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CROP, the Comparative Research Programme on Poverty, is a response from the academic community to the problem of poverty. The programme was initiated in 1992, and the CROP Secretariat was officially opened in June 1993 by the director-general of UNESCO, Dr Federico Mayor.

In recent years, poverty alleviation, poverty reduction and even the eradication of poverty have moved up the international agenda, and the CROP network is providing research-based information to policymakers and others responsible for poverty reduction. Researchers from more than one hundred countries have joined the CROP network, with more than half coming from so-called developing countries and those in transition.

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For more information contact:

CROP Secretariat
UNIFOB Global
Nygårdsgaten 5
N-5020 Bergen
Norway
Tel: +47 5558 9740 Fax: +47 5558 9745
email: crop@uib.no
website: www.crop.org

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# Poverty and water

## Explorations of the reciprocal relationship

***edited by***

**DAVID HEMSON, KASSIM KULINDWA, HAAKON LEIN AND ADOLFO MASCARENHAS**

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# Water and poverty: the inextricable link

*Kassim Kulindwa and Haakon Lein*

## Introduction

'Poverty is still the gravest insult to human dignity and is still with us despite decades of international efforts to eradicate it. Life at the edge of existence.' This is how the former Chair of the World Commission on Environment and Development, and former Prime Minister of Norway, Gro Harlem Brundtland, characterised poverty.[1] Today, more than 20 years after the Commission presented their report *Our Common Future*, the claim is still as valid as then.

Poverty can be defined in absolute and relative terms. Absolute poverty refers to individuals' abilities to meet their basic needs. In other words, individuals do not have the resources to meet their basic needs for healthy living and a dignified existence. They do not have the resources to provide for food, shelter, clothing and medical services, among other things. Relative poverty, on the other hand, compares the status of individuals against others in a community or society in terms of an income and wealth standard. According to this definition, the poor are those who have significantly less resources, mainly income and wealth, than others in their society.

Sen (1999) categorises poverty into 'income deprivation' and 'capability deprivation', terms that could loosely be equated to the above characterisation. It has to be noted, however, that income and capability deprivation, though different, are not necessarily independent of each other, for it is well known that although not all capabilities are determined by income, income nevertheless plays a significant part in generating capabilities. The broad definition is also acknowledged and used by many, including the EU, the World Bank and the UNDP.[2] The UNDP considers poverty as a denial of human rights, good health,

adequate nutrition, literacy and employment. It further asserts that, 'these are not favours or acts of charity to be bestowed on the poor by the governments and international agencies, instead, they are human rights as valid today as they were when the Universal Declaration of Human Rights was adopted'. As a consequence of the denial of their rights, many of the world's poor suffer oppressive political measures which hinder their development, and therefore poverty also has a political dimension.

The measurement of poverty is not without difficulties, given its complexity of definition. In practice, various institutions dealing with world development issues and poverty have given different figures for levels of poverty.[3] Of late, criticisms have been hurled towards both the World Bank and the UNDP alleging that the adoption of a poverty definition of 'a dollar a day' produces a distorted picture of global poverty.[4] It is argued that this definition departs from the established concepts and procedures for measuring poverty. Although the purchasing power parity concept is applied, the arbitrary 'dollar a day' does not have a realistic basis in terms of representing poverty across localities and boundaries. The same argument goes for the representation and categorisation of countries as being poor or rich based on their GDP per capita regardless of considering distribution and other aspects of capabilities, and access and enjoyment of other goods and services, natural or otherwise, that contribute to the quality of life.

However, less controversial measures have been developed which include the various aspects of capability deprivation; these include the Human Poverty Index (HPI) and its variants.[5] Despite the practical difficulties of the definition and measurement of poverty, it remains clear that a measure of poverty using an index may help us to gauge the trends and the rate at which change is taking place. However, to decide on policy, strategy and action, we need to decompose the components of the poverty index in order to get a clear understanding of the nature and state of the components of the 'index number' in order to determine appropriate and effective solutions and implementation.[6] In addition to the quantitative indications, qualitative analysis of the non-quantifiable elements of capability deprivation should concomitantly be carried out.

## Water and poverty

The link between water and poverty is complex, but at the same time simple to understand. Access to adequate amounts of clean water is essential for maintaining good health, and access to water for agriculture is essential for food

production. For poor rural farmers, these links may be unfolding first as a daily struggle to secure enough clean water for their households as well as for watering their crops. Without access to clean water, their children may be sick and their crops may fail. However, as with most poor people, a farmer will most likely have less access to water than the more wealthy in society, and what he/she does have will be of lower quality than the water they receive. Despite this, the farmer most likely will have to pay more – in the form of labour or money – for the water received (UNDP, 2006: 48–54). Inadequate and unequal access to water is, thus, both a result and a cause of poverty.

The close link between water and poverty is made clear in the United Nations Millennium Declaration adopted by the UN General Assembly on 8 September 2000, where it is stated (under point 19; http://www.un.org/millennium/declaration/ares552e.htm) that:

> We resolve further: To halve, by the year 2015, the proportion of the world's people whose income is less than one dollar a day and the proportion of people who suffer from hunger and, by the same date, to halve the proportion of people who are unable to reach or to afford safe drinking water.

The close link between poverty reduction and access to water was weakened when the declaration became operationalised into the Millennium Development Goals (MDGs). Halving the world's poor population became Goal No. 1, while the issue of securing access to safe drinking water only became a target under Goal No. 7, on 'Ensuring environmental sustainability'. Despite this, the goal of halving the number of people without access to clean water is probably one of the most cited and well known of the MDGs. It may also be one of the most difficult to achieve.

Although the links between water and poverty may be easy to grasp, the issue of how to organise our societies and our water resources so that the poor gain access to the water needed for consumption and production is still complex and highly contested. The problem of securing water for all is unfortunately too often perceived and presented as a question of physical lack of water available for human use. This is not the case. For instance, Africa faces large problems in securing sufficient and clean water for all, but physically the continent has more water available per capita than Europe.[7] Physical water shortage is definitely a real phenomenon in some dry regions and countries of the world; however, water scarcity is a much more common phenomenon. Water scarcity is a term linking availability of water with use, implying that regions with ample available water resources may face water scarcity. Water scarcity[8] is the result of the interplay between resource availability, consumption patterns (Table 1.1) and the (mis-)management of the resources. Water scarcity

**Table 1.1** Relationship between water use and national income

| Country | | Annual water withdrawals per capita, $m^3$ (1970–87) | | |
|---|---|---|---|---|
| | GDP/capita, US$ (1990) | Domestic | Industrial and agricultural | Total |
| Tanzania | 110 | 8 | 28 | 36 |
| Sri Lanka | 470 | 10 | 493 | 503 |
| South Africa | 2,530 | 65 | 339 | 404 |
| United Kingdom | 16,100 | 101 | 406 | 507 |
| Sweden | 23,660 | 172 | 307 | 479 |
| United States | 21,790 | 259 | 1,903 | 2,162 |

*Source:* Sullivan, 2002.

is thus linked to water governance rather than to shortage in the absolute physical sense of the term. Water governance, and especially the link between sustainable water governance and poverty, is the core theme of this book.

## Water and health

Water-related diseases are among the most significant causes of deaths in many developing countries. Diarrhoea is the second-largest cause of deaths among children under the age of five years in Asia and Africa (UNDP, 2006: 43). Five times as many children die of diarrhoea as of HIV/AIDS, despite the fact that reducing the risks linked to the disease is a fairly straightforward issue: clean water and sanitation 'are to diarrhoea what immunization is to killer diseases such as measles and polio: a mechanism for reducing risks and averting deaths' (UNDP, 2006: 43). Access to water and sanitation is also essential for reducing instances of other serious water-related diseases, such as intestinal helminths (parasitic worms) and schistosomiasis, which cause so much misery, especially on the African continent.

Securing people's access to improved water sources[9] and sanitation is undoubtedly a big challenge. As Table 1.2 shows, Africa lags behind in water supply coverage in both urban and rural areas, followed by Latin America and the Caribbean, and then Asia. Rural coverage is worst in rural Africa, where most of Africa's poor live.

The main challenge relating to water supply is not only how to expand coverage to larger segments of the population, but also how to make sure that the poor have better access to water. Securing access to clean water for the

**Table 1.2** Global water supply coverage, 2000

| Region | Population (millions) | Urban coverage (%) | Rural coverage (%) |
|---|---|---|---|
| World | 6,055 | 94 | 71 |
| Africa | 784 | 85 | 47 |
| Latin America and the Caribbean | 519 | 93 | 62 |
| Asia | 3,683 | 93 | 75 |
| Oceania | 30 | 98 | 63 |
| Europe | 729 | 100 | 87 |
| North America | 310 | 100 | 100 |

*Source:* WHO, 2000.

poor is obviously a complex issue. As discussed in more detail by Hemson in Chapter 2, various, rather ambitious, water initiatives and reforms have been launched during the last 40 years or so, but they have been at best only half-heartedly implemented. The International Drinking Water Supply and Sanitation Decade in the 1980s aimed at supplying safe drinking water and sanitation services to all by 1990. The period since then has been far less ambitious, as reflected in the more modest MDGs. However, to aim to halve the population without access to improved water sources may also prove to be unrealistic. Further, there has been a change in approach from a reliance on public-health-driven water and sanitation efforts to what are often termed 'demand-driven approaches', often including elements of private sector involvement. Underlying this new approach is the idea that water should be treated as an economic good, which in turn lays the foundation for the introduction of various types of water pricing systems.

South Africa is one of the countries in sub-Saharan Africa that might face problems of water scarcity in the coming years due to limited resources and a high demand. South Africa faces problems of securing adequate access to clean water for those groups that were disadvantaged under apartheid. Several chapters in this book deal with South African experiences and the water reforms introduced in the post-apartheid era.

In Chapter 3, Goldin writes about water reforms in post-apartheid South Africa. A number of changes in water policy and legislation, strongly biased towards the rural poor living in former homelands and informal settlements, have been made since 1994. A key element in the reforms has been to create new institutions to include the interests and voices of previously disadvantaged groups. Using concepts of social capital, trust and shame, Goldin analyses the situation in a specific water user association as well as in the water sector generally.

A key message emerging from her text is that restructuring and opening up old elitist institutions, which to a large extent have been based on reciprocity and trust (social capital), may prove to be a long and cumbersome process.

In Chapter 8, Hemson explores the relationship between water services and women's work to indicate the extent to which household care givers are being freed from drudgery to provide care and engage in productive income-generating activities. The current situation is that women have to carry out the menial and time-consuming task of fetching and carrying both water and wood. The cholera epidemic centred in KwaZulu-Natal, other water-borne diseases, and the rising incidence of HIV/AIDS place severe stress on the capacity of women to sustain families and undermine anti-poverty initiatives. Intervention at the level of communal facilities has reduced the time burden on women, but has not necessarily increased the level of consumption to improve family health.

In Chapter 9, Schulz outlines key elements of the new South African policy, which uses an increasing block tariff (IBT) water pricing system, and discusses how this system can support the welfare of the poor. The IBT includes a free-of-charge basic water supply (25 litres per person per day) and increased block tariffs combined with rebates targeted at poor households. Applying three different approaches to welfare (utilitarian, weighted utilitarian and Rawlsian), Schulz concludes that two of the models show that price discrimination will improve the welfare of consumers. Further studies have shown that the water demand of rich households is more responsive to price changes than that of poor households, indicating that the price mechanisms will mainly work in the upper income segment of the market. For the poor, price jumps in basic water supply will work more like a tax rather than as an incentive for reducing already low consumptions of water.

Moving on to Tanzania, in Chapter 7 Kulindwa elaborates on the use of cost–benefit analysis in water supply projects, based on a study from Kilosa in the Morogoro region. A number of water improvement projects were scrutinised: the results show that if a purely financial appraisal of the improvement projects is carried out, none of the projects are economically viable. However, if time saved on fetching water and health improvement effects are incorporated, the picture changes dramatically and several of the projects become economically viable. The policy conclusion is that there may be a limited scope for private commercial involvement in the water sector and that the state still has an important role in providing basic water supply services.

In Chapter 4, Aderinwale and Ajayi discuss the link between water and poverty in Nigeria. Drawing on experiences from four urban areas, they

conclude that despite efforts by the government to improve and reform the water sector through a new water and sanitation policy, the government targets for the sector are far from being met. The situation in the four study areas is not up to a reasonable standard and the cost of safe water is described as exorbitantly high. The existing policies thus have to be revised and reinforced, and better monitoring systems have to be put in place for the situation to improve.

## Water for agriculture

In addition to being a prerequisite for basic health, the link between water and MDG No. 1 (on halving the number of the world's poor by 2015) is clear and direct, as water is essential for food production and food security. An estimated 70 per cent of available freshwater resources are used for irrigation, and irrigated agriculture is of crucial importance for food production, contributing up to 40 per cent of the world's food production (World Bank, 2003); yet it accounts for only 20 per cent of farmland. In order to keep pace with a growing population, much more land must be brought under irrigation in the coming decades. In some regions, such as the Middle East and large parts of Asia, the potential for future expansion is limited, whereas in most of sub-Saharan Africa and Latin America there is considerable untapped potential for bringing more land under irrigation (FAO, 2003).

Irrigation can be described as a technique for human intervention in the hydrological cycle, allowing expansion of crop production in both time and space (i.e. into new land which has not been utilised previously due to lack of sufficient rainfall, as well as into seasons with insufficient rainfall). In addition to allowing expansion of crop production in time and space, irrigated agriculture has a number of specific agro-economic advantages compared with rain-fed agriculture. Irrigation may give higher gross yields per unit of land through higher yields per crop, by more crops per year, through growth of heavier-yielding crops or by increased (and more profitable) use of major inputs such as manure and labour. Irrigation may also reduce yield fluctuations and allow more continuous and adaptable production. In sum, irrigation increases the production capacity of the farm, thus reducing the minimum farm size necessary for supplying the household.

While irrigation is a means to release some of the environmental constraints on agricultural production that are set by nature, it also requires the introduction of new technical and social arrangements linked to the appropriation and distribution of water. In settlements on the heavily irrigated slopes of

Mount Kilimanjaro in Tanzania, there is a saying that 'no man can irrigate alone' (Tagseth, 2001: 55), reminding us that irrigation is an inherently social undertaking. The social complexities of such undertakings may vary. Some scholars, such as Wittfogel (1957), have argued that throughout history irrigation has laid the basis of certain ('despotic') forms of state formation. On a smaller scale, numerous local studies of traditional irrigation have shown that irrigation has been sustainable for decades because of established social mechanisms for participation by all as regards both cost and benefits (e.g. Kaswamila and Masuruli,2004; Mkavidanda and Kaswamila, 2001; Mwakalila and Noe, 2004; Sokoni and Shechambo, 2005).

So, in what ways is irrigation important for the poor? As shown in Table 1.3, its importance may vary among poor farmers, rural labourers and the urban poor. In the first instance, irrigation is a means for increasing the production capacity of the farm. This is, of course, important for all farmers – even the rich – but it is especially important for the marginal farmers living on the brink of survival. In addition, irrigation commonly facilitates more employment opportunities for waged labour as it allows cultivation of more crops per year, as well as more labour-intensive crops. Irrigation, inducing growth in production as well as productivity, may also in the long run lead to lower food prices, which will benefit the rural poor as well as the urban poor who are dependent on buying food.

Irrigation does contribute to poverty reduction, and irrigation development can be made more pro-poor (Hussain and Hanjra, 2003). First, this can be done by securing better access to water for poor farmers. The positive link between irrigation development and poverty reduction has been found to be weaker in areas where land is highly unequally distributed than in areas where land is more equally distributed (Hussain and Hanjra, 2003). In societies where much of the most valuable land and water resources have, for historical reasons, been controlled by a few rich farmers or commercial operators, water may be used for producing low-value cash crops. Targeting irrigation development to certain communities or localities can be one way of making irrigation more pro-poor. Another possibility is to redistribute water in favour of the poor.

In South Africa, access to and a possible redistribution of land and water rights are pressing but also politically sensitive issues. In Chapter 6, Conradie addresses these problems when she tries to assess the costs of transferring water from a commercial sector to smallholder agriculture in the Fish River valley in Eastern Cape. An argument against such a transfer has been that this will result in loss of production. However, Conradie concludes that a considerable share of water used by the commercial operators could be transferred to

**Table 1.3** Important impacts of irrigation on the poor

| Impact | Type of poor | | |
|---|---|---|---|
| | Small farmers | Rural labour | Urban labour |
| Output/production | Higher and more stable output | Indirect: increased demand for non-farm goods and services as incomes rise | Indirect: increased demand for urban goods and services as incomes rise |
| Prices | Impact varies depending on whether farmers are net consumers or net producers of food | Falling prices lead to reduced food bills | Falling prices lead to reduced food bills |
| Incomes | More stable incomes but the overall effect will depend on the relationship between increased output and falling prices | Increased and more stable incomes through rising employment and falling prices | Increased real value of incomes |
| Employment | No change due to self-employment of smallholders | Increased demand for agricultural production and irrigation construction, maintenance and operation | Increased demand for urban goods and services |
| Health and environment | Increased nutrition<br>Negative: greater exposure to water-borne diseases<br>Possible displacement, especially in large projects | Increased nutrition<br>Negative: greater exposure to water-borne diseases<br>Possible displacement, especially in large projects | |

*Source:* Modified from Lipton, Litchfield and Faurés, 2003.

smallholder agriculture at very little or no cost, measured in the form of reduced value of production.

In many parts of South Asia, recent irrigation development has been based on the use of various types of small-scale tube wells and pumps. This development, described as a 'groundwater boom', has mainly taken place through a process whereby farmers have bought and installed pumps and tube wells utilising surface as well as groundwater reserves (Shaha et al., 2003). This development is discussed in more detail in Chapter 5, where Lein shows that in Bangladesh it has been fairly successful in the sense that cereal production has increased considerably and labour demand in agriculture has risen, leading to slow but stable increases in labour wages.

Concern has risen, however, over whether poor farmers, unable to buy and install expensive wells and pumps, have been left out of the development

process. One solution put forward is to try to promote particular pro-poor technological solutions such as, for instance, the treadle pump, promoted by non-governmental organisations in both Asia and Africa. Another solution has been to set up special institutional arrangements whereby the poor can directly secure some of the benefits through the sale of water (Wood and Palmer-Jones, 1991). However, experiences from Bangladesh have shown that even if the irrigation equipment is privately owned, the poor can access water by buying it from the pump owners on reasonable terms. Due to the extremely fragmented system of land ownership in Bangladesh, most landowners, even those owning pumps, depend upon buying water for at least part of their land. Agricultural change based on what is commonly labelled 'the green revolution', and in a sense a 'private water market', is not commonly perceived as being particularly pro-poor. However, Lein argues that this development has been good for the poor and that, together with other important processes outside agriculture, at least provides a partial explanation for why rural Bangladesh, contrary to many expectations, has seen fairly substantial improvements in the poverty situation.

A new period has emerged following the International Water Supply and Sanitation Decade (1981–90) in which modest targets have been set and far greater responsibility has been given to nation-states to provide the required funding. In turn, the pressure has been put back on local communities to provide a level of commitment both to raise capital and to cover maintenance costs. In addition, priority has been given to the role of the private sector. This remains the dominant paradigm in water delivery, as reflected in a number of chapters in this book. In the concluding chapter, Chapter 10, Mascarenhas summarises some of the main policy-related findings of the chapters, focusing on the role of public versus private responsibilities in the water sector. Although he is critical of privatisation as a means to solve the water crisis for the poor, his conclusion is that providing water for the poor always pays but in many different ways other than the purely economic.

## Notes

1. See Øyen et al. (1996: vii), 'Foreword' by Gro Harlem Brundtland.
2. See Giancarlo (2003), World Bank (2001) and UNDP (1997), respectively.
3. These include the UN programmes and the twin Bretton Woods institutions.
4. See Chossudovsky (1998).
5. For example, the nutrition/calorie intake-based poverty line plus other measurable basic necessities. The HPI was introduced with a view to look beyond income poverty to include other dimensions of human poverty such as powerlessness and lack of capabilities.

The HPI's measure of deprivation includes illiteracy, malnutrition among children, mortality, health and poor access to safe water. See also UNDP (1997), Federman et al. (1996), Asra and Santos (2001) and Dalaker (2005) among others.

6. May (2001), for instance, notes that disaggregating the Human Development Index (HDI) for South Africa by province and race revealed great disparities in the level of human development in different parts of the country.
7. Africa has an estimated 1.5 times more per capita runoff than Europe (Jones, 1997: 47). However, this average conceals large regional variations both in Europe (e.g. Scandinavia versus the Mediterranean countries) and Africa (North Africa versus Central Africa).
8. The UN's water initiative refers to water scarcity as: 'the point at which the aggregate impact of all users impinges on the supply or quality of water under prevailing institutional arrangements to the extent that the demand by all sectors, including the environment, cannot be satisfied fully. Water scarcity is a relative concept and can occur at any level of supply or demand' (UN, 2006: 2).
9. Access to improved water sources is defined by the UNDP as access to a reasonable amount (20 litres per capita per day) of drinking water from household connection, public standpipes, protected dug wells and protected springs or rainwater collection within 1 km of the user's dwelling (UNDP, 2006: 410).

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# 2

# Water for all: from firm promises to 'new realism'?

*David Hemson*

## Introduction

Internationally there is again fresh debate about the provision of water and sanitation and a renewed urgency to ensure that the backlogs are being met. New targets are being set and new commitments made, particularly after the Johannesburg World Summit on Sustainable Development (WSSD) in 2002. But there is also scepticism that there is nothing original in the international debates and campaigns on water and sanitation provision, and that the commitments made by governments and international agencies are weak. All sides acknowledge the need for greater effort in providing water and sanitation, but the point is often lost in budgetary debates, and only remembered during cholera outbreaks and when emergency provision is made during periods of acute drought. In a sense, the relationship between water and health, water and poverty, and water and development is pronounced, lost, and has to be rediscovered anew during a crisis or major international conferences.

Urgent voices are increasingly being raised about the need for more accelerated provision of water and sanitation. At the time of the WSSD in Johannesburg, research into the effects of denying poor people access to clean drinking water provided the data on the failure to deliver. It was demonstrated that as many as 76 million people, mostly children in developing countries, would die from preventable water-related illnesses by 2020 if countries do not rethink their water delivery systems. Rather than being preoccupied with the shortage of resources alone, the researcher argued that the lack of political resolve in water and sanitation delivery was 'perhaps the greatest development failure of the 20th century'.

> The most egregious consequence of this failure is the high rate of mortality among young children from preventable water-related diseases…If no action is taken to address unmet basic human needs for water, as many as 135 million people will die from these diseases by 2020. (Gleick, 2002)

Gleick argued that this problem was 'one of the most serious public health crises facing us', and deserved far more attention and resources than it had received so far. 'The numbers are appalling, actually, although the worldwide water community shouldn't be that much surprised', he said (Heredia, 2002). More have died from water-related diseases than in all post-World War II conflicts.

The figures are staggering. Even in the best scenario, in which the Millennium Development Goals (MDGs) were achieved – unlikely given current international commitments – between 34 million and 76 million people (overwhelmingly children) would perish from water-related diseases by 2020 (Gleick, 2002). Despite these compelling arguments in terms of public health and survival, a very general commitment to delivery was made at the WSSD but without the concomitant pledges of the necessary investment.

Although the need is clearly evident, programmes on water delivery do not follow a straight line in policy and implementation. In many Third World countries a high media profile is given to water provision, with beautifully photographed children cupping their hands to a tap and lengthy expressions of concern from those in power. An examination of any national budget in developing countries will show this distress has not been matched by an appropriate level of investment; nor has it been accompanied by good and transparent public management.

A brief history of the conferences on water shows, in broad outline, continued concern with the issue of water provision, first, in relation to the provision of basic needs and as a primary means to health, child survival and human dignity, and, somewhat later, as an economic good.

The overlapping of the Decade for Women and the Water Decade should have focused attention on the release of women from the drudgery of carrying water long distances and their more effective role in improved management.

Even with the very modest goals now set out in the MDGs there is some wariness among campaigning organisations and researchers long used to international conferences and workshops. Comprehensive promises and plans are laid but poorly evaluated, resulting in disappointment and cynicism. Overall there is probably greater scepticism about international planning and objectives than at any time previously.[1] To what extent is this justified?

**Box 2.1** Water: a chronology of conferences and changing objectives

**1970–80:** UN initiatives and the birth of the plans to provide universal water services.

**1975–85:** UN Decade for Women.

**1981–90:** International Water Supply and Sanitation Decade; promises to deliver clean drinking water and sanitation to all, less funding provided than promised, downscaling of objectives, lowest level of technology, village-level management. Objectives not reached, unclear evaluation. Generally conservative lessons drawn.

**1990–2000:** Clean drinking water endorsed by Agenda 21 in Rio de Janeiro and other UN conferences in New York, Beijing, Cairo and Stockholm and also in other government-hosted conferences.

**1992:** The Dublin statement on water and sustainable development after the International Conference on Water and the Environment (26–31 January) advocates water as an 'economic good' and a community and women focus. At the same time there is a reduction in actual global investment in water supply and sanitation.

**1996:** Birth of World Water Council and Global Water Partnership; emphasis on local initiative, better management, and cost recovery; there is some increase in spending on the techniques of integrated water resource management.

**2002:** Earth Summit, Johannesburg, South Africa, 26 August–4 September confirms Millennium Development Goals which set out a modest target of halving by 2015 the proportion of people who are unable to reach, or to afford, safe drinking water.

**2004:** Theme: Local Actions for a Global Challenge.

As more lessons have been learnt from the slow pace of delivery and despite the accompanying greater familiarity with the issues, many observers moved from scepticism to outspoken criticism of the initiatives being launched at the international level. A scan of the extensive conferences in Box 2.1 shows a retreat from firm commitments to provide water and sanitation 'for all' to more slippery and inexact formulations such as first 'halving' those unreached, before the distant goal of providing for 'all'. On the whole, there have been two decades of promises to meet the demands of the poor for water services 'for all' as an immediate target ('more for some'), followed by a promise to meet this target within a quarter of a century! The targets appear increasingly fuzzy with broad goals being talked of without any accompanying commitment to funding. Parallel to the commitment to meet these targets, the international finance institutions are arguing strongly for privatisation of water supply.

