

It is stressed therefore that a system must be within the present economic capacities of a community. Despite the importance of a water supply, water authorities are not seen as proper organizations to stimulate local economic activities (35).

Some of the activities mentioned above are carried out to raise money for a short term goal such as construction, extension or repairs. They are not really appropriate for covering recurrent operation and maintenance costs (43). However the fact that communities are willing to engage in such activities proves that they are aware of the benefits of safe water.

5.4 Regular charges: flat rates and graded rates

The alternative to community funds is that user households pay a regular and fixed contribution for the special purpose of financing the water system. Payments are made to the water agency, the local government or a water users' organization.

The advantages of regular and direct water charges are that they can be more easily related to the actual water use and the operation and maintenance costs of an improved community water supply.

For charging a choice has to be made between general payment of flat water rates and graded rates. Rates made on the basis of metering which will be discussed in the next chapter.

5.4.1 Flat rates

In many countries water charges are still calculated without using meters and often charging a flat rate is the only alternative (61). This generally involves a fixed charge, usually on a quarterly or monthly basis, which is not related to the quantity of water used.

(Source: Bhattacharya, S.K.)

Figure 4: Flat rate.

The greatest advantage of a flat rate is that it is easy to administer and less costly than meter installation (12, 30, 43, 102). It is a simple method well adapted for use with public standposts in rural areas and in low income urban areas supplied with communal water points (25, 29, 47, 102). Flat rates are easily calculated, and the collection of money is straightforward.

However, although widely used there are serious limitations and constraints involved with the use of flat rates. The main disadvantage of a flat rate is that it encourages wasteful use of water. Once a fixed rate is paid the consumer has no financial pressure to reduce consumption. This may have certain benefits from a health point of view but is an open invitation to the wasteful or secondary commercial use of water. There is in fact a psychological incentive to consume water which is a big disadvantage where good water sources are scarce (12, 30, 34). Before implementing a flat rate structure, water authorities must be

sure that abundant water is available and that measures are taken to curb wasteful use. Without such control waste and improper water use leads to an uneconomical situation and often the need for some form of subsidy (30, 34).

A way to overcome this problem might be the use of some kind of flow limiting device. The installation of flow limiting devices however has some drawbacks itself. It will mean that extra capital cost have to be made and, as has been the case in Indonesia, the installation of limited flow connections might raise considerable resistance and will encourage people to find ways to bypass the flow restrictors (21, 40, 107).

Flat rates are also seen as unfair, since without stratification in use, large volume consumers and those with the opportunity of secondary productive users, pay the same price as small volume consumers (100A). In fact flat rates often press more heavily on low-income households than on the better-off, even though the latter often use relatively more water (102).

In Kenya it was found that house connections that were charged on a flat rate base used much more water than metered connections. It became the normal practice that people charged on a flat rate base resold their water, often with high profits, to their neighbours who had no house connections and who were not able to get safe water somewhere else in the neighbourhood. This not only undermined the revenue collection from, for example, official kiosks, but also undermined the principle of equity and hampered the total financial functioning of water schemes and projects. For these reasons it was thought that the use of flat rates should be discouraged as much as possible (37, 40).

5.4.2 Graded rates

As a first step to a fairer rate system some categories of households might be distinguished. In this case user households are classified into two or three rate categories. These categories can be based on estimated differences in water use, number of household members, and income (e.g. high, medium, low).

In Malawi a graded rate system was proposed in the following way (17):

(i) equal payment for each family or household;
(ii) payment based on the number of people within each family;
(iii) payment based on the family's intended consumption level.

The setting of the rate can be based on different criteria, most importantly the level of service supplied. With a house connection the rate is often based on the value of property. For standposts the rate is usually set by the water authority either alone or in cooperation with the communities involved (25). Other ways of calculating the level of rates can be found for example in Kenya where groups of consumers are supplied rather than individuals. The water is sold by the water authority to a group of users who then have to decide how the water will be divided amongst themselves. The group as a whole is responsible for the payment to the water authority (40, 104). In Malawi this same kind of system is used, only here water is delivered through a metered supply (17, 18, 19, 37). Again the group, or the community as a whole, is responsible for payment to the water authority. In urban areas in Kenya and India, use of a standpost may be included in the house rent (40, 47, 56).

The advantage of graded user rates is that they take a rough account of volume used and payment capacity, without having to go to the expense of installing and reading water meters.

Especially in areas with considerable differences in income and in water use related to these income levels, water authorities could try to develop graded rather than flat rates (101).

The introduction of graded rates is easiest when clear and valid indicators of water use and income levels can be found. This will depend on local circumstances. A good way to work out graded rates is through assessment and dialogue in individual communities (100A).

A system of graded rates also makes it possible to charge for productive use of domestic water by individual households. Especially where benefits are substantial , there are strong reasons to charge a higher water rate from such households (100A).

5.5 Installation of meters

Metering enables payment to be made for the amount of water actually used (44). Traditionally resistance against metering is based on three arguments: the belief that water is a unique commodity for which no payment can be asked; that the payment for water on a quantity basis deters people from using the supply; that the financial costs of installing and reading meters are too high (57). However, when properly operated and in appropriate circumstances, using meters for the charging of water use could be the most direct and fair way of revenue collection.

5.5.1 Advantages of meters

The greatest advantage of using meters is the direct association between payment and water use. In this sense it provides a fair and simple means of payment. The community pays for the service it receives and consumers pay in direct proportion to their consumption. However, in developing countries, there is criticism of this system on the grounds that the lower income earners have to pay a greater proportion of their incomes in order to enjoy the benefits of a piped water supply (38, 46, 82). The second advantage of metering is that it limits waste and misuse of water, and allows monitoring for leakage and loss in the distribution mains (46, 77, 79, 84). This is especially important in those areas where water sources are scarce or in dry periods of the year. A third advantage is that variations in charging systems can be applied.

5.5.2 Disadvantages of metering

The main disadvantage of meters is that they are costly. They are expensive to produce and install and need regular reading and maintenance. In cases where low income users are provided with a tap service, the installation of a meter may reduce waste but often proves to be uneconomical since the price of a meter itself may be more than the total yearly revenue received (46). An alternative may be to provide

an unrestricted supply with a flow limiting device (84), which however has negative consequences itself (see 5.4.3). Moreover, meters are vulnerable to damage, vandalism, fraudulent interference and need continuous maintenance.

5.5.3 Metered rates

Although pricing policies and techniques vary among countries as well as within each country, basically four types of water pricing techniques can be distinguished for metered supplies. Each is appropriate for different conditions and influences water use and conservation differently:

(i) Uniform rate charge: here everyone pays the same price per unit of water. The cost to the consumer increases in direct proportion to the amount of water used. This means there is an incentive to be careful with water amongst both high volume and low volume users.

(Source: Battacharya, S.K.)

Figure 5: uniform rate charge

(ii) Declining Block Rate Schedule: here the price of a unit of water decreases in a stepwise manner (in blocks) with increase in the volume used. Low volume beneficiaries pay a higher price per unit of water than the high volume users which would act in contradiction to policies both of water conservation (12) and encouraging the use of at least a minimum quality for good hygiene.

(Source: Bhattacharta, S.K.)

Figure 6: Declining block rate schedule

(iii) Increasing Block Rate Schedule: here the price of water increases in blocks with increasing use of water. The cost to the consumer increases at an increasing rate of consumption. This method of charging encourages conservation and provides lower unit rates to low income groups whose use is generally low (93, 94, 98, 99).

(Source: Bhattacharya, S.K.)

Figure 7: Increasing Block Rate schedule

(iv) Seasonal Rate Schedule: in this system the price in dry periods is higher than in other periods of the year. In this way authorities try to reduce the demand during dry periods (12).

5.5.4 Reading, billing and payment

When water meters are used a system must be designed for reading them and collection of the money. Efficient maintenance and a system of billing must be introduced since the installation of meters that are not regularly serviced and read is a waste of effort and money. Bills must be accurate and regular which is often impossible in some situations (44, 77, 99).

Reading must be organized on a regular basis, taking place every one or two months, preferably at the same time in the month. This not only reduces the costs of reading and billing, but it also means that the monthly bills are more uniform in amount, often very important to the consumers. Meter readers must be responsible people but checks for honesty can be carried out using a rotating schedule of control routes (8, 40, 80). Accuracy and fairness of the bills is vital for compliance in paying. Once the meters are read and the amounts due calculated the money has to be collected and sent to the water authorities at regional or central level.

People may have to pay their bill at the office of the water authorities, as seen in Malaysia, whereas in the Dominican Republic the money is collected by the caretaker or a promoter working for the responsible organization (79).

Payment of money due from metered supplies still has a lot of deficiencies. For example in a paper prepared for a meeting of the Development Assistance Committee of the Organization for Economic Co-operation and Development (OECD/DAC) in 1985, the World Bank indicated that the performance level is very low in schemes supported by the Bank (104).

Figure 8: Cash collection office in Ghana (Photo IRC)

5.5.5 Use of meters

The use of water meters seems to be most effective in urban areas. In larger cities, where house connections are the general rule and the costs of metering is a small fraction of the total cost, metering has become generally accepted as a method for basing charges (63), although some countries have been slow to follow this principle. Aid donors and investors, especially the World Bank, now insist on the metering of all supplies for new urban projects they finance. Similarly, agreement exists on the idea that all industrial and commercial water users should be metered (97, 79).

Evidence is available that meters can be used for the benefit of both consumer and supplier providing a suitable level of service is found. This was seen in a study of the provision of six cities in Indonesia with a metered piped water supply using yard connections. Cost analysis between metered yard connections and a standpost with or without a watchman showed that the yard connection was an attractive solution for both the consumers and the water undertaking. The percentage of water unpaid for was not significantly higher for the low income groups using these connections than for other income groups (72).

In Egypt 70% of the meters installed are damaged which makes revenue collection very difficult (106). In Indonesia financial constraints and institutional weakness led to problems in the past, since the body responsible for the water system carried out no maintenance or replacement of old meters. Furthermore, worn out meters were not depreciated accordingly and were still considered in service until being replaced with new ones. For the sake of water billing, meter readings were done by estimating the consumption of the previous month (32).

The unrealiability of meters when not properly maintained can lead not only to serious revenue loss but also to suspicion amongst consumers concerning the accuracy of bills. This often leads to refusal to pay (46).

Apart from these disadvantages meters may not be advisable for every kind of supply. They may be technically impossible because of, for example, low pressure within the pipelines. There may be problems of misregistration (metering air instead of water). Poor quality of water, particulary water carrying sediment, might also cause problems resulting in malfunctioning (32, 40, 79).

Metering requires a high degree of organization for reading meters, collecting revenues and organizing the billing, often far beyond the manpower capacity of water authorities in developing countries. (43, 51).

The change-over to a fully metered supply is often very difficult. It is hard to induce the strict discipline for regular readings, the preparation of monthly or quarterly bills, the insistence on payment and a firm policy of cutting off supplies to those who are behind in payment (12). The advisability of meters can be questioned if one recognizes that the costs of buying, reading, maintaining and administering them are high in relation to the product delivered (21). Buying the meter is often more than half of the total costs of making a house connection (29). Extra trained personnel are needed, which increases the already high costs. The need for intensive maintenance and trained personnel makes the use of meters less feasible in rural areas where the principal

piped water supply system consists of public standposts. Due to excessive use, the rate of damage and deterioration of meters installed at public taps is higher than in the case of house connections (32).

5.6 Direct sales of water: vending

Water vending, that is the sale and distribution of water, has many forms. The water may be obtained from private or municipal taps, standposts, rivers or wells and sold either from a public vending station or from door to door (97, 109). In developing countries many people are served by water vendors who deliver water, often contaminated by handling, at a price higher than people in similar situations pay for a full piped service (60, 83, 96, 107). The elimination of the need for a vendor is only possible if competitive sources are provided through more closely spaced standposts or house connections, (97) a situation not met in most countries. It is possible that when properly organized, vending can become an economic interim solution for these areas awaiting piped water supplies (50, 63, 109). Such a institutionalized, planned and regulated vending system would also solve some of the problems of revenue collection, but no such system is yet reported operating due mainly to managerial and organizational inefficiences (40).

There are several ways of collecting revenue from the selling of water through public water points either served by a standpost or a house connection. In general, water selling is organized by the establishment of public outlets known as kiosks. The most common type of kiosk is the official water point where water can be obtained against payment for each container of water collected. Kiosks can be operated by:

(i) An official agency, (Kenya and Bourkina Faso) (40, 47, 52, 83);
(ii) The community itself, through for instance a tap-committee (Sudan and Malawi) (1, 17, 118, 48);
(iii) A concessionary, or licensed retailer (Indonesia) (33);
(iv) Private organizations such as a housing society (Kenya) (37).

Other methods of water vending can be distinguished apart from kiosks. In Indonesia for example approved customers connected to the water system pay a special, higher metered rate and are permitted to re-sell water. Their customers are nearby residents and owners of mobile tanks and carts who pay for the water and re-sell it to those living some distance from the piped system. The cost per cubic metre is relatively high to the ultimate user but was found to be acceptable as long as the revenue is collected properly (3). Another option is the selling of water through coin operated vending machines. These are now being tested in Thailand but are in an early stage of development. The intended advantages of this system over a kiosk is that no vendor is needed, but they are expensive and difficult to maintain especially in the case of remote villages. Furthermore vandalism and damage to the coinboxes is a serious problem and may eventually lead to the need for some sort of supervision, defeating their main advantage (26).

Figure 9: Water carrier in Mexico (Photo IRC).

5.6.1 Advantages of vending

The greatest advantage of a well organized vending system is that it generates a small amount of revenue, whilst limiting water wastage and vandalism.

By permitting individual people to sell water at a slightly higher rate from house connections or from public standposts it makes a water supply system a more economical option for water authorities, especially where public standposts are vulnerable to damage. Usually selling water from kiosks is done "by the bucket", giving a direct connection between the price and the amount of water. This means that people become more aware of the value of the commodity, which encourages proper use.

5.6.2 Disadvantages of vending

The kiosk system has many disadvantages. Use is irregular depending on available cash as well as need, and therefore the income revenue is hard to estimate. This often deters people from becoming vendors and often kiosks may be forced to close because of the inability of the vendor to make a living (17, 19, 33, 92) . If a government official is employed to operate the kiosk, his salary and maintenance costs form an extra burden for the authority particularly when, as in many large cities, standposts are numerous (21).

The success of a kiosk often depends on its location, those in poor areas where no alternatives are available being generally more used. They are thus functioning as a tax on poverty and can have a detrimental effect on the use of the available water. In Ethiopia the installation of kiosks in a poor rural area actually reduced the consumption of water (37, 92). Kiosk operators need to have their sales revenues collected daily to reduce the danger of loss or theft. This can add considerably to administration costs making the sale price far greater than the actual cost of providing the water (16, 43, 61).

Water vending by whatever means has the disadvantage that the water is often contaminated either in storage, re-distribution or on the journey home. This has obvious detrimental effects on health (14A, 100A).

5.6.3 Use of kiosks

With limitations on permission to operate a kiosk and restrictions on the allowable charges, operating a kiosk is not a very profitable job and often few candidates are available (33). Usually a private individual may sell water at a fixed maximum price (46, 52, 60, 75). In Kenya plans are being studied to make operation of kiosks more profitable (40). It is suggested that to create competition anyone should be allowed to operate a kiosk and these will have no price controls, so that the price of water would be controlled by market forces. (40).

It is difficult to determine the potential of kiosks. The expansion of any kiosk scheme probably depends upon permission to the operators to charge prices higher than those permitted under government regulations. Such an open kiosk system might work by increasing the number of kiosks in operation (33, 40). Another problem is that there is often no coin available small enough to be equivalent to the small amounts of water purchased. This can be solved by introducing a token or coupon system for payment (36, 55, 73).

5.7 Taxation

The use of some form of tax as an indirect way of revenue collection for water use can be found in most parts of the world (20, 35, 60). Although they are more easily implemented in urban areas taxes can also be found in rural areas. The use of taxation does not seem to be related to any particular level of service and in both urban and rural areas taxes may be levied for the use of house connections, group connections or standposts (13, 56).