## What progress has been made from the 'development decade' to the 'water decade'?

The period up to the 1980s, which led to the strategy of the 'development decade', was broadly dominated by a concern for increased public expenditure

to close the circle between overinvestment in the First World and chronic underconsumption in the Third World. The Brandt Commission (officially the Independent Commission on International Development Issues), which expressed the common wisdom of reformers in the 1970s, espoused a basic development model that held that increased investment in the Third World would be the means of securing continued world economic growth and profitability through accelerating trade. Concern for the poor countries would lead to continued growth among the advanced capitalist countries.

The prime concern was with stability, and the Brandt Commission spelt out a relationship between economic crises and 'weak or failing governments' that has considerable resonance with present concerns. It was argued that weak state structures would create a political vacuum that would, in turn, lead to extremists gaining power. This concern was concretely (and somewhat percipiently) expressed about Afghanistan as 'one of the lowest aid recipients for its size and poverty' (Brandt Commission, 1983: 36)! The apparently compassionate commitment to poverty alleviation was seen as entirely compatible with a world of wealth accumulation as both were thought to be achievable through reciprocal beneficial relations between First and Third World countries. But in the heated debates of the early 1980s, when economic crises and slow growth led to the sharp ascendancy of neo-liberal policies, these proposals were not seriously considered (Quilligan, 2003). Instead, 'development' advanced in a piecemeal and seemingly arbitrary manner in the shadow of colossal military expenditure and financial crises of the richer countries.

While UNICEF and WHO were revising their concern for water and sanitation in the context of Primary Health Care, the Brandt Commission significantly did not isolate water and sanitation as a separate and sectoral concern; rather they were placed within the expansionary economic policies which sought to speed growth on a broad, rather than sectoral, basis. The argument for increased aid reflected the view that basically compassion was not as expensive as imagined. The Brandt Commission argued that aid would not cost a fortune; the Emergency Relief Program on which it based its proposals for international investment to achieve widespread poverty relief was 'far lower than people think' (Quilligan, 2003: 9). Although widespread social advance was possible on relatively small resources, even these were not made available.

The framework was broad and comprehensive; seeking to link continued development in the North to the desperate needs of the South. It employed the development model, which ranked hunger as the greatest need, and followed it with virtuous circles of housing, health, education and income. The Brandt Commission and international developmental agencies worked with the strategy shown in Box 2.2. The stress was on food, better

**Box 2.2** The North–South basic development model

- Food brings satisfaction
- Housing brings stability
- Health brings security
- Education brings opportunity
- Income brings sustained development

health and rising incomes which would in course solve such problems as water delivery.

But it was noted at the time that there was (and still is) 'no systematic effort to eliminate global poverty' (Quilligan, 2003: 9) and that the satisfaction of basic needs is not considered an *entitlement* for the poor of humanity by most Third World countries and by international financial institutions. In the case of water, a decision was taken not to have a specialised, separate water body within the UN; indeed the idea was actively discouraged in the 1970s (Black, 1998: 8).

Water was grouped together with food, energy and technology in a composite initiative to end hunger. Curiously, despite the generalised approach to meeting basic needs and alleviating poverty within the overarching framework, special attention internationally came to be given to water and (to a lesser extent) sanitation. At the same time as the Brandt initiative was promoting a general approach of meeting hunger in an attempt to stabilise political relations (and failing to win the support of the United States), the International Decade for Clean Drinking Water and Sanitation (IDCDWS), 1981–90, was being launched.

The Decade was launched with great confidence, fanfare and support from the famous and the good in November 1980 with the slogan 'Safe water and sanitation for all by 1990'. The then UN Secretary-General, Kurt Waldheim, announced at the time that the goal was 'eminently achievable' (Appleton and Black, 1990). Its 'take-off' and progress were, however, somewhat problematic and there does not seem to have been clarity about what funding was available, how it was to be expended, what intermediate targets were to be attained *en route* to the final target, and so on.

All evaluation of progress in water provision is bedevilled by shaky statistics. The Decade started without clear figures of those served and unserved (at the national or international levels), indeed one of its principal lessons was that this had to be given more rigorous attention. Without clear monitoring and evaluation it is unlikely that the broad percentages of delivery were anything more than informed guesses.

**Table 2.1** Coverage of water services (millions of people) in developing countries

| Population with access | 1970 | 1980 | 1990 | 2000 |
|---|---|---|---|---|
| **Water** | | | | |
| Urban | 320 | 530 | 1,100 | 1,480 |
| Rural | 180 | 570 | 1,190 | 1,480 |
| Total | 500 | 1,100 | 2,300 | 2,960 |
| **Sanitation** | | | | |
| Urban | 340 | 370 | 940 | 1,370 |
| Rural | 130 | 210 | 600 | 780 |
| Total | 470 | 580 | 1,540 | 2,150 |

*Source:* Jolly, 2003.

The statistics available (which have, at times, differed considerably and only now have been given the stamp of approval of the WHO/UNICEF) now provide hard data for the population under each heading, and do concentrate on provision of water services in the continents of the South: Latin America, Africa and Asia (Table 2.1).

The figures show a generally encouraging trend towards greater access, although at very uneven rates. What is not clear from the data is the size of the backlog. This is made up of two important components: first, those already 'on the books' as unserved, and, second, population growth in new families and children who are adding to the backlog. The tendency can be for the backlog to remain the same or even grow while delivery is rising; in a report this is reflected upon in relation to South African conditions (Hemson, 2003). The statistics show that by 2000, a decade after 'water for all' should have been achieved, some 1.1 billion people still lacked access to safe water and 2.4 billion lacked access to adequate sanitation.

The percentage of those with access tends to reveal the momentum of delivery in the water sector; in the sanitation sector there was progress often from a very low starting point (Table 2.2). Only in urban sanitation was there an appreciable acceleration of delivery.

Both the frequency and percentage statistics have to be read together to get a clear idea of what is in progress. It does seem as though the Water Decade (1981–90) did accelerate delivery considerably with an additional 1,300 million receiving water; in rural areas, however, the water delivery increase was considerably slower than in the period 1970–80, declining from 217 per cent in 1970–80 to 109 per cent in 1980–90. In rural sanitation there was, however, a considerable acceleration in delivery over the previous period rising from 62 per cent in 1970–80 to 186 per cent in 1980–90, and thereafter slowing considerably to 30 per cent.

**Table 2.2** Percentage increase in delivery of water and sanitation in developing countries

| | 1970–80 (%) | 1980–90 (%) | 1990–2000 (%) |
|---|---|---|---|
| **Water** | | | |
| Urban | 66 | 108 | 35 |
| Rural | 217 | 109 | 24 |
| Total | 100 | 130 | 29 |
| **Sanitation** | | | |
| Urban | 9 | 154 | 46 |
| Rural | 62 | 186 | 30 |
| Total | 23 | 166 | 40 |

*Source:* Calculated from Jolly, 2003: Table 4.

Although the figures for increasing access show evident progress, despite marshalling what resources were available the Decade did not reach its goal of extending coverage to all, and (as is clear from the tables above) was followed in the 1990s by much slower progress. During the Decade, for example, the coverage of rural population with provision of clean drinking water increased from 29 per cent to 66 per cent but then increased more modestly to 71 per cent in 2000. From the data in Table 2.3, it is clear that the greatest lag was, as could be expected, in rural sanitation which increased from 13 per cent to 35 per cent coverage during the Decade but then only to 38 per cent in 2000. Some continents, such as Africa, lagged considerably.[2]

Even though the statistics show an appreciable increase from 43 per cent to 79 per cent of the total population in developing countries having access to clean drinking water and from 25 per cent to 55 per cent having access to sanitation by 1990 (again although diverging considerably upwards beyond those figures initially reported),[3] this was a substantial failure. Indeed, internationally the Decade was even described by some as a 'flop' and the key question was what lessons could be drawn from this apparent debacle (Appleton and Black, 1990). Although it is difficult (and unnecessary here) to provide a comprehensive review of the Decade and the various interpretations and lessons drawn from its evident failure to make real advances towards its objectives, some points need to be made about the context.

What is not mentioned in any of the documents of the time is that the general period was one of high military expenditure and parsimonious spending on key development initiatives; nowhere is it recorded what was invested globally in infrastructure in the Decade and the concrete results by country and internationally. Early on it was clear that nothing like the amount needed

**Table 2.3** Percentage of total population in developing countries with access to safe water and improved sanitation

| | 1970 (%) | 1980 (%) | 1990 (%) | 2000 (%) |
|---|---|---|---|---|
| **Water** | | | | |
| Urban | 67 | 75 | 95 | 94 |
| Rural | 14 | 29 | 66 | 71 |
| Total | 29 | 43 | 79 | 82 |
| **Sanitation** | | | | |
| Urban | 71 | 53 | 82 | 86 |
| Rural | 11 | 13 | 35 | 38 |
| Total | 27 | 25 | 55 | 60 |

*Source:* Jolly, 2003.

would be forthcoming, a fact which undermined the very notion of a campaign to meet the targets.

> Projections of increased revenues were optimistic, and the depressed world economic situation at the onset of the decade did not help matters. (Valdes-Cogliano, 1985: 41)

Increased spending by international organisations was on nothing like the scale initially envisioned. During the Water Decade the neo-liberal policies of the international finance institutions were shifting focus from macroeconomic stabilisation (without performance criteria related to structural measures) to explicit structural conditionality. The increasing grip of fiscally conservative policies which was being formalised during the 1980s (e.g. the IMF Structural Adjustment Facility that was established in 1986) must have had a direct impact on international grants and national spending on meeting basic needs such as water and sanitation (Truman, 2001). The funding for the Water Decade and the reflections on what was achieved must have been deeply marked by the shift towards increasing austerity and its impact on increasing impoverishment. The 'lessons' drawn during this period are notable for their acceptance of the paradigm of demand-driven implementation and strict cost recovery in operations and maintenance.

## Neo-liberal policies and poverty

The Water Decade also ran into a series of secondary contradictions, basically because poverty alleviation was not proceeding as desired and local populations

could not meet the tariffs to pay for the operations and maintenance costs. This caused many large projects to break down or (it is strongly alleged by critics of welfare) subsidies were directed increasingly to these projects. Both developments held back the drive for delivery, the instances of project failure dampening enthusiasm for continuing in the same way, and the subsidisation of services reducing the capital available to extend services to the more remote poor. Early into the Decade there were discussions and redirection of the work implicitly accepting not only the lack of resources but also an additional wide range of problems encountered.

The official position was that the Decade was a success with rural water supply coverage rising from 30 to 50 per cent (the variance from the figures quoted above appears to reflect coverage as a percentage of the original population figures, not as a proportion of the increased population). The problem was where the starting point should be: the numbers needing to be covered at the beginning of the decade were fewer than those at the end, that is, the backlog was growing. According to a general review of the Decade, 'population growth outstrips many gains', and clearly the extension of sanitation to the rural population had not advanced (Black, 1998: timeline).

The argument then revolved around statistics, much of the debate centring on the very evident gap between the proportion of the population served by infrastructure and the proportion effectively having its needs met. In many instances there were considerable differences between these two figures as infrastructure had broken down and the figures for delivery had become historical rather than real.

> As things turn out, the high priests of the water and sanitation ('Watsan') creed are unanimous that counting up new installations isn't a fair way to evaluate the Decade. Most of the 'safe water supplies' referred to in the old statistics were out of order, in disrepair or abandoned. Installing many more of the same would hardly have been a great leap forward. (Appleton and Black, 1990)

By this interpretation most of the effort appears to have gone into the *rehabilitation and repair* of existing facilities rather than the addition of new projects. Despite the very evident failure it has become very important to reclaim the 1980s as a time of relative progress to keep up a sense of momentum.

> The 1980s were not a lost decade for water; it had been declared a water decade. During that time more people had gotten access to water than ever before. Even sanitation had advanced somewhat, which proved that global goals could mobilise action. The challenge was to remobilise the commitment to global action in water and sanitation. (WHO/UNICEF, 2000)

It appears that the opponents of higher-level funding for water and sanitation made their arguments silently, early in the new period, by simply not providing sufficient resources. Later, the criticisms of accelerated state-led development were made more robustly and influentially.

## Lessons from the Water Decade

Surprisingly, none of those talking of the 'lessons learnt' spelt out the need for greater financial commitment from the developed world in the language of the Brandt Commission. The conclusions reached were tentative and relatively modest, attempting to put a brave face on a poor situation and downsizing the promise of decisive change.

> Despite the failure to meet the quantitative goals, much was learnt from the experience of the water and sanitation decade ... There was further realisation of the importance of comprehensive and balanced country-specific approaches to the water and sanitation problem.
>
> Most importantly, perhaps, was the realisation that the achievement of this goal that was set at the beginning of the decade would take far more time and cost far more money than was originally thought. (Choguill, Franceys and Cotton, 1993)

The debate was one about *realism* in development: accepting that targets had to be modest and, implicitly, that adequate funding would not be available. Projects, it was argued, should be modelled on this reality. The conclusion that the inadequate provision of resources had been disastrous for the people of the Third World was not drawn possibly because a recognition of failure would concede that there was no real commitment to solve the problem; it would also possibly undermine the morale of those who worked in the institutions involved in the implementation of water and sanitation provision. The main lesson (also espoused by many a politician) was, despite the evident desperate need for clean drinking water, not to promise too much.

> One of the early lessons was that setting unrealistic targets is counterproductive. All the Decade players – donor agencies, project managers, technical experts – have been struggling throughout the 1980s to escape from the notion created by the hype that anything short of facilities for everyone would represent failure. (Appleton and Black, 1990)

An acknowledgement of failure was avoided by both the international agencies and the professionals involved in implementation. At one level this

was understandable in terms of avoiding demoralisation, but it also meant there was no clear review and understanding of all the factors involved in the underachievement.

The Decade was assessed not in terms of a lack of international funding and commitment, but rather in terms of grossly optimistic targets, inappropriate technology and misguided social techniques. Rather than make an extensive evaluation of resources and results, the professionals involved in water and sanitation programmes emphasised learning and new approaches, learning from what worked – at the lowest level and scale. The conclusion drawn by conservative economists from this failure of public intervention was to cut back on commitments to further finding. Among the sincere reformers, there were attempts to salvage the commitment to comprehensive delivery through public services from those advocating wholesale privatization. The emphasis was placed on the lessons to be learnt from the international mobilisation.

The results of the Decade have been contested and, in the apparent tradition of international finance organisations, no thorough and public evaluation was officially made of the process.[4] It seems that in the process of implementation it became clear that nothing like the investment appropriate to the task would be made available, that there was no continuing commitment from the political leadership, and that there were difficulties in ensuring sustainability (although the term did not attain the ascendancy it did later). A full schedule of difficulties and disappointments is hinted at by commentators of the time. One of the few reviews of the time listed the problems. These included much lower funding for the programme being available,[5] and the failure of operations and maintenance in many rural water projects (Valdes-Cogliano, 1985: 41).

The twin concerns, working within limited expenditure and giving emphasis to operations, led to a rethinking of priorities long before the Decade concluded. Practitioners and national planners made a turn towards smaller-scale initiatives and eventually to increased community participation. Black (1998) refers to a period of concern about appropriate hardware being followed by reflection with *software* including, in particular, the participation of the rural poor in the planning and management of projects.

There were two impulses here: the first to secure (in the jargon of development) 'buy-in' from communities to secure their compliance if not full agreement both to the project (through advancing a proportion of its capital costs) and to the method of its implementation, and the second to ensure that communities were prepared to meet the costs of operation and maintenance. At one level, the approach stressed the fact that many of the larger initiatives were unsustainable and that greater stress should be placed on smaller projects with

simpler technology, on institutional development and on clearing blockages rather than additional funds. The implementing agencies themselves had to improve and develop a more appropriate method. (In South Africa this led to the development of an unusual NGO, Mvula Trust, based on demand-responsive policies, whose leadership ascended rapidly into the ranks of the World Bank.) At another level, practitioners and those more closely involved in implementation were more positive: access to water services had come to be regarded as a human right – an assertion which bore more fruit in the 1990s. Despite this recognition, the extension of basic services had to depend on demand and this in turn depended on the precarious income of impoverished communities.

Some of the lessons listed in Box 2.3 seem unexceptional; others show a direction in policy increasingly towards cost recovery and detachment from a sense of urgency. There seem to have been at least two approaches to the international drive to achieve some advance in water provision and improvements in sanitation. The first inclination was to reject the idea of an 'activist', interventionist, developmental, international organisation and state as an inappropriate instrument of policy making, planning and delivery and rather to stress the value of water as an economic good, that is, to expand the role of markets. Although this was not quite so clearly stated at the time, the campaign for private sector participation, or privatisation, had been initiated.

A more considered review of the Decade, relying on the benefit of hindsight, would come to a more comprehensive set of conclusions, essentially advocating doing more with less. In addition to the broad strategic lessons implicit in much of those conclusions mentioned earlier, including appropriate technology and better management of operations and costs, the following lessons also seem to have been learnt:

- Set lower goals, as (realistically) sufficient funding will not be available, rather than argue strongly for more resources.
- Emphasise the very simplest level of technology with wells and village hand pumps to make local water sources more available to the poor within existing budgets.
- Place responsibility first on communities and second on national governments rather than on international organisations.
- Place the responsibility for initial capital resources on communities (demand-responsiveness) and require communities to be responsible for operations and maintenance.
- Make water provision an aspect of community development rather than a public health issue.
- Seek ways in which more can be achieved with more or less the same financial commitment by fixing systems rather than providing greater funding.

**Box 2.3** Lessons learned

- Greater emphasis on an instrumental role for international programmes as analyser, networker, communicator of ideas, and so on, rather than direct implementation;
- no single model to follow, examine local successes;
- software alongside hardware is essential;
- demand-responsiveness and decision-making at the lowest appropriate level leads to complex variables of success or failure; and therefore
- common indicators have to be identified to provide 'structured learning'.

*Source:* Black, 1998: 64–6.

- Pay greater attention to the role of women in managing water resources and benefiting from delivery.
- Stress better utilisation of water to improve health conditions: for example, hand washing, construction and use of toilets, and such like.

The mixture of apparently progressive measures such as the involvement of communities and recognition of women's participation with the lack of public commitment to delivery has continued to the present.

Significantly during the Decade there was a gradual shift in the overall direction from public health and its international organisation, the WHO, to development agencies, particularly the UNDP. This made explicit what was an evident tension that manifested itself to some extent in the debate over transferring water delivery out of the hands of public health engineers and giving the responsibility to 'publicly spirited' innovators who could devise schemes showing how to do more with less.

The key point made by the neo-liberal critics of previous publicly financed and administered schemes was that public health engineers were unable to appreciate the need to provide a lower level of service, which was cheaper in both capital and operating costs. These engineers were presented as classically urban, oriented towards a high service level, incapable of understanding the rural dimension, and inflexible. Significantly, the example comes from water, largely the domain of these engineers, rather than sanitation.

> At the start of the Decade, the major inhibition to the provision of water supplies in rural areas was that public health engineering authorities in developing countries were classically structured to provide and administer centralised piped water systems with household connections. These were self-evidently impractical and unaffordable for rural communities which might be situated far from main roads, whose households were often scattered, and whose members were primarily engaged in homestead farming of a semi-subsistence kind and lived in dwellings constructed from natural materials. (Black, 1998: 3)

If these engineers were falsely accused, they defaulted in not providing a defence of themselves or of a higher level of service; gradually both these engineers and the WHO are not mentioned in terms of delivery. Certainly there were other principles or developmental issues at stake: the delay in the rise in rural incomes in developing countries that would have made higher levels of service financially viable, the low levels of public investment, and a numbing lack of concern for child health in poor countries.

In a number of documents relating to water services it is mentioned that the relationship between clean drinking water and sanitation and improved health, although clear in theory, is often difficult to establish in practice. Even though sanitation, particularly, can have a marked effect in improving child health, such arguments have not been to the fore in discussions over necessary investment in public health facilities, and WHO has not until recently been prominent in its advocacy.

## Recovering costs, managing demand

One of the lessons drawn by the World Bank and other agencies from the Water Decade was to install demand-responsive policies and to decentralise water delivery. The language of demand appears contradictory. Obviously, poor people do demand water services through the political parties speaking on their behalf (a subject not often broached in the literature), but the 'demand' sought by the World Bank is not political but economic. On demand-responsive principles, projects should not be initiated where they were not 'demanded', that is, where there was not a willingness in the community to put aside an amount for capital costs and a commitment to meet the costs of operation.

Although at one level it seems common sense that people should be committed to their own improvement, it is not quite so simple. Such policies have operated to increase the exclusion of the poorest and have made whole communities vulnerable to water-borne diseases. Demand-responsiveness is an important step to constituting water as an economic good and in the longer term to making room for multinational water companies, to advocating privatisation in the form of concessions, management contracts, and so on.

To bring projects within the typology of 'demand-responsiveness' of very poor people involved considerable changes in the type and extent of technology used. According to Black (1998), the first new strategy of the Decade was to downscale projects and to concentrate on rural needs. First, community hand pumps were developed and tested in 15 countries, and, second, the concept was developed of village-level operations and maintenance (VLOM) that

served as the appropriate level at which to maintain the simple technology. There were problems with the original water pump and constant testing and redesign.

These preoccupations indicated the extent of the shift from extensive projects and reticulation to engagement at the local level with the simplest and cheapest of technologies. It appears that the practitioners accepted that the target of covering the entire population would not be reached, but that the greatest progress could be made only if these techniques were adopted. This was never explicitly stated but the emphasis on smaller-scale yet more sustainable projects implied such a change: attempting to spread coverage as far as possible through simple techniques. Essentially the focus had moved from the vision of delivering water for all through comprehensive plans, to an emphasis on small-scale initiatives, which would advance in a piecemeal fashion doing what was possible with the means that were available.

Instead of a preoccupation with delivering water and sanitation services, the emphasis turned to sustainability. The lessons were evident to the planners who reviewed the problematic progress made in the period up to the Water Decade. The issue was raised in terms of the breakdown of services, which had been implemented without sufficient foresight concerning their operation and maintenance, and with a dislocation between the local and national support systems. The argument for sustainability was presented as a response to the typical type of breakdown experienced during the Decade:

> Where authorities responsible for rural water supplies had installed significant numbers of hand pumps, a high proportion of these broke down after a period of time – and remained broken down. Centralised systems of operation and maintenance were inappropriate for 'systems' in which each installation was a separate, stand-alone facility located some distance away. Where such installations had been provided in the name of public health as a free public good, there was no sense of community ownership. Consequently, when they broke down the community did nothing. They neither knew how to mend their system nor perceived the breakdown as 'their' problem. This raised another issue: did they value the service and if not, why not? (Black, 1998: 14)

This extract sums up the argument for demand-responsive policies, greater community participation, simple technology and a greater emphasis on the economic value of water by placing the cost burden more directly on the shoulders of the poor. What is not mentioned is the faulty technology used in the early phase, practical engineering problems, the lack of a developing civil society in many Third World dictatorships and the desperate impoverishment of the rural people targeted. Social disorganisation, low levels of education and

local conflicts are integral to impoverished communities and it is unlikely that the poor of the world want to take 'ownership' of projects when they become problematic.

Still what was presented as the universal case study seemed to have some validity (in the inefficiency of public administration in poor countries) and to be linked to a hard-headed acceptance of the economics of scarcity in relation to funding. With a deficiency in funding more had to be squeezed from poor people to make delivery viable. The argument focused on the notion of sustainability at a community rather than a regional or national level.

> 'Sustainability', in short, required that people – even poor people – would have to make some financial contribution, at least to maintenance. 'Cost recovery' became the new watchword, bracketing sustainability and VLOM with savings. (Black, 1998: 28)

The attractive notion of sustainability was fused together with the most rigorous cost recovery. The need to be tough-minded was reinforced by the knowledge that the investment resources needed to provide full coverage from public funds, given the rate of population growth and the economic setbacks many developing countries were facing, were never going to be available. Around $10 billion was being invested in water and sanitation each year by the end of the Water Decade; but this was a small fraction of the amount needed to provide full service coverage. In terms of the policy of cost recovery, water and sanitation systems would have to become more financially self-sufficient, even where they catered to low-income communities.

## Placing the sting on the poorest

While the term 'sustainability' had a comforting and environmentalist ring to it, it was burdened with ambiguities. It appears to offer the prospect of local initiative, democratic management and greater participation by women; but it carried a cruel sting: the poorest were expected both to raise capital for construction and to meet the maintenance costs of projects. The poorest had to take the greatest level of responsibility for water services: organise the 'demand' to be presented to the appropriate authority, levy the capital charges and maintenance tariffs, and manage the projects on a 'standalone' and low technological basis. There was and is a sharp contrast with more prosperous urban communities who were not expected to make these contributions except to pay the tariffs imposed. On this basis 'demand responsive' policies are

inequitable, placing the greatest burden on the poorest for the lowest level of service.

While these problems associated with the very localised versions of sustainability were clearly evident to practitioners, they accepted the hard logic of scarce resources being stretched to cover larger numbers. The language of development readily adapted to new conditions.

> The vocabulary of 'sustainability' was speedily adopted by development theorists and practitioners, including those concerned with water and sanitation. The need for services to be 'sustainable' became the new conventional wisdom. Essentially this meant that service spread and management should be cost-effective, taking into account constraints on the resource itself, and on the availability of financial resources. (Black, 1998: 28)

The allocation of sufficient resources to do the job is, however, hardly referred to in the lessons drawn and neither were the development policy makers and practitioners vocal in advocacy for more resources.

From this interface between cost recovery and democratic participation arose the concept of '*demand-driven*' policies and practices which now generally characterise country policies in much of the Third World. The impulse for demand-driven policies is to spell out 'demand' in the economic sense of textbook 'effective demand' in which communities have to organise themselves to represent the communities to the appropriate authorities, initiate the project steering committee, contribute towards capital costs, be active in the implementation of projects, and undertake full responsibility for operations and maintenance. This policy marked a decisive turn from state-driven policies in which state agencies and intermediary non-governmental organisations (NGOs) operated to implement projects for which budgets had been provided from the national treasury or international organisations and only in conclusion have projects been handed over to 'the community' for operations and maintenance.

Demand-responsiveness was presented as a 'radically different approach' from that of the past combining innovation, flexibility and learning processes.