Water tax is usually applied as an added percentage on a general taxation on property or land, but may also be raised through local income tax, sales tax or a tax on agrarian services (31, 56, 85, 88).

Governments consider that water taxation as a means of revenue collection allows a form of progressive taxation (higher levels of income and higher levels of service attract more tax), which might benefit income redistribution (56). Revenue gains can be used to finance losses that occur in less fortunate areas. One form of progressive tax is to charge a levy on a cash crop that is marketed through a single buying agency such as a cooperative. Alternatively a progressive charge can be made on the value of houses or on some index of a family's income (43).

5.7.1 Advantages of local taxation

Considering the problems revenue collecting agencies already face, general taxation does not seem to be a suitable option. However, if taxation is a part of revenue policy a more locally based form is often more appropriate, especially in those areas where some form of financial contribution for development activities is already asked. The chances for success of such a village or community based taxation system lies in the fact that there is a greater likelihood of compliance, the administrative costs will be lower and most important, it will bring back the relationship between payment and use (43, 99).

Such a form of taxation was tried in Tanzania, a general local development levy being collected by village councils. Part of the levy is delivered to the district government and part is for local uses, of which a certain part is allocated for the water system (35). This example provides some proof that local taxation is possible, if a firm local institution is available, and can be a serious alternative to direct charging. It can be locally controlled and some form of progressive payment can be built in (71).

In Maharastra (India), through the use of a local property tax, the owners of large houses with house connections in fact helped to pay for the piped water from standposts which served the poorer section of the community (13).

5.7.2 Disadvantages of taxation

The main objection against the use of taxation for water revenue collection is that it is generally felt that water should be paid for by the citizen as a consumer rather than as a tax payer (75). Using indirect ways to charge for water largely takes away the connection between payment and use and there has to be a clear understanding that the tax is actually for water use. This reduced connection between use and charge also takes away the incentive to use water carefully and makes it more difficult to involve people in activities for operation and maintenance of water supply. Taxation is also dependent on the administrative performance of revenue collecting agencies. It is a complex option and needs a good organizational structure. Experiences show that where a surcharge on the real property tax is employed the administration of property tax is usually poor. Registers of property are old and do not reflect the real conditions nor do the tax levels reflect market values. In addition to this revenues that are collected for water authorities in this way are often used to cover general authority expenses (71, 93, 104). As with any other system, taxes are difficult to collect, especially in rural areas. In India it was found that locally based taxation for water use was inoperable because of the poor quality of tax collection (81).

The fact that in developing countries it is hard to define strict income categories makes it difficult to design a tax structure that is fair and does not harm those most in need. This was seen in an Indian urban estate where people living in a tenement building were all charged equally although their ability to pay differed considerably (56).

These kind of problems differ according to service level. A progressive tax is more easily implemented for private house connections than than for standposts where the users might be from very different income groups. Due to many of these problems some countries have completely abandoned the use of taxes for water use (35).

5.8 Options in combination

A number of combinations between the distinctive options can be found in the literature. The reason for certain combinations might be influenced by the wishes of the water agency, the wishes of the community and what is possible from the technical and geographical point-of-view.

In an area where water is scarce a flat rate for public standposts might not be the best option from the point-of-view of the water company. If the users however prefer a flat rate, the water company might consider to supply a certain amount of water to the community (in bulk or through a meter) which is distributed to the users. Users then pay a flat or graded rate to, for example, a water committee who then pays the bill to the water company (17). In principle the community or the group itself can decide what each member household has to pay. The group also decides how the money is collected.

Another combination is the use of meters and vending. In some countries water is distributed through metered connections to official community standpost caretakers who in turn re-sell the water at a preset price to members of the community (12, 30).

The system of payment can also be ruled or regulated according to systems of land ownership as is the case in some slums in Calcutta. Here a three-tiered system of land ownership exists: the official land ownership, the hut ownership, and tenancy. The standposts may be allocated within the slum and operated by licensed water vendors. This might be the hut owner or, when this is approved by the other tenants, it can be one of the tenants. The water authority charges the vendor for the entire consumption who in turn will recover the costs from the tenants along with their rents (12).

Most options discussed can be combined with one another e.g. metered house connections can be charged for through taxes, metered standposts can be paid for by voluntary fund-raising, or the community water bill from a metered supply can be paid from a community revolving fund etc.

In fact, most piped water supply systems are paid for through a combination of options for achieving payment. In the literature most of the combinations found are combinations of meters and flat or graded rates or between meters and vending. Also some combinations of taxation and flat rates or metering can be found. Little information is available about other combinations, especially about the possibility to combine metering, rates, vending or taxes with community fund-raising activities.

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PART II

GLOSSARY OF TERMS

1. INTRODUCTION

This glossary of terms was written initially for use in the Public Standpost Water Supplies Project as co-ordinated by IRC. Although it clarifies a number of relevant terms regularly used in publications on community water supply for developing countries, its main focus is therefore on terms and expressions related to aspects of achieving payment for piped water supply systems. It aims to take away some of the confusion of meaning and interpretation of commonly used terms and expressions.

From the work on the Literature Review it became clear that in a substantial number of the reference documents the terminology is not clear: the same terms relate to different matters, or are defined differently. Sometimes abstract or technical terms are used without further specification.

This glossary not only offers definitions but where possible provides information on the meaning and use of the term. In some cases the definitions or descriptions attached to a term are quoted from other publications. In other cases definitions are modified or new definitions have had to be constructed. Where necessary a short clarification in the form of an extra note (NOTE) is added to the definition. This Note is also used to give references to related terms. The glossary is in alphabetical order. The references refer to publications given in the attached alphabetical list of references in Part III/3. Where no reference is given, this indicates that a new definition has been constructed.

2. GLOSSARY OF TERMS

Ability to pay

Economic capacity of a person or community to pay for water supply services. (Uzin, L., 1976, p.37)

Access to water

Geographical, physical and social aspects within a certain setting which influences the opportunity of people to use safe water. (Wijk-Sijbesma, C. van, 1979, p.42)
NOTE: Various types of access can be noted. There is geographical access determined by the area whose inhabitants will use the supply. Secondly there is physical access, or the effort and technical means necessary to get the water. Thirdly, social access, such as problems in the sharing of a village water supply by different racial or caste groups.
NOTE: See also: Equity.

Accounting for services

Justification of management activities and financial administration state-of-affairs of a drinking water supply system by the directly responsible persons. (Wijk-Sijbesma, C. van, 1986, p.3-21)

Administrative costs (of a water supply)

Costs connected with management of a water supply system. (Uzin, L., 1976, p.85)

Benificiaries

Users of facilities

Benefits

Positive effects (of water supply and sanitation) on health and socio-economic status of people.
NOTE: May also refer to development of community or group capacities for organization, administration, problem solving etc.

Bilateral (agreements, negotiations)

Arrangements in which two parties participate. (Sykes, J.B., 1982)

Bilateral organization

National agency for the administration of its country's external support programme.
NOTE: See also: Donor agencies.

Billing and collection system

Methodology applied to the application and receipt of water charges.
NOTE: Generally used for the organization of payment for metered connections by use of water bills.

Block tariffs

Methodology in water pricing in which the total amount of water supplied to a consumer is subdivided into seperate blocks of specified quantities; each block has a different pricing rate.
NOTE: See also: Declining block rate and Rising block rate.

Bulk sale

System in which a water distributor sells a large supply of water at a fixed price to one client who in turn sells this water to others.
NOTE: The client can be one person, e.g. a kiosk holder or concessionaire who sells the water to individual consumers or it might be a village water committee or tap committee who distribute the water among their members against a certain fee.

Capital costs

Capital costs cover all costs associated with construction, rehabilitation, expansion and/or acquisition of a system.

Caretaker

A local person hired, appointed or selected to carry out preventive maintenance and small repair works of a water supply system.

Charge

Price of water services for a given volume or period of access.
NOTE: See also: Tariff.

Coin operated standpost

Standpost that operates after a specific amount of money is inserted into an attached coinbox. Each payment represents a fixed quantity of water.
NOTE: See also: Standpost.

Commercial use (of water)

Non-domestic use, usually by small shopkeepers or other small entrepreneurs. (Uzin, L., 1976, p.11; 67)
NOTE: See also: Productive use.

Committee	A group of persons elected and/or appointed with specified responsibilities, authority and competence within a community. ((Wijk-Sijbesma, C. van, 1986, p.3-2) NOTE: See also: Tap committee and Water committee.
Communal taps	See: Public standposts.
Community contribution	Labour, material, land, money and other resources and services members of a community contribute towards the costs of construction, operation and maintenance of a water supply service. (White, A., 1981, p.55-58)
Community standpost	See: Neighbourhood standpost.
Community taxation	Financial contribution required from member of a community for financing of communal services and development activities. NOTE: See also: Local taxation.
Concessionaire	Someone who has gained the rights to sell water to the public either from a public water point owned or controlled by a government institution, or from an individual connection or privately owned standpost. (Hovichitr, P., 1984, p.9-10) NOTE: See also: Licensed retailer, and Water vendors.
Construction costs	All costs connected with the building of an installation.
Contracts (between agency and community/ cooperative)	Written set of conditions and terms as a final registration of the mutual promises and responsibilities of the parties involved.
Cooperative (of water users)	United group of people working together to finance and maintain a common water supply.

Cost

Resources spent in carrying out activities benefits not realized. (Esch, M. de, 1983, p.20)
NOTE: Also benefits not realized like lost productivity through premature death or disability. See also: Direct cost, Fixed cost, Marginal cost, Operating cost, Overhead costs, Replacement cost, Running costs and Standard cost.

Cost benefit analysis

A way of establishing project viability by comparing the present worth values (i.e. discounted costs) with the present worth values of the benefits expressed in monetary terms. The value of this tool depends on whether all benefit and costs can be adequately measured quantitatively which is often not possible (WHO, 1987).
NOTE: The benefit cost ratio between several alternatives. When strictly applied this analysis requires that both costs and benefits are expressed in monetary terms. Nevertheless most health and social advantages cannot be translated into monetary units.

Cost effectiveness

A quantitative measure of comparing the efficiency of attaining project objectives through one alternative solution in comparison with other alternatives. For example rehabilitation may be more cost effective than the construction of an entirely new system (WHO, 1987).
NOTE: Contrary to cost-benefit analysis, effectiveness is not expressed in money. It can either be given as a health or social objective or as an activity at a given performance level.

Cost-efficiency analysis

Analysis to find the least wasteful way of performing an activity. It looks for alternative ways of increasing the volume of an activity and its outputs at a given cost level. (Esch, M. de, 1983, p.21).

Cost recovery

(1) Repayment to the Government for all or part of the investment, interest, operation, maintenance and other expenses incurred in a given project by the people who benefit from that project. (1: ESCAP, 1981, p.9)
(2) Application and collection of charges equivalent to the costs for the provision

of services (both capital and operational) either directly from the recipients or otherwise (e.g. through subsidies) (WHO, 1987).
NOTE: The primary objective of cost recovery is to ensure the financial viability of projects or institutions, so that adequate funds will be available for efficient operation and maintenance and the expansion of the services to new areas. Another objective is to increase the financial autonomy of water and sanitation agencies.

Cost-saving

Technique aimed at limiting the cost effect of an activity or transaction.

Coupon system

Payment system common for standpost use. Instead of paying the caretaker money, users hand over a special token (paper or plastic cards, wooden coupons, special coins), which represents a certain volume of water. Tokens are submitted by the water authority through official offices or through e.g. shops. (Rivett Carnac, J.L., 1984, p.3.7; Mouiri, M., 1985, p.54; Maack, S.C., 1975, p.107).
NOTE: A coupon system is a good alternative for direct payment where the smallest available piece of money represents a higher value than the price people have to pay for a fixed amount of water collected with a standard-sized bucket, can etc.

Cross-subsidy

(1) Financial arrangement in which revenues from a financially profitable water supply system are used to support other less profitable systems within a community, project or a country.
(2) Financial arrangement in which the larger and financially more capable consumer pay a relatively higher price in order to keep the price to a minimum amount for the whole of the served population.
NOTE: Cross-subsidy can be applied on several scales. It can be used between cities (the relatively well-to-do city supports the poorer city), within cities (rich areas and commercial enterprises support slums and fringe areas), between cities and surrounding rural areas or within one rural community (holders of private connections support use of public standposts).

Declining block rates

A fixed charge for an initial volume of water, followed by progressively smaller unit prices within discrete ranges of quantities consumed. (ESCAP, 1981, p.6)

Defaulting

When consumers do not meet their financial obligations on time.
NOTE: See also: Non-payment.

Depreciation

The loss of value of a system or facility over time as wear and tear occurs, or resulting from sudden physical damage. (Rogers, B.P., 1981, p.97).

Direct cost

Cost which can be identified directly with a particular activity or product. (Esch, M. de, 1983, p.20)

Disconnection

Cutting off of the water supply to a house or a group connection.
NOTE: See also; Sanctions.

Domestic tap

House connection. (Uzin, L., 1976, p.10)
NOTE: See also: House connection.

Domestic use

Household use of water for activities like cooking, washing, bathing and other hygiene practices.

Donor agency

Bilateral or multi-lateral organization providing technical and financial support to development programmes and projects in a country.
NOTE: See also: External support agency.

Effectivity

The extent in which results or benefits of a programme are in line with the goals and objectives set in the initial planning. (Esch, M. de, 1983, p.29)

Efficiency

The competent use of resources. (Esch, M. de, 1983, p.29)
NOTE: A given operation and service achieved with the least expenditure and waste. Similarly, a given quantity of resources used to produce the greatest possible output.

Equity

Equitable distribution of burdens and benefits. (Wijk-Sijbesma, C. van, 1979, p.21-24)
NOTE: See also: Access to water.

External support agency

International organizations, and foreign governmental or non-governmental agencies which provide technical and/or financial support to development programmes and projects in a country.
NOTE: See also: Donor agency.

Financing

Paying for costs involved in a project or programme; Funding.

Fixed cost

Cost which tends to be unaffected by variations in volume of output, but depend mainly on the passing of time, e.g. the cost of providing the facilities and organization. (Esch, M. de, 1983, p.20)

Flat rate

(1) A charge for water or sewer service that is not based on metered quantity. Basis may be size of service pipe, number of water fixtures or outlets, land frontage, or other arbitary measures, usually fixed by law (Rogers, B.P., 1981, p.148).
(2) Charges unrelated to the volume of water used. They might include set installation charges and fixed service charges per billing period (ESCAP, 1981, p.6).

Free service policy

A policy in which costs are fully subsidized and consequently no direct charge is made to the consumer for the service. (Uzin, L., 1976, p.86)
NOTE: Sometimes merely notional and the costs are covered by taxes.

Full cost recovery

Recovery of all capital and recurrent expenditures and depreciation as well as interest.

Graded rate system

Charge system for water whereby actual water consumption is not measured, but consumers are classified into different payment categories according to estimated differences in water use and payment capacity. (Wijk-Sijbesma, C. van, 1987, p.30)
NOTE: Classification through existing data, community decisions and/or survey. See also: Weighted rate system.

Grant

Donation or subsidy from a private or governmental institution.

Group connection

House- or yard connection or standpost servicing a number of households which are all members of a specific group. This group may take care of its own internal division of water use, tariffs and operation and maintenance of the water facility.

Hardware

Components to provide the physical elements or systems, water supply and/or sanitation (WHO, 1987)
NOTE: See also: Software

House connection

A piped water supply to an individual dwelling terminating in a tap or taps for a single house. (IRC, 1986, p.15)
NOTE: See also: Domestic tap.

Household use (of water)

Water used for drinking, domestic and sanitary purposes.
NOTE: See also: Domestic use.

Human resources

Youth, adults, men and women who are paid employees or volunteers, inclusive of skilled and unskilled personnel who are collectively engaged in planning, managing, operating and maintaining the water supply and or sanitation services (WHO, 1987).