> It requires a new way of designing projects to pay closer attention to the correct incentive structure that will elicit appropriate responses from a wide range of stakeholders – communities, NGOs, private sector and government. (Sara et al., 1998: 3)

Through this approach water would be managed at the lowest appropriate level largely as an economic rather than a social good, in a holistic manner in which women would have a key role.

The concept of 'demand responsive' approaches was well expressed in the World Bank's approach from the beginning of the 1990s (Sara et al., 1998). Again 'demand responsiveness' implies the recognition by implementing agents of the water needs of the poor rather than an insistence on paying. But the term is one of current economics rather than of public management and relates to *effective* demand, or put more simply, to the willingness to pay.

## Costing a public good

The evolving new strategy carried its own ideological template. A crucial element in the post-Decade approach was the stress on water as an economic good and less of a public health service. The concept of economic good was essential to the 'radically different approach' (Sara et al., 1998: 3) which became known as the Demand-Responsive Approach. Although this was not clearly spelt out in documents, water as an economic good would have to be priced at full cost, an emphasis would be placed on cost recovery in maintenance, and mechanisms would have to be sought to involve communities in meeting both capital and operational costs. Cairncross (1992) in making an important review of the period argues that water should be treated as an economic good and should be viewed as a *product* instead of a *service*, in order to stimulate consumer demand. From this perspective progress in delivery depended most on marketing and responding to 'consumer demand' rather than on development planning.

The conception of water as an economic good was linked to the highlighting of its scarcity; recognition of scarcity in turn would encourage cost recovery. This emphasis tended to displace the question of the allocation of funds; the battle to achieve delivery; the negligent role of many states, which were being consumed by profligate trappings and military expenditures and which ignored social needs and even the nature of participation by the poor in projects.

Rigorously enforced, such a policy would exclude the poorest who are most likely to be both 'demand deficient' (without cash) *and* less socially organised.

The stress on *participation* had two sides; first, there was a sense that this was the method to achieve cost recovery and ultimately sustainability of projects, and, second, a democratic and popular impulse to put the services in the hands of the people. Both elements have been held in uneasy alliance. The first was emphasised relentlessly by international funding organisations and the second was developed by NGOs as the answer to the challenge of producing democratic systems of delivery and operations. There has been much written on the

human factor in development, which is instructive, although it also somewhat diverts attention from the essential questions of state support, welfare and equity in systems of delivering services. There was an evident link in the sense that projects were now becoming defined as 'community projects' with simple technology that placed the community with the full responsibility of providing the cost for their continued operation.

## Domineering vested interests

The demand-driven policies have strong advocates not only in international finance institutions but also among NGO officials, but three points have to be made. First, what is just described is essentially an 'ideal type' formulation which obscures actual practice in many countries. In South Africa, although demand-driven policies have been officially approved, there has been a decisive shift from the 'ideal' both by the state *and* the NGOs involved in the commitment to speed up delivery and to provide free services. Second, whether demand-responsive policies lead to greater sustainability has been contested (there is research establishing proof of this reciprocal link) and practically it has proved more difficult and much slower to insist on communities raising capital amounts first. Many projects not administered on a demand-responsive basis were equally as sustainable. Third, demand-responsive policies are intrinsically exclusive and imply that the poorest will not be able to afford access to clean water, a trend that has been identified in South Africa.

Demand-driven policies apply particularly to rural communities, and research papers on the subject make this an unconditional assumption. The requirement that rural people should provide a disproportional amount of costs drives a further divide between urban and rural provision.

There are, of course, other elements in the 'demand' for water projects, not least those of contractors, providers of equipment, investors, all of whom need projects to sustain themselves and politician allies who may rely on the support of contractors and related entrepreneurs. Although this is not part of the established literature on development, in some countries there is a simple relationship of dependency between the two parties: the politicians who sit on tender boards depend on companies to provide the financing for their election campaigns. In the case of the Lesotho Highlands Water Project some $5m passed as bribes between contractors and a state official for their tenders to be successful (Adams, 2002). The tendency in the strong advocacy conducted by contractors with politicians is to 'upscale' in terms of size of contract and

technology; the rewards to the company are much greater with larger size, which may help explain the virtual inevitability of corruption, cost over-runs and profit taking in larger projects.

The observance of demand-responsive policies holds a contradiction between planning, which provides a big picture in delivery, and demand-responsive policies, which are open-ended and piecemeal. These, theoretically, are opposite phenomena pulling in different directions. Depending on the definition of community (a notion that is largely smaller than larger) there would be a very uneven queue for delivery. Planning could lead to benefits on a regional scale, while demand-responsive policies lead to a patchwork of served and unserved communities. In fact, in any context there are a few examples of differing strategies in the experiences of local people, and it is hard for them to be convinced of the need for capital to be collected when a nearby village has had delivery without 'demand-responsive' tactics being imposed.

By definition there will also be inequitable results with the better-off sections of a community insisting on a higher level of service because they are prepared to pay and exclude large sections who cannot afford the monthly tariffs.

## The new period: cost recovery, privatisation and human rights

The lessons of the Water Decade went further than the changes in policy and led to a set of new international coordinating institutions with appropriate sets of principles.

In the aftermath of the Decade, the emerging position was cemented in place in 1992 in the Dublin Principles on water, which brought a large number of professionals and policy makers together around a common concern over the scarcity and misuse of fresh water. The Principles incorporated many aspects of the lessons of the Decade, including demand responsiveness and the economic value of water (Box 2.4).

While scarcity was the main theme ('fresh water is a finite and valuable resource') of the Dublin principles, they also stressed the need for public participation and the role of women. But the emphasis on scarcity led on to the most important definition of water as an economic good, a very significant statement which emphasised markets in water and cost recovery. The Principles combined recognition of some crucial elements in community water management, in particular women in water management, but also publicly opened the road to the commercialisation of water around the notion of scarcity. The main recommendation was that a new approach was required – recognising

**Box 2.4** The Dublin Principles, 1992

- Fresh water is a finite and valuable resource, essential to sustain life, development and the environment.
- Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels.
- Women play a central part in the provision, management and safeguarding of water.
- Water has an economic value in all its competing uses and should be recognised as an economic good.

that water is a scarce natural resource – an important perspective at one level, but one hardly appropriate in considering meeting the needs of the poor who have the lowest consumption. The various elements in practice existed in contradiction with each other.

The Dublin Principles both contained an emphasis on water as an economic good and marked a growing acceptance of *water markets* in combination with democratic and equity elements (in the role of women and participation) which tended in an opposite direction. Very importantly, there is little emphasis on the role of the state in approaching the question of water from an angle associated with more democratic practices.

In the period, which followed, it was argued that the private sector was more efficient than government and had other advantages such as the ability to raise funds. Although the arguments were not necessarily consistent, it was variously argued that the private sector could provide greater coverage of the population, could manage resources more efficiently (as measured by the fewer workers employed to maintain the same or better levels of delivery), had greater impact on the health of the population served, and, most important, had access to the necessary finance (WWC, 2000). All these points were vigorously contested by researchers and practitioners, but, irrespective of the evidence, the arguments have become part of the dominant discourse in contemporary water delivery. Despite a victory in official policy, it is argued later, rampant privatisation has not followed in the South even though there have been significant developments and even though a policy environment has been enforced by international finance organisations inducing governments to accept the private sector in delivery.

The Earth Summit of 2002 was the marker for the opening up of a new and highly contradictory period. At one level, much less is promised and the emphasis is placed on the better management of existing financial and natural resources. International institutional direction is de-emphasised and the responsibility of the nation-state is stressed. The tension between the different elements

**Box 2.5** The main Millennium Development Goals

- Eradicate extreme poverty and hunger.
- Improve maternal health.
- Achieve universal primary education.
- Combat HIV/AIDS, malaria and other diseases.
- Promote gender equality and empower women.
- Ensure environmental sustainability.
- Reduce child mortality.
- Develop a global partnership for development.

is, at times, acute. An article in the *UNESCO Courier* pithily sums up the various contrary moments:

> Access to water is at the same time a basic need, a fundamental right and a potentially lucrative market.[6]

For the first time, however, at such a summit, there has been serious contestation of policy by social movements and NGOs generally opposed to privatisation. So fierce has been the opposition to the sale or private management of water networks that even leading executives stated at the summit that they were not planning further initiatives. Despite this, and the trend towards fewer public–private partnerships in poor countries, there are currently attempts to encourage private involvement through bilateral trade negotiations and other processes marked by imbalanced power relations.

The MDGs adopted by the United Nations in 2000 (and extended at the Earth Summit in 2002 to include sanitation) in one sense indicated the closing of the approach that stressed greater capital investment through 'decades of development' (see Box 2.5). Instead a new period has emerged through the WSSD in which modest targets are set at an international level and far greater responsibility is given to nation-states to provide the required funding. In turn, the pressure has once again been placed on local communities to provide both a level of commitment to raising capital and maintenance costs and to undertake the social management of projects. This remains the dominant paradigm in water delivery and is reflected in this book in a number of the chapters that follow.

## Reinforcing the contradictory tendencies

There are two additional and contradictory tendencies, which pull policy and practice in different directions at the same time. The first is the enormous

pressure exerted internationally on governments and international agencies to stress the role of the private sector which is almost inevitably not the small vendors of water (often mentioned in studies as charging exorbitantly for carrying water) but rather the multinational corporations which span the globe. In international trade negotiations and through the policies of the IMF and World Bank, policies are advocated or enforced that favour the privatisation of water services. This is somewhat contradicted by the human rights or social justice perspective in which access to water services is advocated as a basic human right both as an international standard and as a strategy to get greater attention and resources to the needs of the poorest.

These different and often conflicting perspectives mark policy in the new period; on one hand there is sharper and more determined advocacy from social movements and more strategic NGOs such as WaterAid, and on the other there are very modest targets put forward and a lack of determined commitment from international funding bodies. In addition to organisations among the poor demanding delivery there are NGOs, which range from being the implementing agencies of funding agencies, with little independence from state or banks, to engaging in increasingly strident advocacy. A recent advert in a British newspaper, for instance, showed a woman pouring filthy water from a waterhole into a bucket and carried the caption: What kind of mother makes her child drink water like this? One that doesn't have any choice.[7]

The new period carries all the tensions within such divergent principles as access to water as a human right, the opening of markets in water, and the spelling out of broad 'pro-poor' policies by national and international development agencies. These contradictory elements are all uneasily balanced, with unpredictable swings from one pole to another. The same newspaper which strongly advocates greater delivery, for instance, also carries a statement from a then British government minister arguing for private provision on the grounds that only the rich elite support public services in the Third World. Yet these are the very policies most strongly opposed by the very poor.

Of all the themes stressed by the international agencies none are as pervasive as that of private participation and management of public resources.

## Privatisation: a new panacea?

Although need has been clear for many decades and the results of inaction have been made evident by public health research, the necessary resources still have to be committed to the problem. Increasingly, the attention being turned

to the problem of resources has turned to the private sector in the hope of accessing the considerable resources of the water multinationals. In the statements of various water conferences and reports there is increasing mention of the enormous prospects for the private sector and the weakness of the public sector in meeting basic needs.

The argument for private participation opened by stressing the evident weaknesses of the state, particularly in managing cost recovery. It was further reinforced by the wider theoretical perspectives of water being an economic good and that markets existed for water. The state lacked commitment, was bureaucratic and inefficient, and finally was incapable of extending services to reach the goal of providing for all. It was argued, for instance, that only 35 per cent on average of the recurrent costs of services were being charged to users: this was leading to stagnation and deterioration and preventing any extension of services to the poor.

> This analysis played an important part in the development of sector thinking. It appeared to demonstrate once and for all that, in the developing world, endowing public bureaucracies with exclusive authority for installing and operating water supply, drainage and sewerage works was simply not going to work. They were neither motivated nor empowered to function cost-effectively. (Black, 1998: 52)

From this argument the evident conclusion was that households and the private sector had to take over.

> The standard pattern of water and sanitation services would have to be reversed, and responsibility re-conferred on individuals, households and private entrepreneurs. (Black, 1998: 52)

As the difficulties of delivery within the Decade were encountered, an increasingly sharp critique was made of the public sector itself, particularly in the urban areas. The quotation below expresses some of the contemporary perceptions of urban public sector management.

> Extensive review of urban infrastructure programs, notably by the World Bank, revealed that many municipal water authorities in developing countries were grossly inefficient and wasteful of scarce supplies. Population growth and changing living standards were causing water consumption and waste output to rise dramatically, putting extra strain on services. Public utilities could not keep up. Leakage and mismanagement were rife. (Black, 1998: 52)

This was a dramatic and savage attack on public institutions delivering water, emphasising the visible problems rather than analysing the reasons for these deficiencies. Public sector failure has become an important theme in an explanation of the difficulties in meeting the needs of the rural poor, and international finance organisations are increasingly becoming engaged in advocacy of private sector participation as a solution to these pressing difficulties.

At times the language was commercial and crass, proposing that water should be marketed as a *product* and *not a service*:

> The principal lesson is that progress and continuing success depend most on responding to consumer demand. A program's designers and managers must understand that they are selling a product, not providing a service. Where sufficient demand exists, the facilities and services offered must be tailored to that demand; where demand is not strong, it must be stimulated. (Cairncross, 1992: v)

In the reaction to the failure of the Water Decade, there was a decided change in policy. The view that the state should provide a necessary public service to ensure health and survival of the poor slipped away. Instead it became conventional wisdom that water and sanitation services should be a product subject to the rules of the market. In the immediate aftermath of the Decade, however, the more definite conclusions about the need for accelerated private participation were not firmly expressed but implicit in the increasingly *commercialised* view of water services.

Initially the argument was not for comprehensive private participation but for the means to secure greater efficiency of water projects through community participation from the very beginning of projects: first in the start-up capital, and second in operations and maintenance. The argument was that even the poorest would be prepared to make a financial contribution (and money was always stressed) if they were convinced that the project was 'theirs'; such participation would induce payment which would mean that the project would have a much greater chance of sustainability. In addition, the argument was not so much about the total amount saved by community financial participation (although this could become substantial if there was effective operational control by communities); rather was that there should be a limited role for the ineffective state. Implicit was the assumption that these public and evident deficiencies led directly to the conclusion that the private sector (in reality large multinationals rather than small independent operators) had the solution to the problem of delivery to the poor.

## From a trickle to a storm

A series of international agencies such as the PPIAF (Public–Private Infrastructure Advisory Facility) have been set up to encourage and assist in launching private sector participation. Starting with the critique of state involvement as inefficient, slow, and incapable of raising the necessary finance, these agencies proposed a new role for the same state as facilitator and regulator rather than financier and manager. Such advocacy, accompanied by international grants and loans often requiring private sector participation, has succeeded in encouraging or even directing states to 'harness the benefits of private participation'. The course of privatisation accelerated in the period 1984–89 during which time 26 developing countries awarded 74 infrastructure projects to private concerns. By the 1990s the rising tide turned into a 'wave that swept the developing world' with 132 developing countries involving private companies in 2,500 infrastructure projects attracting investment 'commitment' of $750 billion. The private sector promised in return 'innovative and cost-effective solutions to increasing coverage, raising quality standards' and improved cost recovery and sustainability (PPIAF, 2003).

The wave that surged forward in Latin America and East Asia peaked in 1997 and then declined as the economic crises of the late 1990s and particularly collapsing currencies devastated the repatriation of profits. A number of high-profile projects were cancelled and the large total sums of commitments deflated as issues of corporate governance and the economic slowdown 'led to a chilling effect on investors and resulted in declines in investment so that 2001 levels paralleled that of the mid-1990s' (PPIAF, 2003). Despite this, almost all developing countries now have the involvement of a multinational in infrastructure, and the case for the profit-led involvement in delivery to the poor seems to have swept the board.

There are, unfortunately, a series of confusions about the prospects for private sector investment in the areas of greatest need. First, despite the evident involvement of prominent companies of virtually all developed countries, there is a misunderstanding about the commitment of these companies to undertake substantial investments in countries where there are high levels of risk, particularly currency risk. Almost half of the projects have seen contracts renegotiated, generally on terms more favourable to multinational companies to secure their continued interest.

Second, multinational companies are only really interested in municipal services in better-off cities in which there is a considerable cash flow and not in providing extensive new services in rural areas to impoverished communities.

The very low levels of involvement in sub-Saharan Africa graphically demonstrate this.

Third, these companies do not really want to take direct responsibility for setting tariffs unless there is strong official municipal support to take political responsibility for such decisions. Tariff increases, even with municipal support, have made water companies fearful of the 'broad resistance to raising tariffs to cost-recovering levels' (PPIAF, 2003: 144).

Fourth, the water companies can only invest if they find there is a relatively high rate of return, usually in the region of 25–30 per cent per year and the right to repatriate profits without currency controls.

Finally, of course, there is deep suspicion of multinational companies in the poor countries which increases the overall risk for these companies. All in all these are not necessarily attractive propositions for the companies.

All these factors have limited the onrush of multinational companies in the water services in the South. Despite this, as we have seen there has been an increase in activity by multinationals in water services internationally. The explanation is as follows:

> Two factors have fuelled the expansion of private sector activity in the urban water supply and sanitation (watsan) sector in recent years. On the one hand, international lending institutions and the World Bank are aggressively pushing for Private Sector Participation (PSP) in the watsan sector in low- and middle-income countries, often as leverage for structural adjustment lending. On the other hand, several factors internal to governments in these countries also pave the way for engaging the private sector in what was traditionally a public sector activity.
>
> These factors include: high public sector deficits and the need to reduce them; a shortage of investment resources; moves to de-politicise water provision and tariffs. In addition, the provision of water supply is becoming more complex due to the combined effects of pollution, scarcity of water resources and increasing demands on drinking water quality. Public utilities are barely coping with new technical, administrative, and management requirements that such complexities pose. (Calaguas, 2000)

International water bodies are becoming more insistent that the private sector has to be involved because of a shortage of resources. The World Commission on Water for the Twenty-First Century, a panel sponsored by United Nations (UN) institutions, has frankly called on governments to step aside, arguing that the private sector, which alone has the money for huge investment, should take the lead. Governments should keep out of the water business, it claims, except as regulators and protectors of the environment (WWC, 2000).[8]

This Commission was chaired by World Bank vice-president Ismail Serageldin. Two concepts were highlighted: first, full-cost pricing ('the single most immediate and important measure') and, second, that investment had to come from the private sector (WWC, 2000: 33, 4).

Despite such uninhibited and unreflective advocacy, internationally there is a debate, often heated, over the involvement of the private sector. An NGO such as WaterAid which expresses support for the view that the private sector has a 'crucial role to play' also argues that developing countries do not have the capacity for regulation, have not yet achieved community participation, and lack entitlements and enforcement of rights. In these conditions the strong promotion of the private sector is contentious and 'radically reshapes basic relationships' between civil society, business and government.

## A renewed urgency: the state and delivery

The sharp controversies over the nature of the partnerships being launched in the water sector arise, in part, from renewed commitment to delivery, to human rights, and to establishing democratic 'developmental' states. Ironically just as the critique of the state in developing countries is becoming conventional wisdom, there are new pressures to overcome these weaknesses and establish human rights for the downtrodden and poor, in short to entrench social justice, rather than offer concessions to the private sector. These arguments lead towards the reform and strengthening of the state which ultimately is the only agency capable of meeting the costs of bringing water and sanitation to the billions of poor in need. Although the rules of current conservative public finance exclude the immediate commitment of the state to such funding (and few states build expenditure around any recognition of social need), the private sector certainly is not prepared for any such welfare. In the longer term the state is the only possible guarantor of financial commitments and rights.

In Table 2.4, the target percentage coverage on the basis of the MDGs' target of halving the backlog in water and sanitation is presented in the run-up to 2015. Although Jolly (2003) is optimistic that these goals can and will be reached, two aspects deserve attention, the first being the modest target for rural sanitation, and the second the relatively large number of people involved. Over two decades (1980–2000) it has been possible, according to the UNICEF/WHO figures, to deliver water and sanitation to 2 billion people (see Table 2.4). To meet the relatively modest goal of the MDGs it is necessary to do this again in the coming decade, and even this

**Table 2.4** The growing backlog – halving the number of those without water services by 2015

| | MDGs target access by 2015 (%) | Additional population (billions) |
|---|---|---|
| **Water supply** | | |
| Urban | 97 | 1 |
| Rural | 85 | 0.6 |
| Total | 91 | 1.6 |
| **Sanitation** | | |
| Urban | 92 | 1.1 |
| Rural | 59 | 1.1 |
| Total | 81 | 2.2 |

*Source:* Jolly, 2003.

will only then bring delivery to 59 per cent of the rural population. It seems that responsibility for these goals is being directly placed on countries within a policy framework that increasingly privileges the private sector.

With all their limitations in goals and in practice, the MDGs represent a certain advance in giving some acknowledgement of 'positive' rights and in bringing governments uneasily to a limited commitment to the poorest and to allowing some monitoring of the process. At the same time they are elastic in their target and not directly supported by international grants. The new period is not marked by a coherent strategy and policy (as evidently there is no general plan to end poverty or achieve the MDGs) but the commitments to MDGs exist in possible uneasy combination with human rights and renewed and more intense scrutiny of delivery.

Currently, new relationships are being explored between the national states and international organisations. There is much greater emphasis on the responsibilities of national states to undertake their commitments[9] rather than an obligation on international organisations to drive the process. It is also a time when the language of human rights has become a dominant discourse for the first time in international affairs. This is a discourse full of contradictions and even absurdities, but in one sense this is something new.

Many regimes that have the most abhorrent internal repression of minorities, and so on, can receive approval from the powerful countries, while governments with generally progressive policies can be criticised or isolated for undermining the new international order. Even so, there is a certain step forward, mostly marked by the greater influence of 'civil society' in international debates. The NGOs of various kinds and the people themselves in social movements and international campaigning groups have stressed that human rights should be extended from the 'negative' rights stressed by neo-liberal advocates

(the right to no state interference in individual affairs, private property and freedom from regulation generally) to 'positive' rights in which the language of rights extends to effective and full access to life-giving services such as water and sanitation, health, education, and the like.

The Blair Commission for Africa (CfA) represents many of these features, attempting to draw together the strands of common interest between the rich countries and the poorest continent. While reviewing the goals set out by the Africa Water Vision (which aims to reduce by 75 per cent the proportion lacking access to safe water and sanitation by 2015), it finds that on the existing basis the water target of the MDGs (a reduction by 50 per cent) will not be met until 2050 and the sanitation target will not be met by 2100 (CfA, 2005: 199). The Commission defines access to water as a right and a basic need, and spells out how the health benefits of access to water would lead to the improvement of productivity and the quality of life of poor people in Africa. It calls for donors to reverse the decline in aid for water services to enable the Africa Water Vision commitment to be attained. The CfA supports the African Ministers Council on Water and emphasises the need for a sector-wide approach and sectoral co-ordination (CfA, 2005: 200).

This direct appeal to the Group of 8 most powerful nations had, however, an ambiguous reception and subsequent to its publication has become lost in the preoccupation with the 'war against terrorism'.

## Pre-eminence of water issues

Despite this, there is a preoccupation with water issues which, in a sense for the first time, establishes water and sanitation as the pre-eminent issue in social development: freeing people from deadly water-borne diseases, reducing child mortality and allowing the greater empowerment of women. This emphasis is confirmed by the announcement by the European Union on World Water Day 2004 that water was firmly placed at the top of its political agenda.[10] There is, unfortunately, not an equal apportionment of attention to sanitation, nor to commitment to funding social alleviation.

Water scarcity and water poverty both now figure as key concepts in development which assist in exploring and establishing the multivariate relationships between water and poverty. Analysis, research and debate have clarified the limits of multinational companies in promoting delivery, the essential nature of the state in delivery, the role of civil society in human rights work and advocating the right to water, and the need for much greater resources to be devoted to ensuring that the MDGs are reached.

This exploration of the issues in international development debates helps provide something of the background to the concepts of water delivery and policy and strategy. A number of papers explore the relationship between water services and poverty, the right to water in the national context, and the health disasters resulting from gaps between policy and implementation.

In a number of countries constitutional rights to water have been established in law and reinforced in policy. Although such established rights can lead to successful legal action (such as the Groenboom decision in South Africa, which commits local government to meeting constitutional requirements), the results make it clear that all 'social' rights are ultimately dependent on the ability of governments to provide the necessary resources, on a delivery system which is effective, and on forms of welfare that ensure that there is not only access of some kind, which could establish some level of service, but also effective and full access which ensures the health benefits promised in theory.

Although there have been contradictory pressures and no steady progress in water delivery, there has been continuing research and new levels of advocacy at times from individuals previously associated with enforcing the old 'regime'. Increasingly the arguments are now for greater resources to be provided, for a more critical attitude to be taken towards privatisation and for more strident advocacy in the face of unchanging policies by the most powerful nations.

The issues are becoming starker and more urgent. A World Bank evaluation has concluded that currently 166 million people in 18 countries are affected by water scarcity and another 270 million people in 11 countries are 'water stressed'. It is predicted that by 2025, the number of people affected will increase to approximately 3 billion or about 40 per cent of the world's population (Pitman, 2002). This problem is now considered so severe that it requires a strategic approach that emphasises equitable and sustainable management of water resources.

The World Bank itself through the World Water Report argues that without radical steps the situation will only get worse as the population surges from 6 to 8 billion by 2025. In the next two decades, water use by humans will increase by about 40 per cent, and 17 per cent more water will be needed to grow food. One billion people do not have access to safe water and 2 billion do not have proper sanitation and the numbers are growing. Its report says gloomy arithmetic adds up to a crisis for the human race.

Faced with what a UN body describes as 'inertia at the leadership level', the global water crisis will reach unprecedented levels in the years ahead with 'growing per capita scarcity of water in many parts of the developing world' (UNESCO, 2003a). Water resources will steadily decline because of population growth, pollution and expected climate change.

The Camdessus Report of 2003 strikes an even more alarming chord making it clear that governments and international agencies are not forthcoming with anything like sufficient investment in water and sanitation infrastructure.

> It is impossible to escape the conclusion that the global water sector in its many forms is in disastrous condition. Water is not being sufficiently developed and conserved. Physical infrastructure is lagging behind need. Sector management is deficient, services are deteriorating and deficits growing. Allied to this is a shortage of financial services going into the sector. Indeed, the financial situation has been getting worse in the last few years, and the sector shows no sign of generating the funds to meet future service standards. (WWC, 2003)

These are cogent and urgent arguments from unusual quarters. This book contains a variety of varied analyses of the complexities of the relationship between poverty and water in a current global situation where the incomes of the poor are either stagnating or in decline. It also contains accounts of attempts by community organisations themselves, water agencies, and NGOs to break out of the vicious circle linking destitution and dirty water.

The UN in 2005 announced the Second UN Water Decade (the International Decade for Action 'Water for Life', 2005–15). The question is whether this prioritisation, which starts with much more modest targets than the first, will see an acceleration of the slow progress made since then.

## Notes

1. This scepticism is also now coming from unexpected sources. Geoffrey Sachs, the originator of the 'big bang' approach to privatisation in Russia, argued strenuously before the Earth Summit of 2002 that there was a great misallocation of resources which had to be remedied. He stated: 'the most critical problem for the health systems of poor countries is that essential health interventions simply do not reach poor people adequately' (Sachs, 2002).
2. There appear to be difficulties with these figures issued with the authority of UNICEF/WHO as it is most improbable that improved sanitation can be more or less at the level of access to improved water supplies.
3. From a study of sanitation by Wright (1997) it is calculated that only 20 per cent of the rural population actually had adequate sanitation in 1990, a figure considerably lower than that of the UNICEF/WHO.
4. A number of internet searches revealed nothing on the UN, WHO or UNDP websites, and very little from other sources.
5. According to Valdes-Cogliano (1985), international organisations were not even clear about how much funding was made available as the US assistance was, for instance, 'buried in various accounts'.

6. 'Privatising the Tap, Human Rights and Profit Margins', *UNESCO Courier*, No. 3, October (2003b).
7. *The Guardian* in association with WaterAid, 23 August 2003.
8. 'UN study urges a lead role for private sector in providing supply', *Business Day* (Johannesburg), 14 March 2000.
9. See the *New Statesman* leader, 9 September 2002, which decries weak governments which are incapable of enforcing agreed targets, 'feeble as many of them are'.
10. *Business Day* (Johannesburg), 23 March 2004.

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3

# It takes two to tango: steps towards change in the water sector

*Jaqui Goldin*

## Introduction

Following the introduction of apartheid in 1948, investment, in all sectors including water supply, was legalised for separate development predominantly to serve white South Africans. During these years the elite gained experience and expertise in a range of issues. Systems of co-operation, reciprocity and exchange between the majority of citizens were constantly interfered with to perpetuate and prolong the regime.

Faced with a complex set of social interactions, social capital, which is the social networks and the norms of reciprocity and trustworthiness that arise from them, enables people to act together to pursue shared objectives (Putnam and Pharr, 2000). The legacy of apartheid has had an indelible impact on the way in which water users interact with one another and in defining current relations of power in the water sector. It has resulted in chronic distrust between water users and the authorities and this will take years to uproot.

## Background

During the apartheid regime, a range of institutions to administer water supplies proliferated; they included parliament, provincial administrations, regional bodies, parastatals, water boards, irrigation boards, and local and regional authorities. In addition, each of the ten homelands artificially constructed to separate Africans had separate departments of water affairs, public works, local government and agriculture. In present-day South Africa, there is still a problem

**Box 3.1** Attempts at redressing inequalities from the apartheid era

**(a) White Papers**

(i) Water Supply and Sanitation Policy, November 1994: the '1994 White Paper – Water an Indivisible Asset'

(ii) White paper on a National Water Policy for South Africa: DWAF 1997

**(b) Acts and related regulations**

(iii) Water Services Act: Act No. 107 of 1997. (This Act deals with the distribution of water for domestic, business and industrial use and with the institutions that are given responsibility for managing and distribution services. This Act does not deal with the allocation of water.)

(iv) National Water Act: Act No. 36 of 1998

(v) Water Pricing Strategy: DWAF (gazetted October 1999)

(vi) Guidelines for financing CMAs in South Africa

(vii) National Water Resource Strategy 2002

of co-operation between institutions, departments and people because of the apartheid legacy of fragmentation. This affects the provision and management of water.

With the demise of apartheid, the first policies to make a break with the apartheid past were contained in the Reconstruction and Development Programme (RDP) that was published as a cornerstone to the ANC election manifesto in 1993 and became the official policy of government in May 1994. Since 1994, the Department of Water Affairs and Forestry (DWAF) has released six key policy documents including two White Papers that guide and inform the public about the water policy (see Box 3.1). Together with a host of other legislation (see Box 3.2), policy aspired to reduce the inequalities of access to water in South Africa, yet despite the intentions of policy makers and visionaries, the gap between policy and its implementation remains.

In an attempt to redress apartheid skews, water policy is strongly biased in favour of the poor, mainly those living in rural communities of the former homeland areas and in informal settlements. It aims to redress the unequal distribution of water supply. However, declining funding and a lack of focus on institutional reform and community participation have been key obstacles to the effective delivery of water. The problems of organisation of the small-scale users and the distribution of information and negotiation of powers for those who were not part of water policy networks during the apartheid years have not yet been adequately addressed (Faysse, 2003).

To facilitate the proper use of water in the water management areas (WMAs), the National Water Act (NWA) provides for two types of water management institutions: catchment management agencies (CMAs) and water user

**Box 3.2** Other legislation aimed at reducing inequalities from the apartheid era

Municipal Infrastructure Investment Framework (1997)
National Environmental Management Act 1998 (Act 107 of 1998)
Extension of Security of Tenure Act 1997 (Act 62 of 1997)
Local Government Transition Act 1993 (Act 209 of 1993)
Local Government: Municipal Structures Act 1998 (Act 117 of 1998)
Western Cape Planning and Development Act 1999 (Act 7 of 1999)

associations (WUAs). The CMA will be responsible for the water management of the entire catchment, whilst the WUA's area of jurisdiction remains localised. Throughout the country, a building process has been under way since 1999, and stakeholder committees or forums and reference groups have been established in each of the 19 WMAs. One of the main goals of these non-statutory forums is to create representative committees through which local water concerns can be addressed. The focus of this chapter is on one of the WMAs, the Breede. The CMA proposal for this WMA was submitted for review at the end of 2002 but has not yet been gazetted.

Legislation in the water sector introduces two fundamental new principles: (1) water is a national asset and water rights are separated from land rights, and (2) the user pays principle, namely that consumers pay for the water that is consumed. In the current context of water supply, many of the water users are restrained not by a lack of rights to access water but by a lack of means to take water from its source. Furthermore, for the first time in the history of South Africa the environment is considered a consumer in its own right and because environmental and conservation concerns are so eloquently represented, they dominate the CMA process and tend to take precedence over the focus on water delivery for the poor. Thus, even though there is a policy focus on water supply to the poor, DWAF is struggling to address contradictions that arise in implementing its water policy.

The devolution of decision making to the local level and the shift of focus to water supply for the poor is not a process unique to South Africa. Global trends emphasise that best practice in water management requires local control and user-driven management in designated WMAs. Over the past decades, developing countries have focused on local management of irrigation schemes by farmers who are encouraged to manage their own irrigation systems. The participatory approach, involving water users at all levels but specifically focusing on ordinary water users, is used both in developing and developed country contexts (Ostrom, 1996). This shift in focus brings with it a new set of social interactions and decision-making processes.

The theoretical construct of social capital is used as a tool to understand the complex set of social interactions that are part of the process of building the CMAs. Trust as well as distrust and shame are attitudinal or cognitive features of social capital and are at the core of the discussions that follow.

## Trust

As economists and social scientists today they grapple with understanding the intangible assets that contribute to development, they make extensive use of various components of social capital, including the attitudinal or cognitive components of this construct. The capacity to take part in a critical examination of the roles and responsibilities of civil society and the state, to participate in reasoning processes, to arrive at judgements and to develop capacities together are a delicate and valuable social and political achievement (Warren, 1999). These capacities can be developed when organisations or networks are able to foster discussions, accommodate differences and disseminate knowledge and information in such a way that the outcomes are positive for the deepening of a democracy. In the social sphere, the cognitive component of social capital, generalised trust, fosters tolerance and smoothes relationships between people. As all forms of exchange are embedded in social relationships, trust is an essential ingredient for democracy and it has positive consequences for social action and economic development (Granovetter, 1985; Woolcock, 1998). Building trust between different segments of society becomes an indispensable strategy to deal with the opaqueness of our social environment; as Sztompka (1996) emphatically claims, 'without trust we would be paralysed and unable to act'.

Faced with the complex set of social interactions that are taking place in the Breede WMA, social capital, which includes networks and the norms of reciprocity and trustworthiness that are part of these networks, enables people to act together to pursue the shared objective of constructing effective water management institutions.

### No quick fix for trust: trust is established informally

There are no quick fixes for building trust. Any attempt to consciously construct trust would be artificial and would not have a positive influence on social interaction. The challenge in constructing new institutions such as those that are required to manage water, is that coherent social interaction depends on co-operation, and a co-operative relationship requires a certain amount of

social capital that cannot be artificially constructed or it would be doomed to failure. No amount of rhetoric for participation, transparency or advocacy can construct trust, the important component of social capital, and trust is not something that can be quickly built into an institution. There is a link between notions of empowerment, social capital and development, but the exact nature of these linkages remains obscure and it is not clear how any existing social capital might be activated.

Forums that are dominated by technological and economistic discourse around in-stream flows, weirs, pumps or biodiversity mute the interests of some and amplify the claims of others (Warren, 1999) and this imbalance of interests makes it even more difficult to build trust between different segments of water users. Because of the highly technical nature of water management, there is a tendency to make decisions about allocation or/and water service delivery without meaningful input from the ordinary water user. The result is that whether or not there are reform measures in place to improve access for the ordinary water users, their voice is not the determinant for change.

## Power, risk and trust

There is a relationship between risk and trust, and people are more inclined to build trust when they are prepared to take risks. When people are unwilling to take risks, bonds of trust are unlikely because there is closedness or social fixation (Kickert, Klijn and Koppenjan, 1999) where people are blocked off to aspects of reality that they find insignificant or that they are unable to give any meaning to. It is because of closedness, then, that people are unwilling, or unable, to take the risk to connect with one another, and as a result new social capital is restricted.

Although risk and trust go together it is also true that insecurity and anxiety breed distrust (Patterson, 1999). In the current situation, the lack of clarity about the roles of different tiers of government as well as the incumbent uncertainties around intergovernmental roles and responsibilities in water management mean that transformation is riddled with problems of redesign, restructuring and reshuffling of the old to create new structures. Trust at this time in the water sector is low.

In South Africa the lines of social division that were deliberately constructed by the state along the vectors of gender, race and language still exist. These historical cleavages – and linkages – influence the way in which new administrative systems are constructed and define the claims of some, often at the expense of the poor. Knowledge is a key attribute in defining the way in which these cleavages and linkages take shape, and unsurprisingly those with

less access to knowledge are also those who have the least power to influence decision making.

Building new water institutions is a risky business and those who have been closely involved in the process in the 'new' South Africa anticipated that this would be risky and fairly ad hoc because new ground is being pioneered (DWAF and WRC, 1996; Gorgens, 2001). However, the process of transforming the water sector from the old system to a new one is in fact far from being ad hoc: it is being driven from the top down in a style of governance that is paternalistic and is reminiscent of a low-trust society. Government officials or specialist consultants chosen by the state are in the driver's seat. The policy focus is on participation and the devolution of management to the local level, but this is contradicted by a style of governance that is 'top-down'; moreover, old elites are far more vocal in this process than new entrants into water policy networks. Style of government plays a critical role in furthering a culture of trust, and this style needs to be nurturing and inclusive for trust to flourish. Within the South African context a change in style of government is crucial because the old regime was characterised by an authoritarian and deliberately exclusive government, and anything reminiscent of this will perpetuate distrust because the historical memory of the majority of South Africans has been infused with it.

A consequence of the top-down style of government in South Africa is that the deep change that has been expected and prescribed is not taking place, and old patterns of privilege and power in access to and management of water resources are perpetuated.

Water management systems are efficient when both state and ordinary water users act together; this is because efficient and effective systems depend on synergy between government and non-government actors. The research undertaken by Elinor Ostrom (1996) draws attention to the dominant role of engineers and other experts and argues that although they have competence in technical or other spheres, these are not people who necessarily have the skills that are needed to build durable local water management systems. In South Africa there are public officers who were trained to serve the public and who have suitable 'people' skills but these public – and sometimes former public – servants are not always being put to the best use.

## Policy and practice: turning irrigation boards into water user associations

Although water policies are more than adequate, there is a disjuncture between policy and its realisation, and an example of the contradiction between rhetoric and implementation is to be found in the newly established WUAs.

During the apartheid regime, the most organised water management systems were the Irrigation Boards. These bodies, together with Water Boards, ensured the delivery of water for white commercial farmers. The new Water Act (1998) has ordained that Irrigation Boards transform into WUAs, institutions that are mandated to control localised water resources, and this legislation pivots around a change of locus of control from the centre to local WMAs. Despite this focus, government is maintaining a strong authority in shaping these localised WUAs. Research by Ruiters (1996) on civil society in South Africa draws key conclusions that indicate the existence of an 'undeveloped' local government and civil society. Certainly, under such conditions, the argument that the successful implementation of reform programmes requires a strong involvement by the state holds true (Rueschemeyer, 1992). However, over-involvement results in a less inclusive civil society and a more visible state and this is what is happening in the water sector.

It is notable that although policy reinforces the protection of an equitable status for water users that should be protected through the WUAs, in reality votes in these fledgling organisations are weighted and therefore the status of all water users is not equal. Important decisions are being made by water users who have had the opportunity, through the apartheid years, to accumulate both financial and human gains, investing in pipes, canals and water works and acquiring technical expertise.[1] Because of these skews in assets there are diverging interests which make trust within the water user group a scarce resource. The highly technical nature of water reticulation and the complexity of management systems to organise water delivery are fertile breeding grounds for the relationships of paternalism and the inequalities that persist in this sector today. Inequality in the water management systems triggers familiar patterns of exclusion in the historically fragmented and notably racial and gendered society of the Breede WMA.

## Triggering patterns of exclusion

The legitimacy of WUAs depends on democratic principles – inclusiveness, freedom of information and freedom of expression – as well as on the potential for ordinary water users to become more familiar with water issues, and to enter into regular patterns of interaction around concerns that have to do with water. Following this ideal, over time, trust and interdependence between water users would be established. In a context where there are more regular interactions between water users it is possible that over time the ordinary water user could become more familiar with the technical jargon and could become more comfortable with the way in which the water policy networks operate.

However, it is also likely that the opposite will happen: that all too familiar feelings of exclusion could become further entrenched and that those who were excluded under the old water laws will exit from decision-making forums in the water sector. It is also possible that instead of building new relations of trust between water users, shame-based feelings, where already present, could be perpetuated.

The transformation process focuses on formalistic rules and fails to focus on the propagation of substantive input from below. Members have been co-opted into these forums without the ability – or institutional backup – to participate meaningfully. If the notions of 'participation' and inclusiveness that have been recognised as the cornerstones of these institutional units are absent, can WUAs, in terms of the National Water Act, be considered to be legitimate?

Theoretically, putting together water management institutions in the Breede – or any of the other WMAs for that matter – provides an opportunity for ordinary water users to form new networks and to build social capital. But this is not happening. The strong state presence and the existence of familiar old policy networks with the state actors is not conducive to change because policy rhetoric that promotes social transformation through policy reform is not matched by policy practice. 'We will not be dictated to by others who are not paying for the water works and infrastructure. No one will force us to change and we will do exactly as we have always done' (member of WUAs and previously of the apartheid–era Irrigation Board: interview, March 2001).

The ties that bind and the lines that divide co-exist and limit the potential to generate meaningful transformation in the water sector. Although the new National Water Act has created a space for local water users to play a central role in the management of their own water resources, there are worrying signs in the Breede WMA that this is not happening. The government has formed strong partnerships with those who have been very closely connected with them in the past, and new networks are comprised mainly of these water users who are – and have been in the past – part of decision making in the water sector.

Previously disadvantaged water users remain profoundly alienated from water management planning because WUAs are dominated by technicians, commercial farmers and old local water policy elites who have controlled the irrigation boards in the area for over 21 years. The technical nature of their knowledge, expertise and managerial skills ensures that they have secure positions in the new institutions. Policy for the National Water Act was framed within the spirit of transformation of the new South Africa and advocates that the least well-off need to be beneficiaries of transformation. Training, participation opportunities and access to management form part of that system of transformation, and are there to ensure that the opportunities and capabilities

of ordinary people are enhanced (Clark, 2001). However, the water policy network fails to provide for local capacity building, and so water users, such as farm labourers, who attend water forums but lack technical knowledge have the opportunity for any serious input into decision making.

Old networks are not easily unstuck, and new network opportunities are not yet transforming into meaningful exchanges. The pressing concerns of many ordinary water users living in poor townships and predominantly black areas are rarely addressed in the present-day water management planning forums, and opportunities to enhance the capabilities of ordinary water users so that they can take part meaningfully in water resource management are lacking. It is not surprising that new relationships lack substance.

## Network fixation or closedness

There are old networks that have functioned for a long time in the Overberg WMA.[2] In the late 1940s, the Soil Conservation Act (No. 48 of 1946) brought together many farmers, who gave time, which was a precious resource, to get together to discuss problems of soil conservation. Water is intimately linked to issues of soil conservation, livestock grazing and the growing of crops. Because there were already networks in place, when farmers' wives, who were indirectly connected to these networks, experienced frustration and domestic problems around water, they were able to react and to become drivers for change in their area and to be direct beneficiaries of these networks. The following extract is pertinent:

> All water for house and stock was dependent on good rains … a cartload of water cost R18 … Adults can manage a water shortage. The animals just have to get by. But it is when the babies arrive that the nuisance is experienced more acutely. Drinking water from the village used to stand in our kitchen in six large milk cans. The six cans made me think of Alibaba and the Forty Thieves … One morning there was a terrible smell of putrid water in the kitchen. The water in the milk cans! I was fed-up discontented and angry and was on the warpath. (Wilson, 1999: 27)

This extract captures the shared experience of farmers' wives in the water-scarce Overberg. During the apartheid period, white farmers had established their own networks based on a common interest in improving water supply, and they engaged with government officials to improve output for agriculture. The common need for drinking water captured in the citation above mobilised farmers to activate their long-standing networks and, in this case, it was three wives of farmers who set off to lobby the government in Pretoria. Through this lobbying, government understood that it was in the economic

interest of the country to provide farmers with access to water. The interests of the farmers matched the interests of government, who were geared to promote the well-being of the elite few. Unsurprisingly, a mere eight months later, the result of this negotiated relationship between state and commercial farmer was the announcement of a water scheme that serviced 540,000 hectares in the Overberg.

## Virtuous cycles of co-operation

For years prior to the collapse of apartheid, those involved in commercial agriculture were able to maximise opportunities to build relationships with government and non-government experts in water management. In the process through these common experiences social capital accumulated and could be drawn on to serve the water user 40 years later. Commercial farmers in the Overberg knew exactly how much water was needed for their stock, where the water came from and what the problems were relating to water (salinity, instream flows, flooding, drought, etc.). Important, too, they learnt how to work with government. There were therefore 'virtuous' cycles of reciprocity established, and there was no need to break these. Their farm labourers, or any other poor water users, were not consulted when decisions were made about water, and here 'vicious' rather than 'virtuous' cycles were reproduced (Mishler, 1997). Because of these state–society networks and already established relationships of co-operation and reciprocity, it was commercial farmers who were the first to be approached when policy makers looked for local clients to participate in their new schemes and to contribute to water planning and management in the 'new' South Africa.

Under current water management systems, the use of indigenous knowledge has been pushed to the background. The failure to take cognisance of local concerns and the practice of focusing mainly on commercial farming activities impacts on the quality of interactions that occur within the water policy network because it is difficult to co-opt water users into networks when they do not feel that their input makes any difference to the way decisions – that are going to have an effect on their own lives – are taken. Importantly, there is lack of a history of trust between the more marginalised water users and key decision makers. Old networks are not easily unstuck, and new intra-network relationships are difficult to transform into meaningful exchanges.

The story of Ali Baba's thieves described above captures the essence of the history of water in the region. It shows that through shared meanings and experience, firm trust and social capital were established over time amongst white agriculturists and government bureaucrats responsible for water management.

Black farm labourers, who were not owners of land – or of the water on it – continue to experience vicious cycles of co-operation around water networks as their affiliations, and their trust and distrust, originated in grievances and a shared sense of marginalisation, rather than in productive reciprocity. As the provision of water (and other services) to the poor (non-white) was never a state priority, the trust that did exist was one that was generated through linkages forged in a struggle to survive in a context of black farm-workers and marginalised water users who were totally excluded from policy decision making. The closedness, or social fixation, that has been referred to above impacts fundamentally on the way in which social capital is built today, and it is not surprising that this segment of water users has a more tenuous relationship of co-operation with the state around water issues.

In current negotiations around the building of the CMA, tactical alliances are being built between elite groups. There is also a recognition by some local leaders, who were not involved in decision making during the apartheid years and who now represent the interests of the poor, that they need to forge allegiances with the elite policy networks so that they are able to intervene on behalf of their constituents. This is a frustrating situation; because of their previous exclusion from these networks, today there is little or no opportunity of being listened to. It is also difficult to retain integrity when sliding in and out of two alliances which are potentially mutually exclusive, and anyone who is co-opted into this system is more often than not a silent participator. It is problematic for such a representative, because when he returns to report back to his[3] constituency he has to be vocal and eloquent. In other words, although supposedly attending new water policy networks with a voice, and supposedly being invested with the power to be an 'agent' on behalf of the ordinary water users who voted for him, this person is attending meetings without agency.

Opportunities to build trust are rare. Ironically, this type of participation compromises both government and civil society with notions of participation that only serve to rubber-stamp a process of transformation. Not only is a trust-generating context not being created but distrust becomes more embedded (Tapscott, 1999). The result of this distrust in the transformation process is doubly damaging to future relations of trust for it reduces the incentive to change by reinforcing old elites.

## Trust, inclusion and exclusion

As can be expected, building a new institutional context such as a CMA is highly complex, and despite the efforts of consultants and officials not to

complicate or mystify the process, there are contradictions that are difficult to resolve: for instance, 'inclusivity is important for supporting WRM functions, but a priority is the capacity to undertake specific tasks on behalf of the CMA and other [water management institutions]' (Hart, 2000).

Documentation is mostly prepared by a group of consultants who have been contracted on behalf of DWAF and who are tasked with providing a 'common understanding' of CMAs (Bruwer, 2001). Although the documents are well prepared and the consultants highly committed, the process for many water users, even the experts, remains confusing:

> We don't have a clue about what we are supposed to do. We are told that we have powers but the municipality continues to make decisions and ignores our recommendations. We are supposed to have meetings but we don't know what we are doing. This takes our time and I am getting fed up. (Interview, February 2001, with an Overberg Steering Committee Member, who was an expert and well informed about water matters)

There is doubt about how the advisory or governing board will function, how responsibilities are divided, there are issues of financial viability, of how levies will be determined, and so forth. With so much uncertainty in building new water management institutions, trust relations are difficult. Withdrawal and non-participation are symptoms of a process that is unable to provide opportunities for many water users to feel adequate or competent enough to participate.

Another determinant of social action that has an influence on the way that networks – and in particular trust – are built in the water sector is the notion of shame, which has not yet been adequately explored within the context of discussions on social networks and attitudes such as trust (Goldin, 2003). The remaining section of this chapter will briefly explore shame because it is a relevant component of network 'closedness' or social fixation and because this notion is helpful in understanding withdrawal or non-participation within a given context.

## Shame

Shame is a feature that has everything to do with inclusion, knowledge, acceptance, equality and notions of agency and power. For democracy to become well embedded in the fabric of society, it is important that individuals are able to dissent, argue, disagree and debate, for this enhances human freedom and encourages interpersonal trust and risk taking.

The social scientist Nussbaum (2001) proposed that shame is an inherited condition of our birth, but that later on in life there are social conditions that reinforce our inadequacy, incompetence or isolation and that bring to the fore this inherited shame, and can paralyse and obstruct action or engagement.

Readings on shame (Heller, 1985; Scheff, 1990) all confirm that shame plays a key role in determining the engagement of individuals within the social context. The sociologist Scheff (1990) makes the important observation that intact social bonds are the result of a positive relation of self; Scheff links the intact social bond, or feeling good about oneself, with the emotion of pride. The antithesis of an intact social bond is a threatened one, and the personal emotion connected with this threatened state is shame (Scheff, 1990). The experience of shame varies in intensity but it always results in an inability to engage – manifesting either as silence, as exit or even, in extreme cases, where the pain of shame is intense, as suicide (Scheff, 1990).

## *Gleichaltung* versus embarrassment, criticism and insult

In order to better understand how shame is relevant to our understanding of processes of transformation or change in the water sector, the term *Gleichaltung* is helpful. This is a term that was coined by Scheff (1990) and it describes a healthy reality where the cogs of a machine fit well into each other. Scheff (1990) compares the social system to *Gleichaltung* because a social system that is working well is very much like a well-oiled piece of machinery that functions in a balanced and positive way. When the opposite is true and the cogs do not fit well into each other, social interaction can result in embarrassment, criticism and insult. Instead of producing positive feelings amongst people, feelings of shame are produced and reproduced.

The apartheid era did not produce *Gleichaltung*. Citizens battled to forge honourable identities in a social climate where people were systematically undermined and where shame was perpetuated. Shame-based feelings were an advantage to the authorities since well-being, honour, or pride cemented relations and resulted in people feeling good about themselves – and in a state of *Gleichaltung* apartheid could not have thrived. Mostly, any sense of belonging or relations of trust that were built during the years of struggle had their roots in conflict, rather than in co-operation The honour of activist leaders was constantly interrogated, undermined and threatened by apartheid authorities, and mistrust, shame and guilt were engendered.

In understanding transformation processes in South Africa today, it is important to recognise that a negative chain reaction does not only impact on the personal and the effect is not just transitory, because it has long-term repercussions on larger systems and institutions. The reluctance of many water users to attend meetings and to participate in decisions around water can be understood within the context of this negative chain reaction that produced shame-based feelings.