Human resources development **(HRD)**

Building up potential human resources by focusing on job requirements as well as institutional and human needs. These may comprise specific training activities, managerial and organizational adjustments and the introduction of incentives,

	including correct enhancements. This HRD process should also embrace planning, and skill development, with all three harmoniously geared to the achievement of specified goals (WHO, 1987).
Hygiene	Cleanly practices which promote health, including hand-washing, bathing, brushing teeth, food handling and maintaining a clean household environment, including the safe disposal of human and animal wastes (WHO, 1987).,
Increasing block rates	System of water pricing where a nominal charge is asked for an initial volume of water, followed by increasing rates for every new block. The minimum quantity is set at basic needs level to favour the poor. (ESCAP, 1981, p.6) NOTE: See also: Rising block rates.
In-house connection	See: House connection
Installment fee	Money to be paid for the installation of a tap or metered connection.
Kiosk	See: Water kiosk.
Level of service	Degree of convenience, volume and accessibility of the water supply and waste water disposal services provided under minimum safety requirements. (IRC, 1986, p.18)
Levy	Tax raised on goods or services, of which the proceeds are used for public purposes (e.g. towards financing of the community water supply). NOTE: See also: Tax and Water Levy.
Licensed retailer	Authorized water vendor. NOTE: See also: Concessionaire and Water vendors.
Local taxation	Tax imposed upon inhabitants of city or village by the local authorities. Revenues collected in this way are commonly used for local purposes. NOTE: See also: Community taxation.

Logistic support — Provision of equipment, material, food, lodging, communications and transport facilities in support of project activities.

Maintenance — Activities related to the running of equipment and the upkeep necessary for efficient functioning.

Maintenance costs — Money and other resources spent on upkeep of installations and equipment necessary for efficient operation and uninterrupted service, not to be confused with replacement or depreciation, (Rogers, B.P., 1981, p.223; Uzin, L., 1976, p.85)

Marginal costs — Amount at any given volume of output by which aggregate costs are changed if the volume of output is increased or decreased by one unit. (Esch, M. de, 1983, p.20)

Meter — See: Water meter.

Meter box — An underground receptacle used for the protection of water meters installed outside of a building, and for facilitating access for a reading. (Rogers, B.P., 1981, p.230)

Meter rate — The charge for water based on the quantity used as measured by water meters. (Rogers, B.P., 1981, p.231)

Meter reading — Process of obtaining information from meters in order to make up payment bills of metered connections.
NOTE: Water meters are not always installed for charging purposes. See also: Metered system.

Meter rent — Money paid by owner of a metered connection to water authority for use of a meter.

Metered system

A system in which meters are used to measure the flow characteristics at all strategic points on main supply lines, pumping stations, reservoir outlets, connections to other subdivisions and at each consumer's service. (Rogers, B.P., 1981, p.230-231)

Metering

Measuring the water consumption by a water meter and normally related to charging for that consumption. (IRC, 1986, p.19)

Mixed level of service

Situation within one community where two or more levels of service are used to serve the population e.g. house connections together with public standposts.
NOTE: See also: Level of service

Monitoring

The measurement, collecting, recording and transmission of relevant data concerning activities, to ensure that they are proceeding according to plan (WHO, 1987).

Multilateral (agreements, etc.)

Arrangements in which three or more parties participate. (Sykes, J.B., 1982)

Neighbourhood standposts

Standposts limited to a more specific user group (WHO, 1987).
NOTE: See: Standpost

Non payment

When persons do not fullfill their financial duties associated with use of a water supply service.
NOTE: See also: Defaulting.

Operating costs

Total of all costs involved with: depreciation, administration, operation and maintenance. (Uzin, L., 1976, p.38)

Overhead costs

Costs of materials or services which are not directly tracable to a specific product but which are necessary for the productive or administrative process, e.g. office rent. (World Bank, 1982)

Payment in kind

Instead of paying with money, users of a water supply system pay with local agricultural products or personal service to support operation and maintenance of a water supply service.

Payment per season

See: Seasonal rate schedule.

Peak-demand pricing

The charging of premium rates to consumers for using water during peak periods, most notably the dry season. (ESCAP, 1981), p.6)

Penalties

See: Sanctions and Disconnection.

Preventive maintenance

A systemized and periodic maintenance procedure applied to the components of a system in order to minimize breakdowns, ensure their efficient working, and prolong their respective lives (WHO, 1987).

Private connection

Connection used by one or a resticted number of households.
NOTE: See also: House connection and Yard connection.

Productive use (of water)

Non-domestic use. Water is used for economic purposes without being directly part of an industrial or commercial activity.
NOTE: Water can be used for example for watering of vegetable gardens or cattle watering. The vegetables may be consumed by the family itself or sold and the same goes for the milk produced by cattle.

Promotional pricing

See: Declining block rates

Public (Official) water use

Water use in public buildings like clinics, hospital, schools i.e. where the water is used for purposes of physical health or the common good. (Uzin, L., 1976), p.78)

Public fountain

A structure for constant public supply of drinking water or aesthetic display.
NOTE: See also: Public standpost.

Public standpost — Standpost of which the use is not restricted in any way to a particular group or community.
NOTE: See: Standpost

Rate — A measurement, expressed as a ratio, i.e. cost per volume, volume per time, or percent.

Recipient (or service) — See: Beneficiairies.

Reconnection costs — Money to be paid by owner of service connection to obtain water after having been disconnected. (Uzin, L., 1976, p.34)
NOTE: See also: Sanction.

Recurrent costs — All costs associated with operating and maintaining a system.

Rehabilitate — To restore a water supply service to adequate working conditions.

Repair — Mending of broken down parts of water supply installation. An element of maintenance as distinguished from replacement. (Rogers, B.P., 1981, p.304)

Replacement — Installation of new or alternate equipment in place of existing equipment for improvement, modification or other reasons e.g. disrepair. (Rogers, B.P., 1981, p.305)

Replacement cost — (1) The lowest amount that would have to be paid to obtain a new asset of equivalent operating or productive capability (World Bank, 1981)
(2) The costs of replacing a machine or other asset at a given point of time, either now or in the future (excluding any element attributable to improvement). (Esch, M. de, 1983, p.20)

Resource mobilization — Making unused resources available or diverting resources from other uses; convincing or motivating people to mobilize resources.
NOTE: See also: Resources.

Resources

Means (assets, persons, goods) that can be drawn upon.

Revenue

Large income from which public expenses are met. (Sykes, J.B., 1982)

Revenue collection

Process of obtaining payment from users of a water supply system for delivered services.

Revenue generating activities

Productive activities undertaken by members of a community to raise money to finance the capital or recurrent costs of a community water supply.
NOTE: In general revenue for a water supply system is best collected on a continuous basis but occasional revenue generating activities are also possible. For example, when members of a community want to build, repair or expand a water supply they can decide to organize a lottery, a door-to-door collection, stage a play, or similar activities to raise the necessary funds.

Revolving fund

(1) A revolving fund is a financial arrangement which allows participating members to utilize a common fund established for the purpose of carrying on specific activities or attaining certain objectives which result in repayment to the fund (Scioville, 1980, p.2)
(2) Resources which are earmarked (set aside) for specific purposes with the provision that repayments into the fund may be used again for the same purposes.
NOTE: See also: Rotary fund

Rising block rates

Rates which includes a nominal charge for a minimum quantity used followed by increasing rates within discrete ranges. (ESCAP, 1981, p.6)
NOTE: See also: Increasing block rates.

Roles of women

The full involvement of women in community participation including in planning, implementation, managing and evaluation of water supply and sanitation.

Rotary fund

Fund set up to cover the operating deficit of unprofitable supply systems. The fund is derived from the surpluses from profitable systems, subscribers' payment of domestic connections, and any other local income. It permits small extentions of the system and new house connections. (Uzin, L., 1976, p.24)
NOTE: See also: Revolving fund and Cross-subsidy.

Running costs

Costs of administration, operation, maintenance and repairs to keep the water supply and sewerage system operating satisfactory. (Uzin, L., 1976, p.37)

Sanctions

Actions taken by the water authorities (or other responsible authorities) against persons who do not pay for water supplies provided by those authorities, or who endangers the service or benefits in any unfair other way.
NOTE: See also: Disconnection and Penalties.

Seasonal rate schedule

Price of water varies according to season.
NOTE: Usualy the price goes up in the dry season to prevent wasteful use.

Self-financing policy

A policy that stresses the goal to cover all costs of a project or the water supply sector only from charges made for the services and some special contributions. (Uzin, L., 1976, p.87)

Selling of water

See: Water vending.

Service charge

The rate charged by the water authority or utility for rendering service. (Rogers, B.P., 1981, p.333)

Service connection

A pipeline, with its components, which branches off or connects a water or sewer main with premises. (Rogers, B.P., 1981, p.333)

Service level

Degree of convenience and accessibility of the water supply and sanitation services provided under minimum requirements for health and well-being (WHO, 1987).

Service meter

A water meter installed on a consumer's service line. (Rogers, B.P., 1981, p.333)
NOTE: See also: Water meter.

Shadow price

The value used for cost of a benefit in a project when the market price is felt to be a poor estimate of the economic value for a final facility (like clean water) or services. The shadow price represents the value in use. (Gittinger, J.P., 1982, p.499)

Social tariff policy

Determination of the tariff on the basis of the ability of the community to pay, with subsequent consideration of what proportion of the annual costs and depreciation can be recovered. (Uzin, L., 1976, p.9)
NOTE: See also: Ability to pay.

Software

(1) All components needed to support installation, proper use, operation and maintenance of equipment (hardware), such as communications, education, information, community organization, skills training and staff development.
(2) All programme or project related support activities or information that are planned to ensure safe operations, minimum interruption of services (through preventive maintenance, public acceptance and support) as well as overall achievement of objectives with due attention to the health benefits.
(3) Activities on health education; community involvement, including the role of women; operation and maintenance, as individual projects/programmes or components of investment projects (WHO, 1987)
NOTE: See also: Hardware.

Standard cost

Predetermined cost that is calculated from management's standards of efficient operation and the relevant foregoing expenditure. (Esch, M. de, 1983, p.20)

Standpipe

Part of or alternative term for Standpost (WHO, 1987)
NOTE: See: Standpost.

Standpost

A tap or taps and supporting structure designed for use by a number of families for domestic water supply, (usually a concrete, masonry, metal or timber post) equipped with a standpipe (vertical pipe) and one or more taps (WHO, 1987)
NOTE: In order to avoid confusion, other expressions such as "(public) standpipe" "(public) fountain" should consistently be replaced by the term standposts.
NOTE: See also: Public standpost, neighbourhood standpost and community standpost.

Subscription

Contribution or fee for the membership of a club or society or to obtain the rights to use communal facilities like a water supply service. (Uzin, L., 1976, p.11)

Subsidies

Grants of money by the government or other organization to projects or organizations to reduce costs for individuals or households.

Surcharge

(1) Additional charge for use of extra service or facilities e.g. surcharge for waste collection or for the installation of an extra tap in the house (Dangerfield, B.J., 1983, p.357)
(2) Extra charge imposed when set quantity or quality limits are exceeded (Rogers, B.P., 1981, p.381).

Tap committee

Representatives of a group of consumers within a community who share the same tap. As representatives the members of this committee are responsible for operation and maintenance of the tap and other activities related to the water supply system.
NOTE: See also: Water committee.

Tariff

Price to be paid by beneficiaries of a water supply service.
NOTE: See also: Charge.

Tariff structure

A structure providing for differential rates, with each rate corresponding to a specific consumer category, which usually corresponds to a well defined consumption block or consumption pattern. (IRC, 1986, p.33)
NOTE: See also: Block tariffs and Graded rates.

Tax

A charge, usually money, imposed by a governmental authority (or other institutions legally authorized) upon persons or property for public purposes. (Gittinger, J.P., 1982, p.501)

Training

A planned formal or informal process by which a person is prepared for carrying out certain functions (WHO, 1987)

Unaccounted for water

The difference between total water volume produced before entering the distribution system and the accounted for volume used by the consumers. This main difference is due to leakages through the distribution system and opened unrefined taps and the undetected amounts of water consumed as a result of faulty meters as well as illegal (illicit) connections (WHO, 1987)

Uniform rates

See: Flat rate.

Urban fringe

Urban settlements areas, usually of squatters but not necessarily peripheral, which receive inadequate or disproportionaly fewer services.
NOTE: "Fringe" is not only a geographical but also a socio-economic concept, as some urban fringe areas are located at or near the city centres. The urban fringe encompasses slums, shanties and squatter areas.

Utilization

Includes both operation and use of facilities. (IRC, 1986, p.34)

Variable costs

Costs which vary in proportion (not necessarily constant) to output or performance. (World Bank, 1982)

Village water committees

See: Water committee.

Volumetric pricing

Charging according to the amount of water actually used. Measured by meters, time period of delivery, size of outlet or proportional shares of water available. (ESCAP, 1981, p.5)

Water carriers

Persons transporting water in tins or drums for selling to private consumers.
NOTE: See also: Water vendors.

Water committee

Members of a community chosen or appointed to represent the water users in all matters relating to planning, management, operation and maintenance of a community water supply.
NOTE: They do not necessarily represent the whole community e.g. in some cases only those who have joined a water users association.
NOTE: See also: Tap committee.

Water kiosks

A public place from which water is legally sold, preferably from a metered piped connection, at rates often set by the water authorities. Kiosks can be government owned or can be hired or leased to private individuals or third parties.

Water Levy

See: Water tax and Water rate.

Water meter

An instrument for measuring quantity of water passing a point in a pipeline.

Water point

See: Standpost and Yard tap

Water rate

The charge for water consumed by consumers per unit of measurement, whether measured by metering, a flat rate or a graded rate. (Rogers, B.P., 1981, p.426)

Water resources management

Monitoring, planning and administration of water resources for various purposes. (Rogers, B.P., 1981, p.424)

Water sellers

See: Water vendors.

Water supply facilities — Works, structures, equipment and processes required to supply and treat water for (domestic, industrial) use. (Rogers, B.P., 1981, p.428)

Water tax — Levy by the government or other entity for the use of water for domestic or commercial activities.

Water use — Classification of utilization of water for such purposes as drinking and other household use, irrigation, productive, commercial or industrial uses.
NOTE: See also: Commercial use, Household use, Industrial use and Productive use.

Water vending — Selling of water by private or public water vendors/sellers.
NOTE: See also: Selling of water.

Water vendors — People who make their living (or partly) by selling water directly to the consumer through a stand on the street, on markets or door to door.
NOTE: See also: Concessionaire and Licensed retailer.

Weighted rate system — See: Graded rate system.

Willingness to pay — Level of consumer motivation to pay for final goods or service.

Yard connections — See: Yard tap.

Yard Tap — A tap or standpost located in a court yard and serving a family living together on one homestead, or a group of family units located around a common courtyard (WHO, 1987)
NOTE: See: Yard connection.

3. LIST OF REFERENCE FOR THE GLOSSARY OF TERMS

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APPENDICES

APPENDIX A: SELECTED ABSTRACTS

APPENDIX B: KEYWORD AND COUNTRY INDEX

APPENDIX A: SELECTED ABSTRACTS

1. University of Peradeniya, and University of Helsinki, Institute of Development Studies (1983) Water and society: Harispattuwa Water Development Programme: sociocultural dimensions of water supply and sanitation: a study made in Sri Lanka (Report 3/83B). Helsinki, Finland, University of Helsinki, Institute of Development Studies.

The Harispattuwa Water Supply and Sanitation Project was initiated to increase the number of house connections, as well as supply a comprehensive network of handpumps and public standposts. To be viable these had to be self financed at least as far as operation and maintenance costs were concerned. The low standard of living in the area, together with socio-economic considerations such as goals of equity, income redistribution and economic stability had to be taken into account when setting the tariff for payment.

Research showed that most people in the area prefered and were willing to pay more for a house connection, as handpumps were considered as part of the free wellfare service. However if the water rate alone had to pay for the house supplies the tariff would be about twice the original level and not in line with that of the surrounding areas. Such a high rate, especially with alternative water supplies available, would certainly lead to a limited use of the improved water supply.

Some form of subsidy of the water rate, especially for the lower income groups, was needed to make the system financially viable. The general rural taxes, the principle source of general revenue in this area was considered as a possible source of extra revenue since a tax increase seemed to have no negative effect on production levels. It was calculated that a realistic revision and systematic collection of the rural taxes would generate enough revenue to subsidize the entire handpump programme as well as supply a partial subsidy for the low income groups in the piped water supply areas. An additional source of revenue, possibly subsidization, was recommended in those circumstances where a water rate alone was insufficient to cover the entire operation and maintenance costs.