## Shame, identity and exclusion

Being dislocated and having one's identity taken away may lead to acute feelings of shame. Wicomb reflects well on the relationship between shame and identity. In her article, entitled 'Shame and Identity: the Case of the Coloured in South Africa', she presents the reader with Saartjie Baartman, who was taken from South Africa two hundred years ago. Saartjie Baartman was displayed as a living – and later dead – exhibit in London and Paris. It was only in 2002 that her remains were returned from the Musée de Paris to her country of origin. This powerful icon of what has been referred to as the Khoi 'venus', Saartjie Baartman, serves as a reminder of what can happen, in the extreme, when social capital is deliberately smashed and scattered. Baartman became merely an object; her own identity and dignity were taken away from her as she was displayed in a public space and lost her right to privacy. Baartman became a symbol or icon of dislocation and 'lost' identity.

Shame is a part of the historical memory of so many South Africans and it is a notion that is useful in unpacking certain aspects of the process of transformation that is taking place in the water sector. Although the existence of institutionalised distrust is a healthy manifestation in a democracy (Mishler, 1997), it is astonishing how little disagreement or debate takes place in the stakeholder forums and reference group committees that are part of the process of building the CMA. There appears to be a uniformity of trust, at least on the formal level, and it is only in the corridors – what Wicomb (1998) calls the 'stoep' or veranda – or in-between spaces that dissonances are apparent. This suggests that the formal space provided is controlled and that it is a space that restricts debate and dissent.

It is the nature of shame to stifle its own discourse and to cloak itself so that it is invisible. This is well illustrated by the following extract where the memory of shame-based feelings and an emptiness and hollowness is eloquently described by a water user:

> I say nothing – I have nothing to say but it is high time that they have asked me to be there so I can learn. No, I am not ashamed but I will not speak, as

> I cannot. Shame is about being hungry. I know shame, when I am inside the committee I will just say yes until I learn and they will not know how poor or ignorant I am. It is a terrible thing when you feel hollow inside. Hunger can make you feel this and not knowing anything can make you feel this. (Interview, 2001, WUA in Breede WMA)

When trust is not brokered in formal institutional settings, the informal spaces provide an opportunity for shared values to be exchanged. During the course of a reference group or stakeholder committee meeting, for example, important exchanges take place in the corridors during the tea and lunch breaks. But, for those individuals who are overpowered with shame, even in the informal spaces there is zero exchange. Isolation or insecurity reinforces anomie. Bekker and Leildé (2003) explain this as follows:

> Their social exclusion however individualises and marginalizes them. Their voice is faint and of little influence … their strategy, typically chosen on an individual basis, is one of opting out of civil society. (Bekker and Leildé 2003: 10)

As a person disengages, silently or invisibly, shame-based feelings can be one of the drivers for an exit strategy.

## Shame and honour

As mentioned earlier, distrust can be a healthy part of a democracy, and scepticism of authority is a valuable resource. On the other hand, disengagement and shame-based feelings intensify social exclusion and have a negative effect on democracy. Being excluded from the dominant knowledge exchanges reinforces a negative sense of self, entrenches feelings of shame and makes positive social action and participation in new institutions difficult. Knowledge is a crucial resource for securing participation and it has a political dimension. In order to build successful institutions there needs to be a levelling of the playing field to enable equal partners to come to the table with an opportunity to negotiate as equals and not merely as recipients of information. In the case of the water sector, on both sides, old networks are not easily unstuck and new networks are struggling to take shape.

Both trust and shame are invisible drivers of social action yet they are critical attributes for the establishment of new patterns of belonging; they are essential ingredients when building new forms of solidarity and commitment to participate in management and decision making within the water sector. This chapter has drawn the reader's attention to the importance of shame as a determinant in social action and has argued that shame is an inhibitor of trust

and that it constricts the establishment of the much needed social capital in water management institutions.

## Conclusion

The National Water Act was drawn up in the spirit of transformation but the water networks remain closed to water users who are unable to fully participate because they do not have adequate knowledge about water management issues. Current legislation – in particular the National Water Act (1998) – although advocating participation at the local level, is weak in its protection of civil society. The engineering of forums, committees or associations has created circumstances that are open to manipulation by those who possess knowledge, agency and power and who are able to use this to resist change. In particular, the historical divides as well as the linkages forged during the apartheid era continue to shape the way in which the new administrative systems are constructed under the current laws.

Although the current water policy reflects a reshuffling of allegiances, conditions of trustworthiness are slow to take root and buzz words such as participation or empowerment remain words rather than practical experiences.

The attitudinal components of social capital, in particular trust and shame, play a vital role in forging linkages between government and civil society and between different sectors of water users. It is critical to understand the dynamics of both trust and shame and the role that these attitudes have in shaping democracy in the new South Africa in general, and in the construction of water management institutions in particular.

## Notes

1. This is happening despite guideline documentation from DWAF stating the following: 'it would undermine the spirit and intent of catchment fora if they were to be dominated by a single interest group, or by an association of a few interest groups. However, special interest groups (including pressure groups) should be represented on catchment fora, which will have to have constitutional and managerial instruments to ensure a fair balance of power and influence among strong and weak forum members' (Hart, 2000: 3) – evidence of tension between policy and its implementation.
2. Breede WMA is comprised of the Breede and the Overberg WMAs.
3. At the time of writing this chapter there is still no female voice in this Breede forum.

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# 4

# The link between poverty and water supply: the Nigerian example

*Ayodele Aderinwale and Olumide A. Ajayi*

## Introduction

Nigeria, with a large population estimated at 140 million people, according to the recently released census figures for 2006, is the most populous country in Africa. With a projected average annual growth rate of 3 per cent (1995–2000),[1] Nigeria is expected to have 255.6 million people or one quarter of the population of the whole African continent by 2025. It is also the economic powerhouse of the West African sub-region, accounting for more than 50 per cent of its total gross domestic product (GDP),[2] though the country was under military rule and dictatorship for more than three decades. The new democratic government, which came to power in 1999, has been working assiduously to reconstruct the fragile political and socio-economic base of the country.

Nigeria is richly endowed with huge deposits of natural resources and has surface and groundwater resources estimated to exceed 300 billion cubic metres, which are adequate to meet its current and future water demands.[3] In spite of its enormous human and economic potential, it ranks amongst the 25 poorest countries in the world. About 50 per cent of the population live below the poverty line[4] and are without access to potable water. Considerable efforts are being deployed by the government to improve access to safe drinking water for all Nigerians. The water management policy in Nigeria is operated in accordance with the Federal Constitution with a three-tier government, meaning that law-making powers and functions relating to water and sanitation are divided between the different tiers of government[5] in such a manner that each level within its respective sphere of jurisdiction and competence is equal and independent as prescribed within the concurrent legislation.

As will be demonstrated later, inadequate water has been known to be central to poverty aggravation and degradation of the environment. Where access to safe water is nonexistent, that is, largely in rural areas, people share the water sources with animals and are vulnerable to viruses and bacteria causing water-borne diseases. Moreover, the creation of dams and irrigation schemes often creates an environment conducive for the multiplication of mosquitoes and *simulium* flies, insects which are carriers, respectively, for malaria and river blindness. A 1996 profile by the Federal Office of Statistics showed that dysentery is the second-commonest illness after malaria.[6] Gastrointestinal diseases are mainly responsible for the high mortality rates among infants under five years of age. Cholera is endemic across the country and occurs particularly during the dry season when the water resources are scarce, and therefore heavily used and contaminated. Furthermore, domestic waste and industrial effluents have been known to find their way to rivers and underground water, causing pollution and reducing the quantity of available safe water especially in the urban areas such as Lagos and other big cities in Nigeria.

The problem confronting the water and sanitation sector in Nigeria as well as the inherent challenges are well known to government, a situation which has made it imperative for the government to review current water resources management practices and move towards more integrated management of a resource that underpins the nation's long-term social and economic development. Although these intentions have the potential to resolve some of the water problems, what is required is a more co-ordinated, pro-poor policy and approach that promotes poverty reduction and also deals with standards of living and access to safe drinking water in formal and informal settlements in both the urban and rural areas of the country.

## Conceptual framework

A simple definition underplays the complexities and prevents a structured understanding of the reality of poverty. For the purposes of brevity and clarity, it is perhaps more intellectually and practically rewarding to look at its nature, typology and occurrence. Consequently, poverty becomes a recognisable phenomenon when placed within several contextual frameworks. This, in effect, means that poverty is multi-dimensional, with socio-cultural, economic, religious, environmental, geographical connotations which sometimes can be captured within a measurable analytical framework, while at other levels it may be elusive and subject to various degrees of relativism.

The implications of this are that:

- Poverty can be a group-related and area-specific phenomenon.[7]
- Poverty is also driven by space and time. A country may enjoy economic buoyancy over a period of time and thus change its perception and parameters of poverty.
- Resource availability and its overall management as well as political preferences direct and define the shape and depth of poverty in a society. The intra-country disparity in the incidence of poverty may sometimes be due to misallocation and undue concentration of resources in few hands.[8]
- Poverty has tangible physical, measurable aspects as well as intangible psychological and physiological aspects. Rich men in a crisis-ridden environment may be subjected to the same treatment and mental agony often reserved for the poor.
- Cultural and religious perceptions sometimes encourage and entrench poverty within a particular society such that the society's own minimal standard of living may, in fact, be far from both the national and internationally acceptable standards.

An all-embracing, one-stop-shop definition of poverty, as indicated from these observations, is a difficult and complex task. The hitherto identified complexity as well as the need for consistency apparently informed the utilisation of three deprivation-related indices in the estimation of the Human Poverty Index (HPI) by the United Nations Development Programme (UNDP) *Human Development Report for 2006*. These indices are:

1. The percentage of the population not expected to survive to age 40.
2. The percentage of adult illiteracy (deprivation in education and knowledge).
3. Deprivation in economic provisioning which is made up of the average of:
   (a) the percentage of the population without access to safe water;
   (b) the percentage of the population without access to health services;
   (c) the percentage of underweight children.

However, it is important to note that among the items of economic provisioning, water is the only utility that directly affects and has to be provided for by families and individuals almost on a daily basis. Its acute shortage or inadequacy has a direct impact on the overall well-being of a society with limited alternatives and coping strategies. In the context of this chapter, a family that

is continuously deprived of and denied access to safe drinking water in sufficient quantities and at the right time and place is vulnerable and in every sense poor and lacking a decent livelihood. Inadequate supply of safe drinking water, therefore, has the potential to sustain and reproduce poverty as observed by a recent International Water Management Institute study.[9]

> One facet of water deprivation, that is widely recognized as a typical characteristic of poverty, is subminimal access to near, safe water and sanitation facilities, which results in severe waterborne diseases and often in exorbitantly high costs in labour or cash. But a comprehensive approach is needed, one which recognises that poor people's water needs are multifaceted. Water especially affects income generation, another major element of well-being of which poor people are typically deprived. Poor people's self-employment and wage employment opportunities in urban and especially rural areas depend on water, in addition to other factors. (van Koppen, 2000: 7)

It thus appears that the poverty reduction strategy and the water management strategy should be treated as different sides of the same coin in the extension of the frontier of sustainable development and livelihood. This chapter is an attempt to contextualise a linkage between poverty and water management systems using Nigeria as an example. It begins with an introductory profile and contextual framework in the first two sections. The next section deals with methodology while the two sections that follow review Nigeria's poverty profile as well as case studies of four Nigerian cities. This is followed by sections devoted to a discussion of Nigeria's water supply system and new policy directions.

## Methodology

Issues, analyses and results presented in this chapter were part of a larger body of research work and surveys jointly conducted by the Africa Leadership Forum (ALF), Nigeria and Development Researchers Network (DRN), Italy as part of the European Union (EU) Programming Study for Nigeria, which covered most parts of Nigeria. The methodology consists of formal and informal tools of investigation, which include collection of primary and secondary data, meetings and discussions with institutional and individual actors.

Discussions with these institutional actors together with sectoral information generated by the state provided a basic understanding of: their roles and

responsibilities; the existing situation and problems experienced within the water sector and future plans for reform to meet various challenges and policy initiatives; and programmes required to overcome problems and constraints associated with reform programmes and policies. The same issues were also discussed with active non-governmental organisations (NGOs), community-based organisations (CBOs) and other civil society organisations (CSOs) to facilitate a deeper understanding of the present and potential role of civil society and the private sector operators. In each state, the team of researchers undertook an extensive tour of selected local government areas (LGAs) accompanied by government officials. The objectives of these visits were: first, to determine the extent of LGAs' and communities' sectoral problems; and, second, to ascertain the extent of communities' participation in resolving these problems and their willingness to contribute to future interventions and projects by both the government and donors.

From the various field visits, four case studies depicting the poverty profile of four Nigerian cities were generated. The average cost of water supply was also estimated for each of these cities based on available field data showing a poverty line income of $1 per day. The minimum daily water requirement for a family of six was put at 240 litres per day.

## Nigeria in a comparative context

Before proceeding to the detailed examination of Nigeria itself, it is worth examining the relationship between access to safe water and poverty. What is the comparative context among similarly situated African countries? The general association between access to safe water and incidence of poverty (as measured by the HPI) is observed among some selected countries as shown in Table 4.1. In the table, the countries are ranked by the percentage of the population without access to a safe water source in 2004 (column 2).

The data indicate that a higher proportion of the population without access to safe water (2002 and 2004) is generally associated with a higher Human Poverty Index (2002 and 2004). The two extremes of high and low levels of population without access to safe water are taken as the basis for illustrating the association. The Democratic Republic of Congo (DRC) and Nigeria have 54 and 52 per cent of the population without access to safe water, respectively, and also correspondingly among the highest HPI figures. At the other extreme, Egypt and South Africa have 12 and 2 per cent of the population without access to safe water, respectively, and the lowest levels of HPI.

**Table 4.1** The relationship between the incidence of poverty and access to safe water in selected African countries (ranked by column 2)

| Country | Percentage of population without access to safe water source | | HPI | | Country rank by HDI | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | 2002 | 2004 | 2002 | 2004 | 2002 | 2004 |
| DRC | 54 | 54 | 42.9 | 40.9 | 168 | 167 |
| Nigeria | 40 | 52 | 35.1 | 40.6 | 151 | 159 |
| Zambia | 45 | 42 | 50.4 | 45.6 | 164 | 165 |
| Kenya | 38 | 39 | 37.5 | 35.5 | 148 | 152 |
| Tanzania | 27 | 38 | 36.0 | 36.3 | 162 | 162 |
| Cameroon | 37 | 34 | 36.9 | 35.6 | 141 | 144 |
| Ghana | 21 | 25 | 26.0 | 33.1 | 131 | 136 |
| CAR | 25 | 25 | 47.0 | 47.8 | 169 | 172 |
| Zimbabwe | 17 | 19 | 52.0 | 46.0 | 147 | 151 |
| Morocco | 20 | 19 | 34.5 | 33.4 | 125 | 123 |
| Côte D'Ivoire | 16 | 16 | 45.0 | 41.5 | 163 | 164 |
| Algeria | 13 | 15 | 21.9 | 21.5 | 108 | 102 |
| Namibia | 20 | 13 | 37.7 | 32.5 | 126 | 125 |
| South Africa | 13 | 12 | 31.7 | 30.9 | 119 | 121 |
| Egypt | 2 | 2 | 30.9 | 20.0 | 120 | 111 |

HPI, Human Poverty Index; HDI, Human Development Index; CAR, Central African Republic; DRC, The Democratic Republic of Congo.

*Source:* UNDP, 2004–2006.

Although access to safe water is a sub-component in the estimation of HPI too, the observed trend is a pointer to its absolute and relative importance in poverty aggravation. The same applies to the Human Development Index (HDI) which closely follows the water ranking: the greater the proportion of the population not accessing safe water, the lower the country's ranking by HDI.

Among the 15 countries compared in Table 4.1, Nigeria is among those with the highest level of population without access to safe water and ranks second only to the war-torn DRC in these terms.

## Nigeria's poverty profile

Despite Nigeria's enormous resource endowment, extreme poverty is on the increase there. Nigeria has gone through a period of steady economic decline since the 1980s and the situation has reached crisis proportions. Available data show a steady increase in the incidence, depth and severity of poverty.

Table 4.2 indicates that there has been an increase in the proportion of the population living below the international indices of $1 and $2 a day, although the proportion under the measure of the National Poverty Line has remained constant.

A disaggregated report from the Federal Office of Statistics (FOS) showed the existence of wide disparities in the depth and severity of poverty across the 36 states in the six geo-political zones of the federation; all but one zone reported that more than 50 per cent of households are poor. An earlier quantitative study[10] on poverty in Nigeria presented the following observations:

- The number of the rural poor is more than twice the number of the urban poor although urban poverty is the fastest-growing area of poverty.
- The majority of the core poor are located in the urban areas.
- The North has witnessed faster poverty growth rates than the rest of the country.
- There is a higher incidence of poverty among male-headed households although the absolute number of females in poverty is higher.
- Poverty incidence is higher among household heads aged 45–54.
- Poverty is negatively correlated with the educational level of the household head.
- The incidence of poverty is higher for household heads engaged in service industries, agriculture and forestry.

**Table 4.2** Trends of poverty in Nigeria

| Year | Proportion of population living below $1/day (%) | Proportion of population living below $2/day (%) | Proportion of population below National Poverty Line (%) |
|---|---|---|---|
| 1990–2002 | 70.2 | 90.8 | 34.1 |
| 1990–2004 | 70.8 | 92.4 | 34.1 |

*Source:* UNDP, 2004–2006.

Ten years after these studies, the poverty situation in Nigeria has not improved in quantitative terms. For example, the *Human Development Report 2006* ranks Nigeria as 159th out of 177 nations in the world. The country's ranking has been steadily declining. In 2000, Nigeria occupied 151st position, dropping from the 146th she occupied in 1998. As expected, Nigeria's current social indicators are well below the average for developing countries.

- Life expectancy, which was 50.1 years in 2000, dropped to 43.4 years in 2006, while the total fertility rate is currently put at 5.8 births per woman.
- More than half of the population (52 per cent) are without access to safe sources of water.
- Public health expenditure represents 1.3 per cent of the GDP, while the combined gross primary school enrolment ratio in 2004 was just 55 per cent.

A set of qualitative studies[11] conducted in Nigeria by the World Bank in 2001 provides an equally discomforting picture of poverty in Nigeria. Besides confirming the findings of quantitative assessments, the report demonstrated that the non-material expressions of poverty are more numerous and more often repeated than are material descriptions.

> Study participants widely associated poverty in their communities with a lack of dignity, status, security and hope. In addition to material deprivation characterized by poor, insecure housing, food insecurity and limited access to utilities and services, the poor were described as wretched and lacking in any opportunity to change their situation or provide their children with greater opportunity.[12]

Though both women and men in rural and urban areas identified the same set of key problems and priorities (Table 4.3), four important lessons can be drawn from the findings of the study:

- Despite the existence of views of poverty that are common to all zones, the qualities and characteristics of poverty differ by social group and by geographical and economic context.
- Diverse coping strategies exist, varying according to both location and gender. On the one hand, men and women have different access to support mechanisms, with women relying more on the family network while men have easier access to public and community resources, and on the other, the rural poor exhibit a more diversified pattern of coping strategies than their urban counterparts.
- In the view of the poor, not all the identified problems require the same kind of support to be solved. Just as the problems relating to public service

**Table 4.3** Ranking of major cross-cutting problems facing the poor across all zones

| Rank | Urban poor | Rural poor |
|---|---|---|
| 1 | Lack of piped water | Lack of potable water |
| 2 | Unemployment | Inadequate access to education facilities |
| 3 | Inadequate access to education facilities | Inadequate access to health facilities |
| 4 | Inadequate access to health facilities | Lack of rural feeder roads |
| 5 | Irregular supply of electricity | Non-availability of markets |
| 6 | Lack of agricultural inputs | Non-availability of electricity |
| 7 | Lack of good roads | Lack of processing machines |

*Source:* World Bank, 2001.

provision will require significant external support, the poor revealed that the problems related to the absence/breakdown of collective/co-operative action could be solved mainly through their own efforts.

- More important and/or surprisingly perhaps in public policy terms, the study has highlighted a marked lack of trust towards the local government. The analysis undertaken shows that local institutions, formed by local people in response to their problems and needs, are perceived to be more important than governmental or non-governmental organisations.

Beyond the identification of problems and priorities is another observation: both the urban and rural dwellers recognised the fact that access to safe water is crucial to poverty alleviation, implying that provision of and access to safe drinking water should be central in the formulation of Poverty Reduction Strategy Papers (PRSPs). The benefits of improved access to safe water are considerable in terms of public health and savings to the poor. A recent impact evaluation study conducted by ALF in Kano, Nigeria showed that provision of a community-dug well helped nearby households to save up to N1,000 ($8) per month on water, as well as to make better use of the extra man-hours available because of the households' proximity to a water source.[13]

The four case studies of Nigerian cities presented below further corroborate the relationship between water and poverty.

## Case studies

### Kano

Kano is officially regarded as the most important commercial city in Northern Nigeria. The city centre has always attracted traders, industries and private

**Box 4.1** Tudun–Murtala settlement – industrial area, Maimalani Road, Kano

This settlement is located on the outskirts of an industrial area. Most of the industries produce plastics and batteries. Land around the settlement is contaminated by products from the factories, and water sources including wells and rivers are contaminated.

The population of this community is around 15,000 people. Over 60 per cent are aged between 6 months and 45 years. There are no good roads or state schools or clinics. Unemployment is high and most people who are employed are involved in petty trading and agriculture. Inadequate planning has made access to safe water scarce and difficult. People rely on well water for cooking and drinking. Occasionally when they can afford it, people buy water from 'water boys'.

The few community organisations that are present are mostly ethnic or religious-based and mostly male-dominated. There is no working relationship between the community and the Local Government Council (LGC), and no projects had been undertaken in the community over the four years before this study was conducted.

businesses. Sharia law is officially practised throughout the State of Kano. Urban poverty is rapidly increasing in Kano. Unemployment, lack of cash incomes and poor housing conditions are cited as the main causes of poverty. Many of the urban poor live in slum settlements outside the Government Reserve Areas (GRAs) with no access to electricity supplies or pipe-borne water (see Box 4.1). Most urban households pay for their water consumption needs. Poor households pay up to US$0.18 for 25 litres of water, although most families cannot afford the costs. The main sources of water for the poor are unchlorinated wells and streams. Many families suffer from water-borne infections after drinking water from rivers and unchlorinated wells.

## Ibadan

Ibadan is one of Nigeria's largest and most populous cities. Urban poverty is high and there are large concentrations of poor people in most parts of the city. In most areas, people reported a breakdown in sanitation and waste disposal systems as huge amounts of household refuse have been left uncleared for several months. Parts of the centre have become permanent dumping sites for refuse because urban residents have nowhere to dispose of their waste.

Urban utility services are also problematic, as electricity and water supply systems have also broken down in most areas (Box 4.2). In areas inhabited by the poor, there is a complete lack of electricity and pipe-borne water. Illegal electricity connections are not uncommon. Most urban residents pay for water from wells and water trolleys. As in most urban areas, the cost of water is high with a small jerrycan costing between US$0.25 and US$0.35 in some parts of the city. The lack of access to clean drinking water is creating a health risk as

**Box 4.2** Kajola-Temidire

This community is located along the busy Express Road in Ibadan. The population is around 100,000, and consists mostly of Yoruba-speaking people.

The main problems identified are lack of water, electricity and access roads. Although poverty is high in the community, burglaries are said to be high. Vigilante groups have emerged to tackle the problem.

Households have to pay for water from community wells and private boreholes. A jerrycan of water from water boys on average costs US$0.30. Malaria, diarrhoea, typhoid and other water-borne diseases are common. There are no garbage disposal systems, and refuse is left for months alongside houses where children play and adults prepare food.

The nearest hospital is 20 km away.

Unemployment is high as there are no industries or employers in the area. Most people rely on agriculture, petty trading and hawking. Informal credit organisations exist, as well as ethnic of mutual assistance organisations. There are no national or international NGOs working in the community.

the poor are prone to water-borne diseases from well water, which is often not properly chlorinated.

## Kaduna

Kaduna is one of the major commercial cities in Nigeria. It is also the political capital of Northern Nigeria. The city centre has a population of over 1 million people, consisting mainly of government employees, military personnel, traders, farmers and the unemployed. Kaduna has experienced social and political unrest in recent months and the situation is still quite tense. The centre of Kaduna faces similar problems to other urban areas in Nigeria. There are huge problems with employment, water, sanitation and waste disposal. Illegal dumping of refuse is common. Although not as acute as in other urban centres, the increasing incidence of child poverty mainly among runaways and *almajiris* (street children) is causing a problem of homelessness among young people. Very often, some of these *almajiris* also operate as 'water boys' in times of peace, but their presence has helped in the past to aggravate ethnic and religious crises.

Hausa- and Fulani-speaking people form the main ethnic groups in Kaduna. Strong religious and cultural practices including wife seclusion are widely practised. Strong ethnic and mutual assistance organisations exist although their effectiveness on the ground is not known. Several informal self-help, credit organisations and charitable groups are present. There are also strong national and internationally funded CBOs and NGOs like Al Fakeh that work on peace initiatives with young people, urban governance and empowerment of women and children.

## Port Harcourt

The city of Port Harcourt is the centre of economic activity for the oil industry in Nigeria. All the major oil companies have a presence there, creating employment for thousands of people including expatriates and Nigerians. There are also a large number of secondary industries and businesses serving the oil industry. Most key government agencies have offices in the city and a number of national and international NGOs are also present.

Port Harcourt is one of the most expensive urban areas in Nigeria after Abuja. Although it is a bustling commercial centre, poverty levels are rather high, and the incidence of poverty is increasing with the poor being pushed into marginal areas on the outskirts of the city, where they live in slumlike conditions.

There are few sources of employment for unskilled people, so many of the urban poor rely on the informal sector for incomes. Passenger motorcycle driving, street hawking, market trading and agriculture are the main sources of income for the poor in this city.

Utility services are overstretched and there is a marked lack of investment in services for the rapidly expanding urban population. Most of the urban poor live in poor housing conditions, often with no toilet or sanitation facilities. Overcrowding is a big problem and homelessness is rapidly increasing.

The majority of the poor do not have access to clean pipe-borne water. Water is purchased from water boys or obtained from private wells and boreholes. The average cost of water is about $0.30 per 25-litre container. Health facilities are mostly private, and the costs are prohibitively high for the poor, so that many of them are weak and unhealthy.