Keywords: Sri Lanka; subsidies; house connections; taxes; policy; community contribution; willingness to pay; ability to pay; public standposts.

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2. United Nations Children Programme (1975) Dominican Republic: history of the Rural Water Supply and Sanitation Programme. New York, NY, USA, UNICEF.

The Plan Nacional de Acuaductos Rurales (PLANAR), launched by the Institute Nacional de Aguas Potables y Alcantarillados (INAPA) was directed to promote and install house connections. The project was financed by a revolving fund in which donor organizations and the government participated. For a viable fund, the water rate had to cover not only operation and maintenance but also produce an additional sum of money of which 60% was used to pay for administrative expenses, and the remaining 40% added to the revolving fund to finance the costs of non-routine repairs, extension and new construction.

A decentralized organization structure and community participation were considered to be essential for the best project results. Operations were directed by a Regional Zone Office which kept close contact with Local Administrative Committees through local promoters and Commercial Agents. To obtain house connections the communities had to file a request at INAPA and if INAPA approved, the elected Local Administrative Committee signed a contract with INAPA for a loan. The programme was thus a co-operative venture between the community and INAPA.

To recover the loan and recurrent costs, a flat monthly rate was charged for a standard house connection with differences according to the socio-economic status of the area. Meters were only used for exceptional demand. The community contributed to the construction of the supply which when finished became the responsibility of the Administrative Committee. The Committee was assisted by special commercial agents, who helped in financial and administrative matters, checked accounts, and transfered these to the zone office. To limit chances of theft, transfer was done by post. The agent was responsible for a limited area so could visit regularly and report all findings to the zone office.

The low percentage of defaulters with this system of payment shows that local based management and strict control have a favourable effect on revenue collection.

Keywords: Dominican Republic; organizational aspects; revolving funds; local organizations; community participation; flat rates; development co-operation.

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3. VIAK (1977) Evaluation of the rural water supply programme I, II, III: volume II: main report. Nairobi, Republic of Kenya, VIAK.

Evaluation of the piped water supply sector in rural Kenya showed not only a general willingness to pay, but also the financial ability to cover operation and maintenance costs of a reliable water supply. With an efficient administration, the government policy of charging a gradually increasing rate depending on the availability of supply should have realized enough revenue to cover ongoing costs. However there was organizational, financial and managerial inefficiency with overlap of responsibilities between four ministries and a number of independent organizations. Political considerations were also important. This made effective collection of revenue difficult and caused delays, frustrations and loss of revenue.

This situation is best illustrated with the "Gazettement" procedure. As soon as the hydrological survey is completed and approved an announcement is made twice in the national press: the project is "Gazetted". After a statutory period and approval by the Government, revenues can be collected. In principle the gazettement procedure starts well before the water scheme is completed, however the whole procedure is lengthy so that an enormous amount of revenue is lost.

Since the schemes are often already operating and delivering water free of charge to begin charging later is difficult.

Keywords: Kenya; institutional aspects; organizational aspects; evaluation; constraints, legislative aspects; policy; public standposts; kiosks; house connection; programme; rural areas.

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4. Rivett-Carnac, J.L. (1984) Community water supplies for peri-urban areas (in the context of Natal/KwaZulu, the Republic of South Africa). Cape Town, Republic of South Africa, University of Cape Town, Department of Civil Engineering.

A project to supply water through standposts was set up in a drought stricken area of South Africa. It was recognized that the responsibilities for operation and maintenance could not be assumed by any existing institution and would have to rest with the community. For this reason Community Water and Sanitation Committees were created, founded within the framework of the existing tribal structure and approved by the regional government authorities. These Committees were not only responsible for operation and maintenance, but also formed a link between the community and higher levels of authority. Together with engineers they decided about technical aspects, the level of service and allocation of the facilities. A piped water supply with communal standpipes and individual connections to public buildings seemed to be the most appropriate solution because of the proximity to the urban infrastructure. Engineers and Committees also had close contact on financial matters, including deciding how the communities could run the system on a continuing sustainable basis.

Emphasis was placed on obtaining enough funds to cover recurrent and investment costs based on an equitable tariff. It was important that theft of money and wastage of water was prevented, and a special coupon system for payment was developed, the consumers buying plastic coupons representing one 25-litre bucket of water. The coupons were issued by the Water and Sanitation Committee and sold at a fixed price at shops and other outlets.

The price was calculated to cover the costs of water, operation and maintenance and capital costs together with a profit. This was high compared to that of municipal water, but lower than the price payed for rainwater harvesting and storage or buying from street vendors.

At the standposts attendants collect the coupons and deliver them to the Water and Sanitation Committee Secretary who gives them to the treasurer of the Municipal Water Co-operation. Here accounts are kept and money distributed to the Water and Sanitation Committee, to cover expenses for repairs and salaries. The system works well, no major problems occurred and any fraudulent coupons are easily regulated.

Keywords: South Africa; urban areas; public standposts; cost recovery; water vending; organizational aspects; operation; financing; evaluation.

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5. Boonyakanjana, P.; Lang, M.; Wirojanagud, P.; and Hovichitr, P. (1984). Use of public standposts in Thailand: presented in The First International Meeting on Public Standpost Water Supplies Thailand, November 11-18, 1984. Khon Kaen, Thailand, University of Khon Kaen, Faculty of Engineering.

The Thai public standpost programme, started under the Community Potable Water Project in 1966, failed despite being a viable option for safe water supply in rural areas because of inadequate maintenance and the inability to collect revenues.

The goal of the programme was to supply 600 communities with safe water and for this community participation, in the form of contributed labour, material and money for some of the construction was vital. After finishing the construction, the installation would be managed by a trained village committee who would maintain the water supply, collect revenues, set tariffs and pay the operator's salary.

Initally, the use of surface water in many schemes lead to problems with the operation and maintenance of the treatment plant and consequenly to higher costs. More successful schemes were supplied by mountain springs or groundwater for which operation and maintenance were less difficult and recurrent costs lower. More importantly, community participation was lacking. Inadequate assessments of village needs and abilities and proper preparation of the villagers created misunderstandings. Being traditionally unused to paying for water there was opposition to payment. Initial fees for the construction were not collected because people refused or were unable to pay before construction started. Internal social and political conflicts also affected the scheme and training of the village headman or committee was inadequate. They were unable to set up and implement an efficient water rate acceptable to the community resulting in a lack of revenue. The villagers understood that they would have house connections and did not feel financially responsible for the standpost system which was seen as government property.

For the villagers to appreciate the advantages of an effective water supply system their participation should be encouraged from the project's inception through construction and finally to operation and maintenance. Proper source selection is vital as is good village assessment, together with a comprehensive health education or basic hygiene programme to ensure maximum benefits from the water supply system. Effective training programmes in operation, maintenance and financial management are essential. More experience and expertise are needed and the implementation and monitoring of pilot projects could be invaluable.

Keywords: Thailand; public standposts; socio-economic aspects; socio-cultural aspects; community participation; hygiene; training; rural areas; constraints; local organizations.

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6. Carrie, R. (1982) The Malawi's Urban Communal Water Point Project. (Unpublished paper, ref. no. MAL/CWS/001; MLW/80/036), Lilongwe, Malawi, World Health Organization.

For the Urban Communal Water Point Project (CWP project) in Malawi to secure enough revenue for operation and maintenance the community is involved right from the initial stage of planning and design. Binding contracts are signed by local officials, leaders and members of the community in which all aspects of the organization of the water supply system are clearly itemized. Communities can best be organized around a metered standpost system, each consumer group through its own Tap Committee being responsible for the proper use and management of its communal water point. The water is paid for at a fixed price per cubic meter thus limiting wastage. Each communal water point has its own accounts, the individual members of each group paying a monthly fee. This is based on a flat rate per household, a rate dependent on the size of the household or a rate based on the intended use of any household. The accounts are checked by the plant operator who is also responsible for meter reading and billing. The accounts are closely monitored and in principle every communal water point must always be financially in credit to safeguard against sudden fluctuations in demand and prevent cash flow problems. The Tap Committees are supported by a Central Water Council consisting of prominent local officials and residents.

Keywords: Malawi; public standposts; community participation; urban areas; flat rates; local water committees; metering.

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7. IWACO B.V. Royal Tropical Institute (KIT) and Zandvoort, F.J. (1975) Appropriate water supply: a preliminary study of the operation and maintenance of public standpipes in Kenya and Zambia (Draft Report). Amsterdam, The Netherlands, KIT.

Management and maintenance of public water points in Kenya and Zambia are discussed with special emphasis given to the ability and willingness to pay, the overall conclusion being that payment for water depended more on willingness than on ability to pay.

A survey revealed three common types of payment for water: through kiosks, by charging a flat rate per household and a fixed water charge included in the monthly house or rental plot figure. All three options had their advantages and disadvantages.

The kiosk system is open to abuse as owners, especially in low income urban areas where no other sources are available, can sell the water through water sellers at a rate several times higher than they paid the Water Authorities, gaining large personal profits. However, if attendants are only paid a government salary it is difficult to find anybody willing to do the job. A government controlled price system leaving options for reasonable profits can overcome this problem.

Charging a flat rate per household has generally been unsuccessful although may be pursued for political reasons. Non payment is wide-spread and misuse of collected money or fraud lead to unwillingness to pay, sanctions by the supplier, lack of maintenance and finally breakdown of the system. Group connections can help solve these problems, a group of households obtaining some land and installing a

standpost. A chairman is elected who is responsible for collection of fees and payment of the water bill and to encourage punctual payment a price reduction is offered to all those groups that pay on time.

Fixed water rates incorporated in monthly plot rents are mostly used for shared water taps in urban areas. This system has the disadvantage that non participants mistrust the system and object to paying their water rates and so water charges should be itemized within the rent bill. Most of these problems are more evident in rural areas where revenue collection is notoriously difficult, since the need to pay is less pressing than in the cities where alternative sources of water often do not exist.

Bearing in mind that there is a general inability to pay, these factors contribute significantly to the unwillingness to pay. Involving the entire local community seems essential for the success of water supply which should be integrated within local geographic, social and economic situations.

Regulations on revenue collection, maintenance and sanctioning against misuse and non-payment should be clearly specified and the consumers should be well informed and have the main responsibility over the system.

Keywords: Kenya; Zambia; public standpost; constraints, community participation; socio-cultural aspects; kiosks; flat rate; socio-econonomic aspects, rural areas; urban areas; disadvantaged groups; rural areas; policy; environmental aspects.

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8. Kenya, Ministry of Water Development (1983) Recommendations on water use policy. Nairobi, Republic of Kenya, Ministry of Water Development.

A study team concluded that most of Kenya's population could be supplied with piped water on an economic and equitable basis, if loss of revenue could be controlled. Revenue collection should be decentralized and legalized local "Water Users Organizations" establised responsible for this collection as well as operation and maintenance of the water supply. This creates better financial management with a direct link between revenue collected and the consumer. Government institutions on a district level should concentrate on training personell and monitoring the system.

All different forms of revenue collection should be made as efficient as possible. Flat rates, the most inefficient, should be limited as far as possible to reduce water wastage and ensure equity and where unavoidable should be restricted to specific consumer groups organized around a shared house connection. The group as a whole pays a set price depending on the number of participants, the tariff being in proportion to that for a metered connection. If flow restricting measures are put into operation this together with the inflexible water supply and marginal profits should stimulate demand for metered connections.

Where at all feasible, meters should be used with a well organized structure for meter reading and billing. The readings, carried out perhaps two-monthly are given to the District Water Financial Offices

who can then prepare the bills on a monthly basis. The revenue after deduction of overheads can be used for operation and maintenance costs. Consumer groups can also be organized around standposts, the group buying a bulk amount of water which is distributed to the members through one or more standposts. This is viable alternative to the kiosks system which is in need of revision. Kiosks when used should be more commercially organized and although certain restrictions such as a minimum charge for the water supply, a meter rent and a distribution fee may be desirable the kiosk holder should be free to set his own price so that the kiosk can be run on market principles.

Keywords: Kenya; public standposts; house connections; flat rates; metering; kiosks; institutional aspects; local water committees; recommendations; policy; organizational aspects; billing; rural areas.

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9. Hovichitr, P., Lang, M. and Boonyakanjana, P. (1984) Cost recovery mechanisms for public standposts in Thailand: presented in the First International Meeting on Public Standpost Water Supplies, Thailand, November 11-17, 1984. Khon Kaen, Thailand, Khon Kaen University, Faculty of Engineering.

Thailand has attempted to improve its rural water supply, initially with standposts but with the ultimate aim of installing more house connections. The organization is based on the formation of village committees that ensure there is co-operation by the villagers with regard to the supply of free construction labour and an initial payment to cover part of the capital costs. This initial fee also gives the committee an idea of the difficiculties of revenue collection and familiarizes them with banking for when the scheme is operational. Local discussions decide appropriate rate structures for standposts depending on such factors as the availability of the water.

If water is abundant fees may only be charged for repairs and not for the water itself, but this is obviously not possible where the supply is limited. Here, for effective revenue collection there must be a direct link between quantity used and the rate payed. A flat rate per household has no such correlation. It takes away any responsibility for the system and often leads to some form of subsidization. Coin-operated standposts, although restoring the link between quantity used and payment, are vulnerable to abuse and need more maintenance.

Standposts can be made more viable by having a mixed system of house connections and concession sales from the standposts themselves. A number of chosen villagers collectively own a metered standpost and sell water to other villagers at a price set by the village committee. Metered house connections are made for those who can afford them but the price paid is higher than at the standposts. The village committee needs a good organizational structure to deal with the revenue collection and see that all the operation and maintenance costs are covered and this together with a real desire for a good water supply system must be present before a scheme is initiated.

Keywords: Thailand; rural areas; public standposts; water vending; concessionaires; community participation; willingness to pay; community contribution; flat rates; cost recovery.

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10. Kerkvoorden, C.E. van (1984) House connections help public standposts survive: the role of house connections and public standposts in rural water supply schemes, presented at the Regional Seminar on Public Standpost Water Supplies as Infrastructure in Housing for Low-Income Communities, Cirebon, West Java, March 6-10. Bandung, Indonesia, IWACO B.V., West Java Water Supply Project.

The availability of safe drinking water for the entire population is vital for public health in crowded West Java. The West Java Rural Water Supply Project, acting in accordance with the Indonesian development plan policy of "pemerataan" (equity), supplies drinking water to the villagers almost entirely by standposts. Ideally the operation and maintenance costs should be borne by the consumers but in practice however the villages have failed to appreciate the benefits of safe water and resent payment when traditionally they have had free water available from rivers and irrigation canals. The socio-economic conditions in rural areas are also unfavourable for organizing regular payment since most of the population (in this case 80%) work in agriculture and have an unreliable, seasonal income. Payment in kind, such as a quota of rice per day is too unreliable for the basis of sound financial management. However the remaining 20% of the population who have a better and more stable income from trade or industry are able to pay an initial installation fee and a monthly charge for their own house connections. Providing this group is a large enough proportion of the population this monthly charge can also cover up to 60% of the operation and maintenance costs of the standposts, making it possible to keep the charge for this water at a minimum. This form of cross-subsidy means that the poorer 80% of the population only have to contribute 40% of the costs for their water supply, this supporting the principles of equity. The system is financially self sufficient and benefits public health.

Keywords: Indonesia; rural areas; cross subsidies; mixed level of service; public standposts; house connections; socio-economic aspects; socio-cultural aspects; willingness to pay.

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APPENDIX B: KEYWORD AND COUNTRY INDEX

B.1 INTRODUCTION

The numbers in the Keyword and Country Indices refer to the numbers of the publications in the alphabeticaly-ordered List of References in Chapter 6.

The Keywords are based on the Interwater Thesaurus on Community Water Supply and Sanitation for Developing Countries compiled for IRC by the Water Research Centre (WRC), Stevenage, U.K.

B.2 KEYWORD INDEX

B.3 COUNTRY INDEX