## Implications of the case studies

First, there is a high cost to the poor from low levels of service delivery. From the socio-economic profiles of the four cities presented above it is obvious that one of the most critical issues is the prohibitive cost of water, which ranges from US$0.18 to US$0.35 per 25 litres. An average family will need about 240 litres for daily survival, meaning that about US$1.73–3.36 will be required for daily provision of water. With more than 60 per cent of the population living below US$1 a day, a family will have to spend all of its total income and even borrow if it is to meet its water needs. This is not feasible in the light of other competing needs such as food, clothing, housing, health, and so forth.

Allocating such a high proportion of income to water will instantly aggravate the poverty situation and make many families economically vulnerable. As part of their coping strategies, it was observed that families often resort to unhygienic sources of water as shown in the cases of Kano and Ibadan, resulting in a high incidence of water-borne diseases, which further reduces people's productivity and income generation capacity.

Second, the lack of pipe-borne water has led to informal provision. In the case of Kano and Kaduna, inadequate water facilities seem to have provided employment for water boys and '*almajiris*'. Their large numbers and visible presence in the city centres has in the past also provided fertile ground for both ethnic and religious crises. These divisions have further limited and hindered economic opportunities within the two cities, thereby compounding the unemployment situation with an attendant increase in poverty.

Third, access to water services is increasingly an indicator of income. Non-availability of safe water is becoming the dividing line between the rich and the poor in some of the major cities as typified by the example of Port Harcourt. It appears that capacity for long-term, all-embracing planning for urban development is lacking within the government circle.

Fourth, even proximity to modern and industrial facilities and utilities does not provide a guarantee of access to safe water. Communities that are close to industrial and commercial utilities have been known to experience poverty and live in appalling conditions, suffer from water pollution and environmental degradation. This is perhaps a product of the inability of the public planners to incorporate or make provision for emerging fringe settlements near urban development projects. It thus becomes imperative to view water and sanitation projects as on-going, meaning that the notion of absolute supply coverage often bandied about by government may be an overoptimistic fantasy.

Fifth, poor access to water increases gender inequality and the burden of women who are mostly charged with the function of its provision, which will further affect the quantity of time devoted to family welfare. Long-distance searching for water is a major reason for low productivity especially during the dry season.

Finally, inadequate water and sanitation facilities degrade the environment and further compound the poverty situation. In addition to human consumption, animals also have to be considered. Water scarcity can deplete livestock populations, and further compound the existing nutrition and food security problems especially in the arid regions of the country.

The cumulative effect of these observations and the logical deductions from them is that a well-articulated and functional water resources management system should be used to develop a holistic and strategic framework for poverty reduction within Nigeria.

## Managing Nigeria's water resources

Although Nigeria has abundant water resources, fresh water supplies are generally deficient, and sanitation is poor or nonexistent. Estimates from different data sources agree that only one-third of the rural population and about half of the urban population have access to safe drinkable water. Although Nigeria became a signatory to the UN Integrated International Drinking Water Supply and Sanitation Decade in the 1980s, it is evident that both the water supply and the extent of sanitation systems have declined since then.

Data from the Joint Monitoring Programme (JMP) of the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) showed that Nigeria may in fact be experiencing a decline in access to improved drinking water[14] and sanitation in the urban areas; this means that the level of vulnerability to water-related problems may be growing.

Table 4.4 provides indications of uneven development. Although rural access to improved water sources appears to have improved by 12 per cent between 1990 and 2002, urban access declined by 11 per cent during the same period. In relation to access to sanitation between 1990 and 2002, there has been a decline of 21 per cent in the urban areas and 14 per cent in rural areas. Although this decline may possibly be accounted for by more rigorous means of surveying, the regression marks a persistent negative trend. It is also important to note that access to water remains essentially a function of financial power as well as managerial efficiency.

The evident deficiencies in provision have led to renewed commitment by government. The present government has confirmed its determination to provide access to safe drinking water and adequate sanitation for all Nigerians. As a result of the huge investments required in the sector, a period of 25 years was allowed for reaching this goal. As at 2007, the broad target was to increase the proportion of the population with access to safe drinking water to at least 70 per cent (IMF, 2007). Given that the lack of safe water has alarming consequences for health and development, government institutions at all levels as well as local and external agencies have made improved water

**Table 4.4** Access to improved drinking water sources in Nigeria[15]

| Year | Urban access to improved water sources (%) | Rural access to improved water sources (%) | Urban access to improved sanitation (%) | Rural access to improved sanitation (%) |
|---|---|---|---|---|
| 1990 | 83 | 37 | 69 | 44 |
| 2002 | 72 | 49 | 48 | 30 |

*Source:* WHO/UNICEF, 2001.

supplies and sanitation a top priority. The importance of this was underlined by estimates that further neglect would lead to bigger crises in the future.

With the change to democratic rule, the Federal Ministry of Water Resources formulated an Inter-sector Water Resources Management Strategy (WRMS) in 1999, which has since been reviewed and incorporated in the National Water Supply and Sanitation Policy[16] that was approved by the Federal Government in January 2000. A dialogue with representatives of the responsible government institutions has been initiated and external agencies (especially the World Bank) have supported the process. This has resulted in a draft Strategy Note,[17] which provides an overview of the background to the problem, the status quo, policy and strategies, as well as of the specific recommendations for the entire water and sanitation sector. The Study on National Water Resources Master Plan (NWRMP) received Japanese assistance in 1995 and has since been updated. In spite of geo-climatic differences between the dry north and the humid south, water resources were found to be inadequate to meet the demand for drinkable water throughout the whole country.

The problems essentially remained the same: a lack of information on the current situation, deficient maintenance of dam capacities, lack of planning for water transfer between states (south/west), problems of corrosion of pumping and storage equipment, iron content and/or surface pollution affecting groundwater qualities (especially in the Delta region and other large cities). The efficient use of water and sanitation facilities, most of which were installed in the 1970s and 1980s, has generally been hindered by poor management. Other problems include a failure both to appreciate the economic value of water and to address water conflicts and water pollution in specific areas. These problems are compounded by the fact that the organisations in charge of water supply do not always have the necessary competence, which can result in instability and insufficient monitoring of financial practices. The fact that users do not participate in the planning of the water systems is a frequently cited explanation for the waste of substantial funds provided by the previous central

government and by various donor programmes. While in some communities, different agencies implemented two similar projects, in others nothing was done at all. As most of the facilities installed to date have never functioned, or have ceased to do so, there is, at the present time, little difference between the communities that received investments and those that did not.

Previous governments had ignored small towns partly because it was unclear whether they should be classified as rural or as urban. In urban areas, State Water Authorities (SWAs) were officially in charge, but the field surveys showed that operational efficiency was generally low, and was characterised by poor cost recovery and a poor spread of services. It is thought, for example, that leakage losses in the distribution systems can account for up to two-thirds of the total water pumped through them. Although the need for institutional reforms has been identified as relevant in several reports, there are few signs of any implementation. Instead of starting with at least minor practical improvements, several SWAs have prepared ambitious investment programmes and have asked for substantial external funding. The poor condition of the system for which they are responsible is cited to justify external support. This approach, however, involves the risk of repeating previous top-down implementation, while what is needed is the introduction of participatory approaches that can move the country towards the path of sustainable development and a rapid reduction in poverty levels.

## New policy directions

The issues and challenges raised in this chapter imply that there is a need for the creation of a new political and social environment to support local reforms and build sustainable management capacities. The main WRM policy objective, for instance, has been formulated as follows: 'All Nigerians should have access to clean water and sanitation at an affordable price, of which equity, poverty alleviation and eradication of water borne diseases are priority considerations' (Federal Ministry of Water Resources, 2000b).

The specific objectives are enumerated as follows:

1. Increase service coverage for water supply and sanitation nationwide to meet the level of socio-economic demand of the nation.
2. Ensure good water quality standards are maintained by water supply undertakings.
3. Ensure affordability of water supply and sanitation services for the citizens.

4. Guarantee affordable access for the poor to the basic human need level of water supply and sanitation.
5. Enhance national capacity in the operation and management of water supply and sanitation undertakings.
6. Privatise water supply and wastewater services (where feasible) with adequate protection for the poor.
7. Monitor the performance of the sector for sound policy adjustment and development for water supply and sanitation.
8. Produce legislation, regulations and standards for water supply and sanitation.
9. Reform the water supply and sanitation sector to attain and maintain internationally acceptable standards.

While these are desirable aspirations, their achievement will become a herculean task if we still rely on the previous implementation strategies. For example, the broadly optimistic targets enunciated in the various strategy and policy documents on water coverage assume that water will be available to all the citizens, which in reality cannot be so. Government estimates are usually based on planned settlements, which in the first instance are static: the estimates do not make allowance for the dynamics of urban development and for people living on the fringes or in informal settlements as shown in the examples from Port Harcourt and Tunduwada in Kano. The implication of this is that water implementation strategy should create provision for short-term evaluation and field work to determine the impact of measures as a way of providing clear data and analyses of projects and programmes.

Important also is the fact that between 1999 and 2003, the proposed target in terms of water supply and poverty alleviation was not met in spite of the good intention of the government. Nigeria is still classified as poor, and access to safe water and sanitation has not improved greatly beyond what it was when the water management strategy was initiated, going by recent estimates from the WHO/UNICEF (2005) report on the Millennium Development Goals drinking water and sanitation targets.

Furthermore, the linkage between the State Water Authorities and the Federal authority needs to be strengthened, while community participation in project formulation and execution will be required to make the new policy a functional instrument of water development.

The use of appropriate cost recovery mechanisms needs to be addressed within the new WRMS as a guarantee for the sustainability and expansion of water schemes in the light of growing population, the emergence of 'informal' settlements, and growing demand for social utilities and infrastructure.

## Recommendations for change

Placed within the current context, therefore, it thus appears that the management of the entire water supply system in Nigeria within the framework of new WRMS would need to be deepened and reinforced with adequate and flexible technical and administrative initiatives that are proactive in approach and nature, combined with inbuilt guarantees for sustainability and partnership. Some of these initiatives are proposed below:

1. *Decentralisation:* Decentralisation entails the rational and effective distribution of responsibilities among federal, state and local governments. This is a precondition of the reorganisation and strengthening of both the State Water Agency and the State Rural Water and (Environment) Sanitation Agency, as well as of their corresponding institutions at the local government level. This in turn requires determined activity on the part of political authorities and also depends on specialised external support. At the state level, objectives are yet to be consistently defined while areas of responsibility remain to be clarified. Water corporations are mostly parastatal organisations, in which there is quite often internal resistance to reforms.
2. *Divestment:* Financial and economic independence and accountability of local agencies/water boards should be encouraged and entrenched within the operational modalities of the new reforms.
3. *Community participation:* User involvement should begin at the preparation and planning stage, which includes their financial contribution to investment costs. In areas where water and sanitation projects have been established with the support of UNICEF, certain participatory principles have already been established and a number of decentralised actions have been taken. However, this is true only for a small part of the country.
4. *Economic value of water:* If users are to appreciate the true economic value of water, they will need to contribute substantially to operational costs. Community participation and recognition of the economic value of water should be the cornerstones of the new implementation strategy, which aims to ensure sustainability. If economically realistic tariffs are to be accepted, it will be necessary to build on broad-based trust. This would also allow the promotion of private sector involvement. Community participation in the rural environment and within larger residential communities such as the 'small towns' would involve a transfer of the ownership and management of water systems to consumer communities and a reduction of dependence on local governments. As a first step towards direct engagement, it is proposed that communities should contribute at least 10 per cent to the capital

costs and take over the full operation and maintenance costs after the completion of the installations. For example, in many villages the cleaning and maintenance of the water supply systems – whether ponds, wells, canals or pumps – is a communal responsibility which villages can discharge either by manual labour or by contributions in kind or in cash. The Micro Project Programme (MPP) promoted by the EU even requires a local contribution of at least 25 per cent of the value of the project, a large proportion of which is usually provided through communal manual labour.

5. *Government participation in the capital investment:* Especially in the case of larger investments, water authorities may need to be subsidised if the service is to be expanded. A sound financing strategy requires that both interaction and cost-sharing procedures are developed for the three tiers of government, and no less important, that they are based on demand-driven principles. Subsidies for budgets could, for example, be made conditional on the submission of sound proposals by the community to local or state governments. Discussions on the extent to which each level of government contributes to subsidisation need to be transparent. It is also essential to ensure that each project has access to high-quality professional technical support.
6. *Feasibility studies:* Feasibility studies need to be carried out for each project and should indicate alternative options. Such studies must also consider how both quality controls can be ensured and how unskilled village labour can best be integrated in any project. If projects are implemented in accordance with current professional standards, this will result in an improvement of the capacities of private enterprises and can also help them to build up a reputation, which can lead to further contracts. Furthermore such feasibility studies should create room for innovative ways of incorporating the dynamic changes in urban development and growth in population.
7. *Uniformity of criteria:* For all projections, uniform criteria need to be applied if comparable standards are to be guaranteed. Conceptual planning deficiencies have been identified both at local government and state levels. Any concept must provide beneficiaries with guidelines on how to mobilise their participation and how to make their concrete contribution. Although specific project plans have been found to be well documented in some respects, they are nevertheless of dubious value as they have not been integrated in a general planning concept, and in most cases do not envisage user participation in the projects.
8. *Private sector:* Private sector involvement, which is almost certainly essential if the reform of the water sector in Nigeria is to prove effective in the

long term, can be promoted in various ways. An assessment of the private sector's current capacities may allow those enterprises that are already competent to be more effectively involved. Analyses of the existing systems will help to avoid conflicts and unforeseen negative effects of projects that may introduce unwanted competition for locally established systems (e.g. supplies of water by tanker, lorries and other means of transport).

## Conclusions

Inadequate supply of safe drinking water aggravates poverty. The data used in this study as well the case studies point to this trend especially in Nigeria. It thus means that a well-articulated and integrated water and sanitation management policy is central to poverty alleviation in Nigeria as also in other developing countries.

This chapter places the issue of poverty in Nigeria within a contextual framework of WRMS. The profile and the scenario that emerged from the various field surveys, analyses, illustrations and case studies showed that the current WRMS needs to be reinforced for it to serve as an effective poverty reduction mechanism. This reinforcement could come in terms of the right mix of 'hard' (infrastructure) and 'soft' (water service institutions) components of the WRMS. The creation of a more conducive environment for public–private sector partnership can assist in ensuring that the poor have more access to water. Subsequent reforms within the water sector should create incentives for private operators in communities where they complement the public water supply system in a manner that guarantees a more equitable pro-poor distribution network.

After six years of implementation, it appears that the government targets are far from being achieved. There is no visible progress in terms of increasing the access to safe water or poverty alleviation; improved water provision is not easing the burden of the poor. The 2006 UN Human Development Report attests to increases since 2000 in both the incidence of poverty and the proportion of the population without access to safe water sources. An urgent review and reinforcement of the existing strategy and policy framework as proposed in the chapter is imperative. In addition, there is a need for annual monitoring, evaluations of implementation, and impact assessment studies anchored on dialogue with poor communities and other stakeholders in the water supply–demand chain.

## Notes

1. National Population Commission (1998).
2. ECOWAS (2001).
3. National Planning Commission (2002: 6).
4. UNDP (2000).
5. The three tiers of government are the federal, state and local governments. According to the 1999 constitution, Nigeria has one federal capital, 36 state governments and 774 local government councils.
6. Federal Office of Statistics (1996a).
7. People classified as poor in Nigeria may not be classified as such in another country. For example, the *Human Development Report for 2000* sets different poverty lines for different regions: $1/day is used for sub-Saharan Africa, while $4 and $14.4 are used, respectively, for Eastern Europe and the United States of America.
8. For this reason the *Human Development Report for 2000* recommended, on p. 78, 'budget restructuring' as one of the policy adjustments required in actualising the social and economic rights of the most deprived.
9. For other aspects of the relationship between poverty and water deprivation see van Koppen (2000).
10. See Federal Office of Statistics (1996b, 1999) and World Bank (1996). The lack of up-to-date poverty statistics disaggregated by urban/rural location or by gender must be noted as an important constraint to comprehensive and current discussions on poverty. Where data exist, significant differences in reporting poverty can be noted depending on what source is being consulted.
11. World Bank (2001).
12. World Bank (2001: 40).
13. Africa Leadership Forum (2002: 24).
14. Improved water supply according to WHO and UNICEF includes household connection, public standpipe, borehole, protected dug well, protected spring, and rainwater collection.
15. The coverage estimates from JMP are expressed as the percentage of population with access to improved drinking water sources as defined in note 14.
16. Federal Ministry of Water Resources (2000b).
17. Federal Ministry of Water Resources (2000a).

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# 5

# Water, agricultural development and rural poverty in Bangladesh

*Haakon Lein*

## Introduction

Apparently 'overpopulated', economically backward and well known for disasters and famines, Bangladesh is for many observers around the world a prime example of a developing country stuck in endless poverty with few prospects of progress. However, during the 1990s Bangladesh achieved substantial economic growth and made significant progress in the reduction of poverty. This holds true for both urban and rural areas, but the latter have seen a greater reduction in the depth and severity of poverty, suggesting that growth has been more pro-poor in rural than in urban areas (World Bank, 2002: 5).

Although this reduction in rural poverty undoubtedly has many explanations, it must be related to changes in agriculture. Over more than three decades Bangladesh has seen sustained and substantial growth in agricultural production and productivity. This growth in agriculture has led to increased overall food production and, thereby, improved food security in this once famine-prone country. It has also led to a decline in real food (rice) prices, created jobs in agriculture and helped the many small farmers make a more decent livelihood out of the millions of extremely small farms found in Bangladesh.

There are, of course, a wide range of issues that have to be considered when trying to explain what has been happening in Bangladesh agriculture over the last decades. I will, however, argue that the single most important factor has been water, or more precisely the fact that Bangladeshi farmers have been relatively successful in gaining control over the water resources found

in this delta. Agricultural growth over the last decades has been driven by expansion of dry season irrigation based on privately owned tube wells and pumps combined with the spread of new high-yielding rice varieties.

Agricultural change based on what is commonly labelled 'the green revolution' and in a sense a 'private water market' is commonly not perceived as being particularly pro-poor. However, in this chapter I will argue that this development has been good for the poor and that this, together with other important processes outside agriculture, at least provides a partial explanation for why, contrary to many expectations, rural Bangladesh has seen fairly substantial improvements in the poverty situation.

## Poverty and agricultural growth

Thirty-three years after its independence Bangladesh is still basically a poor agrarian society, with a population in 2001 of around 130 million. Literacy rates are still well below 50 per cent, maternal death rates are far too high, and 37 million people are living in extreme poverty. Both regional and social inequalities are growing (World Bank, 2002) and on the United Nations Development Programme's Human Development Index (UNDP HDI) the country is ranked as number 139 out of 175 countries – between Sudan and Congo (UNDP, 2003).

However, despite such gloomy figures, Bangladesh has also made some remarkable progress over the last two decades (Rahman, Hossain and Sen, 1996; World Bank, 2002; Sen, 2003). Fertility rates have gone down and population growth has declined to less than 1.5 per cent per year. The health and nutritional situation for children has improved substantially, and the under-five mortality rate has gone down from 239 in 1970 to 77 in 2001 (UNDP, 2003). If the current trends continue, Bangladesh and the Maldives will be the only countries in South Asia that will be able to meet the millennium goal for reducing the under five-mortality rate by two-thirds from 1990 to 2015 (World Bank, 2002: 10).

Although there are still far too many poor in Bangladesh there has been significant progress in the fight to reduce poverty. During the 1990s, the proportion of the population living below both the upper and lower poverty lines declined by about nine per cent (Table 5.1). Still, in 2000, 50 per cent of the population (approximately 63 million) could be defined as poor, 34 per cent (42.5 million) as extremely poor. Due to population growth there has been no decline in the actual numbers of poor people, with one noticeable exception, a drop of 2.7 million in the numbers of 'hard-core' poor living in rural areas.

**Table 5.1** Trends in poverty, 1991–2000 (percentage of population)

| | Upper poverty line (%) | | Lower poverty line (%) | |
|---|---|---|---|---|
| | 1991–92 | 2000 | 1991 | 2000 |
| Urban | 44.9 | 36.6 | 23.3 | 19.1 |
| Rural | 61.2 | 53.0 | 46.0 | 37.7 |
| National | 58.8 | 49.8 | 42.7 | 33.7 |

*Note:* Based on cost-of-basic-needs methods for estimating poverty whereby a household with real per capita expenditure below a certain poverty line is defined as poor. For more information see World Bank (2002: technical appendix).

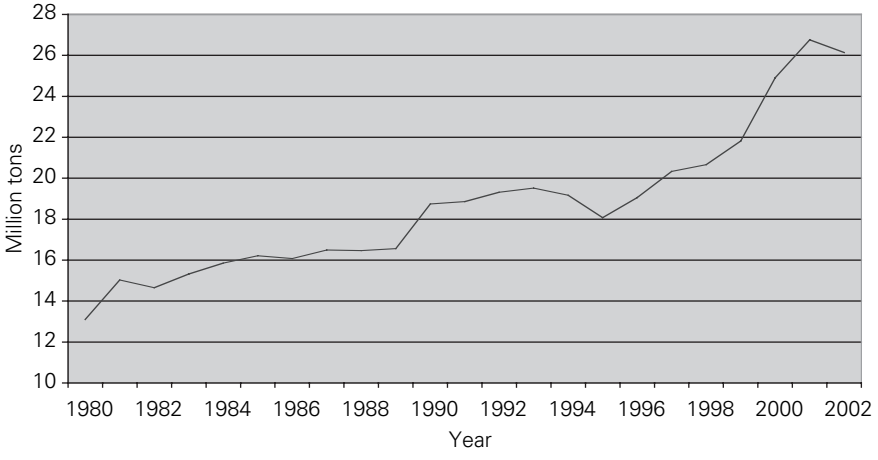
*Source:* World Bank, 2002: 4 (Table 1.1).

During the 1990s the country experienced steady economic growth; in fact, GDP per capita increased by over three per cent per year in the period 1990–2001. This growth is clearly linked to growth in industries and services with export-oriented ready-made garment production the key driving force. But Bangladesh is still a predominantly rural and agricultural society; 77 per cent of the population and 85 per cent of the poor live in rural areas (Bangladesh Bureau of Statistics, 2001; World Bank, 2002). With a population density of 834 persons per square kilometre (Bangladesh Bureau of Statistics, 2001), Bangladesh is among the most densely populated countries of the world. The country is, however, well suited for agriculture as most of the land is fairly fertile and most regions have good access to water in the form of rainfall, surface water and groundwater.

Traditionally the year is divided into three main agricultural seasons. The *Robi*, or winter season, lasts from October/November to March/April. The main crops grown are wheat, pulses, mustard, vegetables and winter (*boro*) rice. By tradition, *boro* rice has been grown only in low-lying wet areas and along the riverbanks. The *Bhadoi* season lasts from March/April to July/August and the main crops are jute and *Aus* rice. The *Aghani*, or *Aman*, season lasts from June/August to November/December, that is from the height of the monsoon period to its end. The main crop is *Aman* rice, either broadcast or transplanted. *Aman* rice has traditionally been the most important rice crop in Bangladesh because it can be grown in areas flooded during the monsoon.

Over more than three decades, the country has witnessed steady increases in the production of food grains, especially rice. Production grew from 10–11 million tons in 1975 to approximately 26 million tons in 2001 (Figure 5.1). This growth was due to increasing yields; the average rice yield increased from 1.52 tons/ha in 1965 to 3.48 tons/ha by 2001 (Hossain et al., 2003: 13).

**Figure 5.1** Growth in foodgrain production in Bangladesh, 1980–2002




*Sources:* World Bank, 1991, and http://www.bangladesh.gov.bd/mof/availability.html.

Parallel to this growth in production, it is worth noting that the cultivated area declined from 8.16 million ha in 1983–84 to 7.19 million ha in 1996. In the same period average farm size declined from 0.8 to 0.6 ha and the number of small farms increased dramatically, while the proportion of large farms declined. Between 1983 and 1996 the proportion of households that were landless rose from about 50 to 60 per cent of rural households (Shaha, 2002).

In this process, water and human measures to control water have played a significant role. Bangladesh is well known for its flooding, which is an inevitable phenomenon in this flat delta draining some of the largest rivers of the world including the Ganges and the Bhramaputra. To some extent Bangladesh's society and agriculture are well adapted to such annual inundation: traditional cropping patterns are organised according to the time of the monsoon floods, homesteads are built above normal flood levels, and numerous riverboats are involved in the transport of both people and goods. However, that does not mean that flooding is unproblematic; water levels rise above normal levels regularly and cause damage to crops, houses and infrastructure. Unregulated monsoon flooding also creates problems and uncertainties, as the timing and extent of flooding vary and are difficult to predict. As a result, farmers have relied on flood-tolerant, but low-yielding crops.

The spread of modern, high-yielding varieties (MVs) in Bangladesh has mainly been linked to dry-season crops, especially MV-*boro*. The more limited

use of MV-*Aus* and MV-*Aman* can to a large extent be explained by what Farmer (1979) has termed the 'deepwater rice problem', the fact that most of the new rice varieties are relatively short-stemmed and thus less suited to the heavily flooded monsoon areas of South Asia. Owing to lack of modern, high-yielding, flood-tolerant rice varieties and effective flood control measures, farmers in Bangladesh have changed their cropping pattern from being organised around a rain-fed monsoon rice crop, to a pattern based on irrigated winter crops. The close relationship between expansion of irrigation and the adoption of modern varieties has led some to term water (irrigation) the main supply side constraint (Rahman, 1984) or – in another terminology – the leading input in the 'green revolution' technology in Bangladesh (Boyce, 1987).

From 1980 to 2000 the area under irrigation in Bangladesh increased from 1.5 million ha to more than 4 million ha, this amounting to about half of the total cultivated area (Hossain et al., 2003). This expansion is first of all based on the deployment of small-scale irrigation equipment. Many plans for expansion of irrigation through large-scale gravity systems have been prepared and some projects have actually been completed, but the impact of these schemes has been limited and small-scale irrigation has been the major source of irrigation expansion. Low lift pumps (LLP), pumping water from surface water sources (rivers and ponds) were introduced in the late 1950s, more advanced and expensive deep tube-wells (DTW) in 1961. From 1974 onwards, shallow tube-wells (STW) rapidly became popular and have, partly together with the LLP technology, been the main source of irrigation expansion. In 2000 these two types of irrigation technology accounted for 71 per cent of the total irrigated area (Hossain et al., 2003: 12).

During the early part of the 1980s, a number of reforms in the agricultural sector of Bangladesh were initiated and gradually implemented (see Mahmud, 1998 for an overview). The main objective of these reforms was to improve farmers' access to agricultural inputs, by establishing a private distribution system for agricultural inputs such as fertiliser and irrigation equipment. Reforms in the minor irrigation sector were a central element of the new agricultural policy and meant that pumps and tube-wells that used to be owned by the Bangladesh Agricultural Development Council (BADC) and rented out to village cooperatives were put out for sale. At the same time, subsidies on equipment were reduced and import and standardisation restrictions were removed. In short, the irrigation sector was deregulated and to a large extent 'privatised' in the 1980s.

The effect of these policy reforms has been much debated in Bangladesh (see Rogaly, Harriss-White and Bose, 1999), Some have argued that they would lead to agricultural stagnation and increasing rural inequalities, others

have seen them as the main key to agricultural growth. I will return to parts of this discussion, but first I will briefly describe the changes that took place in the village Char Bhramondi, between 1980 and the end of 1990, based on several periods of fieldwork between 1985 and 1998 (see Lein, 1990, 1993). Such a single case study obviously cannot be claimed to be typical or representative of the 60,000 or so villages that exist in Bangladesh. But the story of agricultural change in this village can provide some 'on the ground' insight into the processes that lie behind the aggregate statistics referred to earlier in the chapter.

## Water and agricultural change in Char Bhramondi

Char Bhramondi is a small village located a few kilometres to the south of a small town in southwest Bangladesh. The village is located on a *char*, land accreted from the Ariel Khan and Kumar rivers. Most of the *char* is more than 30–40 years old with well-established homestead areas. This land is mainly low-lying and is regularly flooded during the monsoon.

At the beginning of the 1980s the dominant cropping combination in the village was rain-fed *Aus/Aman* grown intermixed. This combination is low yielding but fairly secure and flood tolerant. These rice crops were combined with cultivation of some dry-season crops such as mustard and pulses, and jute grown on more elevated plots. In short, the dominant cropping pattern at the beginning of the 1980s was more or less the same as what commonly prevailed in this region around 1900 (Jack, 1975). In only about 4–5 years this traditional cropping pattern was replaced by a new pattern, organised around a single irrigated winter rice (MV-*boro*) crop. These changes were quite visible in the village: in the winter of 1986 a few plots of winter rice lay as green islands in an otherwise brown and barren landscape, in the winter of 1990 there were only a few barren fields in a sea of green.

The key element behind this rapid transformation was the expansion of small-scale irrigation which took place in many villages in this region during this period. In 1980, less than five per cent of the net cropped area in the Thana (a sub-district administrative unit) was irrigated; by 1990 this had risen to 39 per cent (Lein, 1993). The first cooperative irrigation scheme in the village was set up in the late 1960s and was still in operation in the late 1990s. However, the real expansion of irrigation began in the late 1980s; from 1986 to 1990 the number of irrigation schemes in the village increased from 9 to 26. In 1986, a total of about 59 ha were irrigated, four years later around 202 ha were under irrigation. The expansion of irrigation came as a direct result of the national

policy reforms initiated in the 1980s. In 1984–86 most of the pumps owned by the local BADC office were sold off. In addition, some new pumps were bought from private dealers in Dhaka and the neighbouring town of Barisal where a large irrigation project sold off its stock of second-hand pumps.

Initially only Japanese and some old British engines were used, but in the 1990s cheaper Korean and later Chinese engines became more common. In the late 1990s, electric engines replaced some of the diesel engines. In such cases the pump owner had paid for the poles and the actual installation of several hundred metres of line departing from the main cable along the road. Although the initial investments were quite high, the operating costs could, according to some owners, be cut by up to 50 per cent. It had been assumed that there would be fewer technical problems with the electric-powered pumps. This, however, proved somewhat optimistic. Electricity was quite commonly shut off and at times for days at a stretch.

The pumps in Char Bhramondi were operated under different types of ownership/management arrangements. In 1990, four pumps were owned and operated by so-called landless irrigation groups organised by Proshika, a national non-governmental organisation (NGO). Six pumps were operated through various shareholder systems, whereas the remaining 19 pumps were owned and operated by individual farmers. Traditional land-rich farmers were involved in several irrigation schemes, some in more than one scheme. Villagers and non-villagers involved in trade or other types of local services, or who were working as employees in public or private institutions, also controlled several schemes. Shareholder arrangements were often between relatives, where for instance a brother, working in the town, would provide most of the money for a pump, while a brother or cousin working as farmer would operate the scheme.

As few farmers owned their own pump most farmers relied upon buying water. The most common system in the village was payment in the form of a crop share, normally one-quarter of the standing crop, but in some cases it could be one-third. Such a crop share arrangement can, with a good harvest, be a very profitable system for the pump owner. Default on cash payments was a major problem when pumps were operated by BADC cooperatives. According to pump owners, the crop share system makes it easier to collect payment since the paddy can physically be collected in the field during harvest. The system also has the very important advantage for the farmers that payment in kind means that payment is delayed until after the harvest, whereas in cash payment systems water has to be paid for before and during the irrigation season. The crop share system also gives incentives for the pump owners to manage the scheme well as this sharecropping system implies risk as well as profit sharing between the farmer and the water supplier.

The situation on the water market was surprisingly dynamic and there were clearly elements of competition among pump owners. New schemes were set up, old ones were divided into smaller ones, pumps were sold and purchased, and schemes were abandoned or taken over by new groups. Commonly, farmers initiated such changes when they were dissatisfied with the running of the scheme. This dynamic situation must be seen in relation to the type of technology used; low-lift pumps can easily be moved and reinstalled and drains made of clay would anyhow have to be rehabilitated after every monsoon season. This flexibility is reduced when concrete (*pucca*) drains and electricity lines are set up, giving the 'owner' of the drain and the power line tighter and more permanent control over the irrigation scheme.

Around 1990, more or less all land suitable for irrigation in the village was under irrigation and on all land MV-*boro* was grown. Land left outside the irrigation schemes was either too sandy, too elevated or lacked the pan needed to keep water on the land. Not even in 1986, when only some parts of the village were irrigated, was there any clear evidence of systematic social exclusion in the sense that poor farmers were left out (Lein, 1990). At that time the extent of adoption of MVs in absolute terms (ha of land) was positively related to farm size, whereas the extent of adoption in relative terms (% of the farmer's total land) was negatively related to farm size. Land-rich farmers had more land under irrigation and MV than land-poor farmers, but the latter had a larger share of their landholdings under irrigation and MVs than the land-rich farmers. Tenancy was found to have a certain redistributive effect as a substantial share of the irrigated land was sharecropped out from the relatively land-rich farmers to the more land-poor farmers.

Cultivation of MV-*boro* is in general more labour-demanding than that of other varieties of rice crops and will normally provide more work opportunities for local agricultural labourers. However, in Char Bhramondi this increase was to a large extent offset by a decrease in cropping intensity. It was simply difficult to find time within the agricultural calendar to combine MV-*boro* with other crops in this heavily flooded area. However, the peak labour demand for the new MV-*boro* overlapped with the main traditional seasonal migration period and this led to a more or less total cessation in the traditional seasonal labour migration to other districts of Bangladesh such as Syleth in the northeast and Barisal in the south.

What undoubtedly did increase in the 1990s were job opportunities outside agriculture, both locally and elsewhere. The growth in construction activities especially in Madaripur town and in other areas, the many brick factories, sawmills, trade activities, and so forth, as well as possibilities for jobs in transport

(primarily rickshaw driving), both in Madaripur and in Dhaka, obviously gave landless households new income opportunities. Young healthy labourers in the village had alternative and, by local standards, relatively well-paid job opportunities outside agriculture, while land-hiring farmers complained about the high cost and non-availability of good labour locally. Some had therefore started to hire labour gangs from neighbouring thanas working on piece-rate contracts, whereby a fixed sum was paid to the work group for completing a specific operation (e.g. weeding). The local 'standard' daily wage rate went up from 15–30 taka per day in 1990 excluding meals to 40–50 taka per day (for six hours) including one meal in 1996. In the same year, a rickshaw driver in Madaripur could easily earn 70–80 taka per day. During the same period, the cost of a seer (approximately 0.9 kg) of rice had gone up by only a few taka on the local market. Before 1990, there were no mechanised power tillers in use in the village; in 1996, there were four to five owned by villagers. Relatively wealthy farmers, some already involved in the water market, purchased these allegedly to overcome the lack of draught animals (ghatas) and the high labour costs.

## Why has this been good for the poor?

So how has the green revolution technology and the emergence of a private water market been good for the poor? First of all, it is important to acknowledge that the new crops have enhanced the production capacity of all types of farms, including the very small and marginal. Yields from the new crops are commonly double those of traditional crops and, in addition, the new irrigated rice is much more secure and more predictable than monsoon rice that is more prone to early or excessive flooding. Agricultural 'modernisation' can thus be seen as part of a risk-reducing strategy (Lein, 1994). The new crop will benefit both rich and poor farmers, but it can be argued that increased and more secure production is especially important for the marginal farmer, who struggles to feed his family, in order to avoid being forced to sell off his land.

A common argument found in much of the literature on the 'green revolution' is that any increase in production has been accompanied by an increase in costs, as farmers have to buy expensive inputs such as fertilisers, pesticides and water to reap the full benefit of the new crop. This in turn means that the new crop is only a viable option for the relatively well-off farmers who can afford to utilise the productive but expensive technology.

This issue has been investigated in a number of studies in Bangladesh. In sum, there is little empirical support for the argument that the new crops

have been systematically disadvantageous to the poor farmers (Boyce, 1987; Hossain, 1989; Lein, 1990; Hossain et al., 2003). Basically, all types of farmers, rich as well as poor, owners as well as tenants, have adopted the new crop under one basic condition, and that is that they have access to water. The same inverse relationship between intensity of adoption and farm size as that found in Bhramondi has also been reported in other studies (Boyce, 1987; Hossain, 1989; Hossain et al., 2003). As regards the cost of inputs needed to utilise the new varieties, this is sometimes overestimated. The main inputs needed are water, fertilisers and pesticides. These inputs can be applied in highly varying amounts, and even with fairly low use of fertiliser the MV crops will give substantially higher yields than traditional crops. And despite the substantial costs of purchasing water, studies confirm the experience in Char Bhramondi: that the net benefit from the new crops is substantially higher than the benefit from the traditional varieties (Hossain et al., 2003).

The landless agricultural worker has also benefited: first, through increased employment opportunities, increasing wages and declining food prices. From a more technical point of view, production of MVs is more labour intensive than production of traditional varieties. More labour is needed for land preparation and weeding and for harvest and post-harvest operations. Studies have also shown that the new crop tends to smoothen out seasonal variations in labour demand thereby securing to agricultural labourers a more stable, year-round income. However, as the experiences from Char Bhramondi show, the net effects will depend on changes in the total cropping patterns as well as the degree of mechanisation. An additional factor is that as most farms in Bangladesh are small and becoming even smaller, family labour rather than hired labour will meet much of the increased labour demand. In sum, the total effect on the labour market and wage levels may be difficult to ascertain. It seems, however, to be fairly well established that increased production has been accompanied by declining rice prices seen in relation to wages. For the farmers selling rice this means that their income has increased less than one should expect given the increase in productivity (Hossain et al., 2003). On the other hand, the poor who are net buyers of food have benefited from a decline in real rice prices over the last decades (World Bank, 2002; Sen 2003).

A very strong general trend in rural areas of Bangladesh is that non-farm activities have become increasingly important as sources of income and employment for the rural poor (Shaha, 2002; Toufique, 2002). About 40 per cent of the rural population obtain their main source of income from outside agriculture. Even the poorest 10 per cent of the rural households get 40 per cent of their income from outside agriculture, through employment in non-farm

enterprises, their own business or from remittances (World Bank, 2002). This growth in rural non-farm activities must be seen in relation to growth in agriculture, and direct and indirect growth linkages. In general, farmers benefiting from the new MV crops use a considerable share of their increasing income on various types of rural services, locally produced goods and housing (see Hossain, 1987, 1989). In addition, such indirect agricultural growth linkages have their effects in the irrigation sector directly leading to a growing service market (mechanics etc.), as well as production of low-cost irrigation-related equipment and machinery (spare parts, pipes, pumps, etc.) (Mandal, 2002). Both these linkage effects must be characterised as fairly pro-poor as they provide employment and income opportunities to marginal farmers and rural labourers.

## The emergence of a water market

A second key claim raised at the beginning of this chapter is that the emergence of a 'private water market' has been good for the poor. First, I will argue that it has been good for the poor simply because it has been a prerequisite for the development of agriculture as described above. Without the institutional reforms initiated in the 1980s much less would probably have happened in agriculture and that would have been particularly bad for the poor. In general, land in Bangladesh is unequally distributed, but farms are small and fragmented, and given the capacity and costs of even so-called small-scale irrigation technologies, efficient use depends upon suitable institutional arrangements for water distribution among a number of farmers. Boyce (1987) argued that the 'minifundist' agrarian structure found in Bangladesh makes it difficult to set up efficient and just institutions for water management, and that this has been and would continue to be a major constraint on agricultural development in Bangladesh. Boyce saw institutional reform, including redistribution of property (land) and creation of collective solutions in the form of cooperatives for water control, as one possible and preferred solution (Boyce, 1987: 255). As we know now, this has not been the actual institutional solution; instead a 'water' or more precisely 'an irrigation service' market has become the dominant solution (Palmer-Jones, 2001).

In the debate on policy reforms in the irrigation sector, a key issue has been whether a system of private ownership would lead to a situation where 'landlords' also would become 'waterlords' (Boyce, 1987: 253). This problem of 'waterlordism' was known under the old cooperative system when pumps and tube-wells often were sited and water was distributed so as to maximise returns to powerful individuals rather than the 'cooperatives' and when monopolistic

pricing and the withholding of water were used as tactics to gain control over more land leading to situations like this:

> When walking on the narrow paths and trails between the plots we could clearly distinguish the land belonging to some of the enemies of Shamsul Huq [the pump 'owner' and a rich, absent landowner]; their land was brown and barren, next to plots filled with bulging, green rice plants. From the top of the engine-house of the deep tubewell the command area of the well resembled a chessboard, where the plots were spread about in green and brown squares. (Jansen, 1986: 254)

So how have things this developed under the new system? Those few studies which have addressed this issue seem to support the observations made in Char Bhramondi which indicate that a fairly competitive and dynamic market for irrigation services has emerged (Wood and Palmer-Jones, 1991; Palmer-Jones, 2001). In a recent summary review of rural development policies in Bangladesh, Mandal (2002) claims:

> The privatisation of irrigation equipment has resulted in cheaper tube wells and pumps, which has had significant equity implications as more small and medium farmers were able to benefit from irrigation. The growth in minor irrigation facilitated the emergence of a fast-growing market for irrigation water, which has largely been competitive and broke the monopoly formerly enjoyed by the landed rich or 'water lords'. (Mandal, 2002: 74)

The policy reforms initiated in the 1980s opened up individual ownership and management of irrigation equipment. However, they also made it possible to develop alternative forms of ownership and management of pumps and tube-wells. As early as 1976, some groups of landless and small farmers operating irrigation equipment had been established within the Small Farmers and Landless Labourers Development Project (Bottrall, 1983). It was, however, a national NGO, Proshika, which was first able, at the beginning of the 1980s, to put the idea into practical action on a significant scale. Later, other NGOs took up the idea in various forms (Wood, 1982, 1984; Wood and Palmer-Jones, 1991). Proshika's irrigation programme is based on groups of landless and near-landless rural people owning minor irrigation equipment. In return for providing water to farmers, the group is paid either in cash or in crop share. According to one of its initiators, the programme should be looked upon not solely as an income-generating programme, but rather as a contribution to agrarian reform in the broad sense (Wood, 1982).

Proshika and other NGOs have also set up various types of irrigation programmes for women (see Koppen and Mahmud, 1996). These programmes

are based on various modes of operation and the experiences are mixed. In many cases the groups and their activities were, in practice, dominated by male household members. One of the conclusions drawn by Koppen and Mahmud is that Proshika's approach – with an emphasis on empowerment, creation of strong group coherence and a focus on pure water-selling activities – favours real active participation in mechanised irrigation (Koppen and Mahmud, 1996: xv).

Although a number of viable groups have been established, the rate of failure was quite high, at least in the initial years, since nearly 50 per cent of all groups had been discontinued less than five years after their startup. However, the discontinuity rate was probably even higher in the private sector (Wood and Palmer-Jones, 1991). Proshika's irrigation programme is still running and has been expanded to include a power-tilling programme. According to the 2001 annual report, 225 groups gained ownership of irrigation equipment in 2000–01. Women also benefited and, in total, 285 irrigation projects have been completed by women's groups over the years (http://www.proshika.org/summary/ittsp.htm).

## Conclusion

Irrigation development in Bangladesh, as in other countries of Asia, has been part of a more general 'groundwater boom' based on an informal, private and fairly unregulated exploitation of groundwater (Shaha et al., 2003). Although this 'boom' has improved the livelihoods of millions of people and has mobilised huge private investments into the water sector, future development may lead to increasing problems of resource depletion and pollution.

It will still be a major challenge to sustain growth in food grain production. Even with today's fairly modest population growth rates, there will be 180 million people living in Bangladesh by the year 2025. At present, slightly more than half of the potentially irrigable land (7.6 million ha) is irrigated, so there is undoubtedly still scope for future expansion. Bangladesh has abundant groundwater resources and rainfall as well as rivers in flow, which mean that aquifers are regularly recharged (Ahmad, 2000). Groundwater depletion will probably not become a general problem in the country, but overutilisation of surface water sources and sinking groundwater tables may become a problem in certain areas (especially the northwest region), in some parts of the year (March/April) and in years with relatively little rainfall. Further, in the coastal areas intrusion of saline water might become a problem.

Although growth in foodgrain production must be sustained for decades to come, it has been argued that Bangladesh is coming to the end of what might be termed the 'rice-centric' phase of rural development (Sen, 2003). Crop diversification will become more important as there is a fast-growing demand for vegetables and other produce from a growing and increasingly wealthier urban population. This might be good for the marginal farmers who can produce high-value products on their small farms. Sustaining irrigation-based agricultural growth and increasing crop diversification will thus be important for the rural poor also in the coming years. But agriculture alone will not solve the rural poverty problems of Bangladesh. In fact two out of three jobs in rural areas will have to be found outside agriculture in the coming decades (World Bank and Bangladesh Centre for Advanced Studies, 1998). Rural non-farm activities have been important as regards employment, income generation and poverty reduction in the last decades, and in the future they will become even more important. The good thing is that the non-farm sector may in fact be able to deliver, as at least one assessment concludes that the scope for increased employment in the informal rural sector is 'enormous' (World Bank and Bangladesh Centre for Advanced Studies, 1998: 25). It is to be hoped that there is firm basis for such optimism.

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# 6

# Opportunities for reforming the irrigation sector: the case of the Fish-Sundays scheme of the Eastern Cape

*Beatrice I. Conradie*

## Introduction

New water legislation in 1997 and 1998 paved the way for reform of the irrigation sector of South Africa. By giving black South Africans access to irrigation water, the government aimed to facilitate social and economic development (Republic of South Africa, 1997). In 1995, less than five per cent of the 1,300,000 ha of irrigated land in South Africa was used by black smallholders (Backeberg et al., 1996). They produced almost nothing for the formal market and very little for themselves. Under the apartheid government the smallholder sector was organised as a top-down bureaucracy with projects fully administered by the government or jointly managed by development agencies and project participants. These arrangements were almost universally unsuccessful (Bembridge, 1986; Adams, 1990; De Lange and Crosby, 1995; Van Averbeke et al., 1998; Bembridge, 2000).

In the 1999/2000 financial year the Department of Water Affairs and Forestry set aside R15.2 billion (US$1.5 billion) for infrastructure development and rehabilitation of smallholder schemes (Department of Water Affairs and Forestry, 2000), but without genuine indigenous irrigation schemes on which to model new projects, it is not obvious how the money ought to be spent.

The conditions for success of smallholder irrigation are similar to the conditions for successful land reforms listed by Binswanger and Elgin (1990). Experience in Tanzania suggests the need for more flexible irrigation systems (Gillingham, 1999), while Bembridge (2000) calls for an integrated assessment of technical, economic and institutional factors to suggest rehabilitation of smallholder irrigation schemes in South Africa. De Lange (1997) agrees, and

stresses humble beginnings, simple technology and the will to succeed among participants as the key ingredients for success.

Despite efforts to rethink irrigation planning and project development, very few direct comparisons of commercial and smallholder irrigation exist to guide transformation efforts. Recent studies of commercial farming (Conradie, 2002) and smallholder production (Van Averbeke et al., 1998; Bembridge, 2000) provide an opportunity to examine transformation in the Fish-Sundays irrigation scheme of the Eastern Cape Province of South Africa.

## The Fish-Sundays scheme

The Fish-Sundays scheme, built in the mid-1960s, straddles the valleys of the Great Fish and Sundays Rivers (Figure 6.1). Today the Fish-Sundays scheme irrigates 14,000 ha of citrus orchards on the Sundays River and 35,000 ha of field crops and pastures on the Great Fish River. Smallholder production, also on the Great Fish, amounts to less than a thousand hectares of maize and vegetables. Since there are no smallholder schemes on the Sundays River section it will be excluded from the following analysis.

White settlement of the area took place during the early part of the nineteenth century. Black tribes already occupied the area when the first white farmers arrived, but very little is known about irrigation practised by the tribes. An early account of white irrigation practices describes small, diversified farms irrigating directly from the river (Els, 1965). In the 1920s, commercial irrigation involved more than 23,000 ha of land (Van Veelen and Stoffberg, 1987), employed 3,000 workers and produced 300,000 tons of fruit (Els, 1965).

This level of irrigation was not sustainable. The region's average annual precipitation ranges from 250 mm in the northwest to 600 mm in the southeast, while annual evaporation exceeds 1,500 mm in much of the region (Midgley, Pitman and Middleton, 1994). Water shortages, the salinity problems typical of arid climates and adverse market conditions forced many farmers to the brink of bankruptcy by the middle of the twentieth century (Backeberg, 1984). The crisis was resolved partly through adjusting the farming system and partly through constructing the Fish-Sundays irrigation scheme, which transfers in more than 96 per cent of the annual irrigation requirement (Basson, 1999).

Wool became the dominant crop on many farms in the area during World War II when it was difficult to ship fresh produce to Europe and wool was needed for the war effort. Extensive small stock production is well suited to the areas away from the Great Fish River. This rangeland, called *veld*, typically

**Figure 6.1** The Fish-Sundays scheme of the Eastern Cape

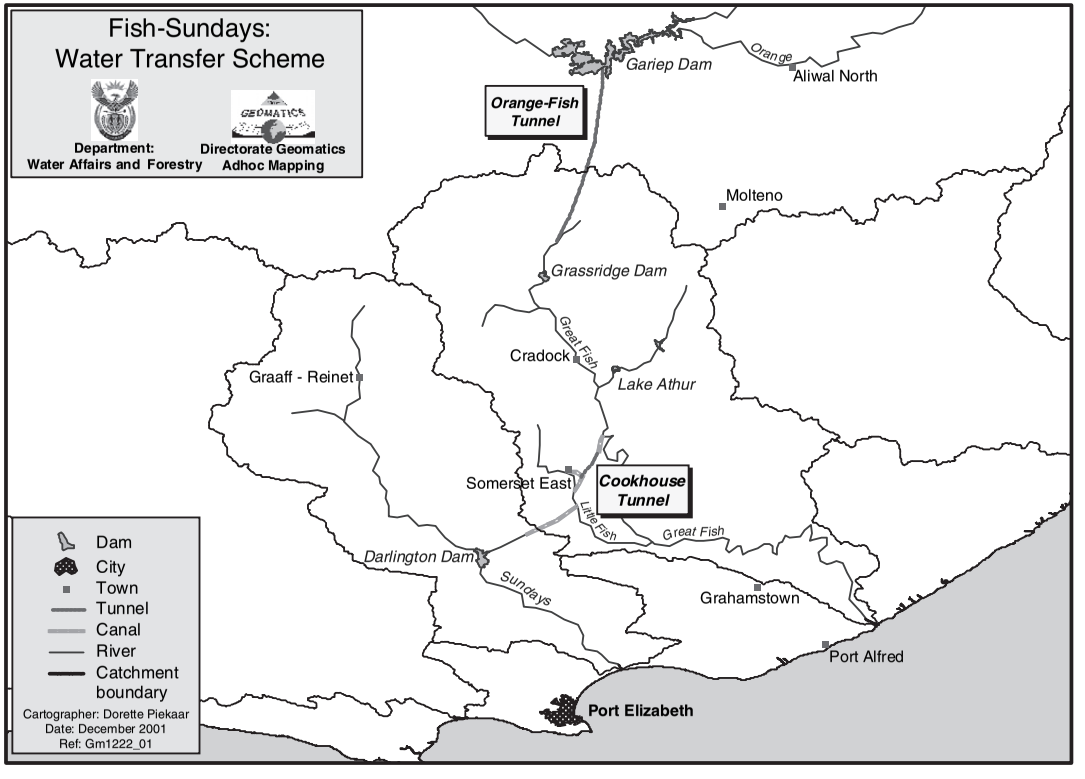

**Table 6.1** Farm size and share of irrigated land for the Great Fish River

| Farm type | Average farm size | | Total irrigated area (ha) | Share of scheme (%) |
|---|---|---|---|---|
| | *Veld* (ha) | Irrigation (ha) | | |
| Smallholdings | – | 0.1882 | 644 | 2 |
| Irrigation farms | 256 | 85 | 8,842 | 25 |
| Stock farms | 2,540 | 85 | 8,432 | 24 |
| Dairy farms | – | 85 | 5,996 | 17 |
| Farm businesses | 7,900 | 140 | 11,446 | 32 |

*Sources*: Bembridge, 2000; Van Averbeke et al., 1998; Conradie, 2002.

has a carrying capacity of 14–20 ha per large stock unit. Wool production is not suited to the denser, thornier vegetation of the Sundays River where fruit production still persists. Wool sheep, angora goats and lately mutton sheep are grazed on *veld* for part of the year, and are brought into pasture for lambing or kidding during the dry winter months. Lucerne is the most important fodder crop. It is rotated every six years with maize, or sometimes with dry beans or potatoes. The latter are cash crops, as is a portion of the lucerne hay crop. Some maize is fed to livestock.

In 1984 the Fish-Sundays scheme was expanded to include tribal land at Tyefu. Irrigation was organised as three large estates providing wage employment and a range of services to surrounding outgrowers. Two sizes of smallholdings were supposed to cater for small commercial farmers and subsistence needs, respectively. At first, smallholders produced a variety of vegetables for sale. Lately the emphasis has shifted to maize, cabbage and potatoes, which are staples in the local diet. The distinction between commercial smallholdings and subsistence plots has also faded. At the moment, all smallholders consume most of what they produce (Bembridge, 2000). For various reasons, the project never developed much beyond the pilot stage (Bembridge, 2000; Van Averbeke et al., 1998). Production was completely disrupted in 1995 when the government stopped funding direct irrigation costs.

Commercial irrigation in the area has a long tradition of superior resource access compared to smallholders. Table 6.1 shows that while the smallholder scheme represents less than two per cent of the total irrigation area, nine out of ten irrigators is a smallholder. White commercial farmers are not all equally rich, but they are all rich compared to black smallholders.

## Model

Assuming perfectly competitive markets, a Ricardian resource rents framework is used to argue that when all other factors of production are rewarded at their opportunity cost, remaining profits accrue to irrigation water. For efficient allocation, marginal values of water should be equal across all users (Sampath, 1992). For commercial farmers, shadow prices generated with a linear programming (LP) model are interpreted as marginal water values (Booker and Young, 1994), while total water value is both residual profit calculated by the LP model and the integral of the derived demand for irrigation water. Water values are thus influenced by the opportunity cost of other inputs, including land and entrepreneurial ability. For smallholders, observed production and designed irrigation costs were used to calculate their maximum willingness to pay for water.

### The commercial model

The LP models of commercial farms were populated with data from Table 6.2. Irrigation and stock farms grow maize, lucerne and dry beans, and keep wool sheep and angora goats. For farm businesses the basic model is extended to include potatoes and ostriches, and dairy farms grow a range of fodder crops to supply their own needs.

**Table 6.2** Gross margin in R/ha or R/breeding unit by enterprise and farm type for the Great Fish River in constant 1999 prices

| Enterprise | Smallholder* | Irrigation farms | Stock farms | Dairy farms | Farm businesses |
|---|---|---|---|---|---|
| Cabbage | 924 | – | – | – | – |
| Potatoes | 59 | – | – | – | 6,601–8,766 |
| Maize | 292 | 2,389–2,742 | 2,389–2,742 | 2,389–2,742 | 2,389–2,742 |
| Lucerne | – | 2,655–2,817 | 2,655–2,817 | 2,655–2,817 | 2,655–2,817 |
| Rye grass Pasture | – | – | – | (394) | – |
| Dry beans | – | 2,981– 3,878 | 2,981 – 3,878 | – | 2,981–3,878 |
| Wool sheep | – | 216–381 | 216–381 | – | 216–381 |
| Angora goats | – | 227–268 | 227–268 | – | 227–268 |
| Ostriches | – | – | – | – | 3,070 |
| Dairy | – | – | – | 4,848 | – |

* *Source*: Conradie, 2002; Van Averbeke et al., 1998.
*Note:* Gross margin does not include irrigation cost for smallholders. All irrigation and machine costs are included for other farm types.

Details of the separate LP models, compiled for each of the four commercial farm types for three parts of the valley, are published in Conradie (2002). Each model maximises profit subject to a water constraint. All fixed factors (permanent labour, land, management and risk) are modelled on a per-hectare basis. The baseline gross margin is adapted for five irrigation technologies (see Table 6.2). Irrigation costs include depreciation of the capital investment and pumping costs where applicable. (A flat-rate water tariff is also included as a fixed cost. The wage rate is assumed to be R700/month, returns to land are R300/ha for irrigated land and R20/ha for *veld*, and returns to management are R951/ha for irrigated land and R12/ha for *veld*. Machine costs are taken from Mentz, Muller and Hartzenberg (1999).) Crop yields are assumed to be 14.1–15 ton/ha for lucerne, 7.44–8 ton/ha for maize, 1.86–2.1 ton/ha for beans and 22.3–25 ton/ha for potatoes. Livestock assumptions are included in Appendix 6.1. Hazell's (1971) Mean of Total Absolute Deviation (MOTAD) formulation is used to restrict crop mix to an acceptable level of price variation. The acceptable level of price variation is set through a MOTAD risk coefficient, which is used here to calibrate the models. The variation in gross margin in Table 6.2 for the commercial sector is due to differences in yield and water tariffs. Water tariffs range between R183/ha and R375/ha depending on distance from the source, and water quotas range from 12,500 $m^3$/ha per year to 13,500 $m^3$/ha per year.

## The smallholder model

The value of water in the smallholder sector is calculated from data published in Van Averbeke et al. (1998) and to a lesser extent in Bembridge (2000). Smallholders on the Fish-Sundays scheme produce 363 kg maize, 241 kg potatoes and 197 kg cabbage per year. Converted to a per-hectare basis, smallholder yields are 4.1 ton/ha for maize, 9.2 ton/ha for potatoes and 31.5 ton/ha for cabbage. Output, including home consumption, was valued at commercial prices of R650/ton for maize, R2500/ton for potatoes and R880/ton for cabbage. Smallholders incur direct crop expenses of R181.73 per plot for maize, R326.08 per plot for cabbage and R176.69 per plot for potatoes. Opportunity costs of land and labour are assumed to be zero. Irrigation costs provide for maintaining a sprinkler system on a 15-year replacement cycle (R33.25 per plot), and pumping costs (R197.61 per plot) are taken from Bembridge (2000), as well as the commercial water tariff of R155.51 per plot. Water value is defined as the difference between plot-level gross margin and irrigation costs.

## Results

Average and marginal water values are the main result of this analysis. Average values measure water use efficiency at the farm level, while marginal values measure water use efficiency at the crop level. Average values can thus be used to prioritise types of farmers, while marginal values indicate how a particular farmer will respond to rising water prices. Regional irrigation demand can be constructed by integrating a set of farm-level marginal water values.

### Commercial water values

Table 6.3 lists simulated average and marginal profits for 12 commercial farm types in Conradie (2002). Commercial farms are estimated to generate an average annual profit of between R3.47/ha (R0.0003/$m^3$) and R625.21/ha (R0.0427/$m^3$) in constant 1999 prices. In a perfectly competitive market, firms should be indifferent between continuing and discontinuing production when zero profits are made. Equally, these firms should be indifferent between buying and not buying (selling) the factors of production associated with this production. In the Ricardian rents model these profits accrue to the missing factor of production, in other words irrigation water. Thus, large farm businesses and smaller specialised dairy farms can be expected to be buyers of water while stock farms and farms producing lucerne and maize can be expected to be net sellers of irrigation water.

**Table 6.3** Water values for commercial irrigation in the Great Fish River

| Representative farm | | Simulated water values in constant 1999 prices | |
|---|---|---|---|
| | | Marginal (R/$m^3$/year) | Average (R/$m^3$/year) |
| Irrigation farms | Middelburg | 0.0011 | 0.0028 |
| | Cradock | – | 0.0019 |
| | Cookhouse/Somerset East | – | 0.0003 |
| Stock farms | Middelburg | 0.0067 | 0.0081 |
| | Cradock | – | 0.0070 |
| | Cookhouse/Somerset East | 0.0014 | 0.0034 |
| Dairy farms | Middelburg | 0.0412 | 0.0412 |
| | Cradock | 0.0427 | 0.0427 |
| | Cookhouse/Somerset East | 0.0378 | 0.0378 |
| Farm businesses | Middelburg | 0.0060 | 0.0060 |
| | Cradock | 0.0120 | 0.0429 |
| | Cookhouse/Somerset East | 0.0163 | 0.0500 |

*Source*: Conradie, 2002.

Similarly, crops are expected to be discontinued in the order in which they become unprofitable. At simulated marginal water values of between R15/ha (R0.0060/$m^3$) and R577/ha (R0.0427/$m^3$) per year, most commercial farms seem to apply their last unit of water profitably. Average values are typically higher than marginal water values, indicating that some crops are more profitable than others on a given farm. In the case of the Fish-Sundays scheme, individual crops' profitability is not obvious. The optimal LP solution for most farms utilises veld to the maximum, regardless of the water constraint, and often uses irrigated land to grow fodder crops for additional livestock production. Cash crops are limited by the lucerne rotation constraint.

With the exception of dairy, the range of average values across typical farms increases from Middelburg to Cradock to Cookhouse/Somerset East. The result is largely determined by the crop yield assumptions. According to farmers and other agricultural practitioners, regional differences in yield are not similar for all crops. There is little difference in maize and lucerne yields, while potato and dry bean yields increase sharply as one moves downstream.

Stock farms and irrigation farms derive most of their crop income from lucerne, which produces the same amount of hay in all districts. However, unexpected rainfall events during summer could potentially damage hay and hence lower the average expected hay price in areas with relatively high rainfall. Almost as a direct consequence, estimated water values for Middelburg and Cradock, where it is drier, are higher than water values for Cookhouse/Somerset East, which receives a higher rainfall, on those farms where lucerne dominates the crop mix. The generally higher water values recorded for large-scale farm businesses are due to potato growing, which has a gross margin three times as high as any other crop. The small variation in water values on dairy farms is due to the crop options included in these models. Dairy cows are the only livestock activity permitted on dairy farms. The optimal solution for dairy farms selects crops in the proportions in which they are required in the dairy diet. Given the available set of fodder crops, only one combination is profitable in all three districts. Hence the derived water values are virtually identical for all dairy farms. Besides assumed crop yields, the other important assumptions are farm-level water quota and the risk coefficient selected to calibrate the model.

The estimates of water values for the Fish-Sundays scheme fall within the published range. Recent studies of the value of irrigation water in South Africa and neighbouring Namibia, listed in Table 6.4, put the value of irrigation water on commercial farms at between zero and R1.318/$m^3$ per year. Fruit crops tend to increase water value, while fodder and grain crops generate water values between zero and R0.10/$m^3$ per year. Values for the Fish-Sundays scheme fall

**Table 6.4** Comparable estimates of water values for commercial irrigation in South Africa

| Source | Crops | Nominal water value (R/m$^3$) |
|---|---|---|
| Louw and Van Schalkwyk, 1997 | Citrus, grapes, vegetables | R0.448 |
| Viljoen, Dudley and Gakpo, 2000 | Maize, wheat, lucerne, green peas, groundnuts | R0.08–0.33 |
| Louw and Van Schalkwyk, 2000 | Perennial and annual crops | R0.00–0.45 |
| Nilsson, Sahlen and Stage, 2003 | Lucerne | R0.045–R0.103 |
| | Maize/wheat | R0.044–R0.107 |
| | Grapes | R1.017–R1.318 |

within the range in Table 6.4. The most appropriate comparisons are provided by Viljoen et al. (2000) and Nilsson et al. (2003), which both report on lucerne and grain production combined with a small high-value component. The Viljoen study is set in the southern Free State, only 300 km away from an area with an average expected rainfall of 400 mm per year. The Namibian estimate comes from an area with an average expected rainfall of only 200 mm (Departement van Waterwese, 1986).

## Smallholder irrigation values

The best available data indicate that on average smallholders make a loss of R146.55 per plot per year on irrigation activities for a water quota of 2,350 m$^3$. At the scheme level, smallholder irrigation reduces the producer's surplus of water by R500,000 per year, suggesting that on efficiency grounds the smallholder sector should be reduced in favour of expanding some sectors of commercial irrigation. The major weakness of this analysis is that it compares actual water values in the smallholder sector to simulated results for the commercial sector. Activities on which commercial farmers may lose money are automatically excluded from the model. For smallholders, the actual money-losing activities formed the basis of the value calculation. To be fair one should remember that it is entirely possible that actual production and costs might reveal negative water values for some, or all, commercial farmers as well.

As consulting engineers, Crosby et al. (2000) interpret the poor technical efficiency of smallholder irrigation in South Africa to be due to what they call 'not irrigating properly', that is, not irrigating according to commercial design specifications for the irrigation systems given to the smallholders.

**Table 6.5** Water values for Fish-Sundays smallholders in constant 1999 prices

| Values per plot | Full irrigation (Rand) | 25% deficit irrigation (Rand) | 50% deficit irrigation (Rand) |
|---|---|---|---|
| Gross margin excluding irrigation | 239.82 | 239.82 | 239.82 |
| Water tariff | 155.51 | 116.64 | 77.76 |
| Pumping cost | 197.61 | 148.21 | 98.81 |
| Depreciation (15-years) | 33.25 | 33.24 | 33.25 |
| Total irrigation costs | 386.37 | 298.09 | 209.81 |
| Average water value per plot | –146.55 | –58.27 | 30.01 |
| Average water value R/m$^3$ | –0.0623 | –0.0375 | 0.0387 |

*Source*: based on Van Averbeke et al., 1998.

At Tyefu, various factors make commercial irrigation systems or practices untenable. Farming is mostly conducted by housewives who have large families to care for. It does not help either that the irrigated fields are located on the floodplain at the bottom of the valley, while homesteads lie on top of the surrounding hills. In addition, the commercial irrigation system installed in the scheme requires that the irrigation efforts of all six hundred plus smallholders be coordinated. This is very expensive, if not impossible. The private response has been to switch to manual watering with buckets drawn directly from the river.

Naturally the labour intensity of bucket irrigation restricts the amount of water that can be applied, perhaps by as much as half of the recommended commercial application. At this point smallholder irrigation is often made to look inefficient, as Table 6.5 illustrates. The first column calculates plot-level profits based on the observed (deficit irrigation) output and the design-specification irrigation costs. This produces a net loss of R146.55 per plot per year, or a negative willingness to pay for water of R0.0623 per cubic metre per year. The third column models reality more closely, and combines a 50 per cent reduction in commercial yields with a 50 per cent reduction in commercial irrigation costs. Under this third scenario, smallholder irrigation at Tyefu turns positive with an average annual profit of R30 per plot and an average willingness to pay for water at R0.0387 per cubic metre per year.

Smallholder willingness to pay for water under a true deficit irrigation model, as opposed to the over-engineered scenario in column one, compares well with the more efficient commercial uses of irrigation water along the Great Fish River, and is more efficient by a factor of ten than the majority of stock and field crop operations in the area. Crosby et al. (2000) suggest that engineers should scale down their designs to reflect the fact that smallholders will most likely use deficit irrigation. Similarly, economists would report much higher average water values if they assumed deficit irrigation. Crosby et al.'s (2000)

insight supports Binswanger and Elgin's (1990) claim that small-scale traditional farmers are more efficient resource users than their commercial counterparts.

## Transforming irrigation

Despite the possibility that smallholder irrigation may be as efficient as commercial irrigation, the smallholder sector fails to grow. But occasionally smallholder irrigation is successful. The circumstances in such cases provide valuable insights into how to transform the Fish-Sundays scheme. Furthermore, even if smallholders are relatively inefficient users of water, they need a very small portion of the available water in the scheme. The loss to commercial irrigation of releasing this water is possibly insignificant, while that small amount of water can make a material difference to livelihoods in a poverty-stricken province.

### Examples of successful transformation

The dismal performance of smallholders on the Fish-Sundays scheme is to some extent corroborated by experience with smallholder irrigation elsewhere in South Africa. Given that we know so little about the complex household objective functions of subsistence farmers, the survival rate of smallholder irrigation projects is a crude but practical measure of successful transformation. Smallholders who do not abandon their plots reveal that they are better off with than without access to irrigation.

> Of the 11 projects established by the project team, only four remained in operation at the end of the four-year monitoring period. The other seven had been abandoned and were considered failures. … Of all those factors that contributed to the failing of these projects, low reliability of water was probably the main one. (Du Plessis, Van Averbeke and Van der Stoep, 2002)

In some cases an unreliable water source limits smallholder irrigation. There are many other constraints, like lack of knowledge, theft of equipment or simply unrealistic expectations that discourage smallholder irrigators within the first few seasons. Du Plessis et al. (2002) suggest that crops must be selected for their salt tolerance and resistance to occasional water stress, but above all that farmers should be familiar with the crops that they first attempt to grow. Such familiar crops are more likely to be subsistence crops than cash crops (Du Plessis and Van der Stoep, 2001).

Table 6.6 enumerates a collection of smallholder irrigation success stories from all over South Africa. Both genders and a variety of crop types, irrigation technologies and farm sizes are represented, but it is often the farmer's creative

**Table 6.6** Smallholder irrigation success in South Africa

| Farmer | Size of holding | Farming system | Yield/performance | Reference |
|---|---|---|---|---|
| Male independent<br>Stephen M. | 150 ha | Commercial tomatoes under drip and short furrow | Employs 150 casuals 200 fulltime staff | De Lange, 1997 |
| Female independent<br>Anna M. | 10 ha<br>Home garden | Commercial sugar contract under sprinkler<br>Vegetables for own use, sometimes sells surplus | 120 ton/ha | De Lange, 1997 |
| Female on irrigation scheme<br>Susan R. | 1.28 ha<br>0.02 ha | Maize on the commercial plot under sprinkler<br>Lucerne on 'food plot' with bucket and furrow | 50 bags | De Lange, 1997 |
| Couple in a food garden<br>Betty and John S. | 0.12 ha | Vegetables, seedlings, fruit tree nursery with hose pipe and bucket | Enough to leave a city job | De Lange, 1997 |
| Female in a food garden at Tembalethu | 0.08 ha | Vegetables under compensated drip and sprinkler | Continued for more than four years | Du Plessis and Van der Stoep, 2001 |
| Male share-croppers<br>OTK Bethlehem | 1 ha | Apples with micro sprayers and fertigation; all decisions taken by white managers | R600/month guaranteed salary | Du Plessis and Van derm Stoep, 2001 |
| Male independent<br>Masisi | 10 ha | Maize, tomatoes and paprika under drip, with irrigation scheduling, pumping from the river | Gave up a building contractor's position | Du Plessis and Van derm Stoep, 2001 |
| Male independent<br>Buysdorp | 5 ha<br>30 ha bush | Garlic, onions, beetroot, carrots, cabbage<br>Micro irrigation | Plans to expand | Du Plessis and Van der Stoep, 2001 |

response to suboptimal conditions that sets successful projects apart from the failures. Some smallholders are building on crop production experience in the commercial sector while others are rapidly adapting systems to which they were first introduced. They are all expanding, some far beyond what can be considered a smallholding in any terms, and sometimes contrary to the best 'sensible' advice from experts. For example, in the midst of the furious debate on the importance of individual tenure, Stephen M. runs a massive 150 ha, probably R5 million, tomato business on communal land. Susan R. irrigates a lucerne field with a bucket from a ditch because she finds it profitable and John S. and an independent man from Masisi left city jobs with secure wages to move into fulltime farming. These smallholders are independent, have reliable water sources and work with technology with which they feel comfortable.

**Table 6.7** Aggregate water supply from Fish-Sundays irrigation farms

| Price in constant 1999 Rand (R/m³) | Quantity of water available at each price | | |
|---|---|---|---|
| | Increment (million m³/year) | Cumulative (million m³/year) | Share of scheme* (%) |
| 0.0000 | 77.63 | 77.63 | 13 |
| 0.0011 | 29.20 | 106.83 | 18 |
| 0.0014 | 4.04 | 110.87 | 19 |
| 0.0015 | 32.59 | 143.46 | 25 |
| 0.0018 | 4.46 | 147.92 | 25 |
| 0.0018 | 22.98 | 170.90 | 29 |
| 0.0030 | 4.32 | 175.22 | 30 |
| 0.0032 | 0.33 | 175.55 | 30 |
| 0.0039 | 17.01 | 192.56 | 33 |
| 0.0045 | 0.67 | 193.23 | 33 |
| 0.0054 | 3.22 | 196.45 | 34 |
| 0.0067 | 42.30 | 238.75 | 41 |
| 0.0080 | 2.75 | 241.51 | 41 |
| 0.0082 | 4.97 | 246.48 | 42 |
| 0.0111 | 18.52 | 265.00 | 46 |
| 0.0120 | 24.83 | 289.83 | 50 |
| 0.0163 | 55.44 | 345.27 | 59 |
| 0.0168 | 0.00 | 345.27 | 59 |
| 0.0203 | 1.72 | 346.99 | 60 |
| 0.0223 | 0.55 | 347.53 | 60 |
| 0.0251 | 1.14 | 348.67 | 60 |
| 0.0290 | 1.04 | 349.71 | 60 |

* Entire Fish-Sundays scheme including 14,000 ha on the lower Sundays.
*Source* : Conradie, 2002.

Any attempts to expand the smallholder sector on the Fish-Sundays scheme that are imposed from above are doomed to the performance achieved thus far, but if the scheme management concentrate on meeting the water demands of committed smallholder irrigators in a flexible and reliable manner, irrigation farming could be the foundation of valuable rural livelihoods.

## Opportunity cost of transformation

The opportunity cost of smallholder irrigation is defined as benefits foregone by commercial irrigation. The marginal values in Table 6.3 are the shadow prices of water for existing water quotas of 12,500 m³/ha or 13,500 m³/ha per year. The marginal values each represent one point on a different derived demand curve for irrigation water that was generated by gradually tightening the water constraint in the LP model. The price element of the demand curve indicates maximum willingness to pay for the associated quantity of water, but also minimum willingness to accept the same quantity. For example, the

marginal value of water to a dairy farmer in Middelburg is estimated to be R0.0412/$m^3$ per year for a quota of 12,500$m^3$/ha. At any price below R0.0412/$m^3$ per year, the farmer will want his full existing water right of 12,500 $m^3$ on his entire irrigated area. When the price rises above R0.0412/$m^3$ per year, he will no longer want the portion of his current rights that only generates R0.0412/$m^3$ per year, and this water will be sold or abandoned.

The aggregate supply schedule, based on minimum willingness to accept and the distribution of typical farms on the Fish-Sundays scheme, is given in Table 6.7. Thirteen per cent of the current water allocation to commercial irrigation, 77.6 million $m^3$ per year, is estimated to have zero opportunity cost. Farmers use this water to irrigate, but the cost of producing the irrigated crop is equal to the gross income from that crop, which means that there are zero returns to irrigation and that reallocating water away from these farms will not reduce overall social welfare.

Cradock's stock and irrigation farms, and the irrigation farms of the Cookhouse/Somerset East area are the most likely initial sellers. The water not needed on these farms could irrigate 5,700 ha. The most optimistic estimates set the maximum land available for smallholder irrigation at Tyefu at 4,600 ha (Department of Agriculture and Rural Development, 1987), while the maximum area ever taken up was 644 ha (Van Averbeke et al., 1998). At the moment smallholders have access to one per cent of the resource, even though they represent 90 per cent of the head count. Giving smallholders access to water derived from commercial farmers who do not use irrigation profitably would increase the smallholders' share of the resource to 13 per cent. If more than 77.6 million $m^3$ per year is required it will have to be purchased at R0.0011/$m^3$ for an additional 29 million $m^3$ per year. Sixty per cent of the current allocation to commercial irrigation can be reallocated at less than R0.03/$m^3$ per year. The purchase price for untreated municipal water is R0.256/$m^3$. While smallholder irrigation may or may not be a profitable use of water, the opportunity cost to commercial irrigation is very low for the Fish-Sundays scheme.

## Poverty relief

There is reason to believe that smallholders on the Fish-Sundays scheme could produce much more than the 363 kg maize, 241 kg potatoes and the 197 kg of cabbage reported by Van Averbeke et al. (1998). This production represents roughly a third of their annual food requirement (Bembridge, 2000) and a gross income of R924.33 per year in 1999 prices.

According to Leibbrandt and Woolard (1999), 24 per cent of South Africa's population fell below the international dollar-a-day poverty line in 1993, while other locally developed poverty lines set about half the population below the poverty line at the time. While slightly arbitrary, the dollar-a-day poverty line allows international comparison and provides a conservative estimate of the potential of smallholder irrigation to alleviate poverty in South Africa. For a family size of 4.6 and an exchange rate of R6.11=US$1, the dollar-a-day poverty line implied an annual income of R10,259 for the Eastern Cape in 1999. The *1999 October Household Survey* sets the average income of rural African families in the Eastern Cape at R7,128 per year. The value of produce raises this income to R8,055 per year and closes the poverty gap from 44 per cent to 27 per cent for almost 3,500 families. If extended to the entire originally tribal area, more than 24,000 families could potentially benefit.

## Conclusion

According to standard commercial thinking, smallholders seem less efficient users of irrigation water than commercial farmers. In the past such evidence has been used to argue against taking water away from the commercial sector and giving it to subsistence farmers. The relative efficiency of smallholders changes when new evidence about actual irrigation practices among smallholders is taken into account. *If smallholders apply half the water used by commercial farmers, they can generate water values that are ten times higher than those achieved by many commercial farmers on the Fish-Sundays scheme.* If this is the case, the main economic argument against transformation disappears.

While it is not entirely clear how well smallholders use water, the opportunity cost of expanding the smallholder sector is minute while the potential benefits are huge. The amount of water on which the commercial sector in the Fish-Sundays scheme failed to generate a profit in 1999, is more than enough to meet the demand from the smallholder sector. Results indicate that a very low volumetric price on water will release 5,700 ha irrigated land from commercial farms, which is enough to create 24,000 smallholdings, increasing the existing number of smallholdings by seven times. On these plots families would grow enough to reduce the poverty gap, as measured against the dollar-a-day poverty line, by a third.

## Appendix

**Table 6.8** Livestock assumptions

| | Angoras | Wool sheep |
|---|---|---|
| Stocking rates | 15–17 ha/LAU | 15–17 ha/LAU |
| Fodder and feed | Combination of *veld* and pasture | Combination of *veld* and pasture |
| Reproductive strategy | Single mating | Every 8 months, or single |
| Live births/ewe | 65–85% | 75–100% |
| Mortality to weaning | 10–15% | 15% |
| Mortality to 18 months | 12–15% | 6% |
| Replacement rate | 25% | 25% |
| **Dairy** | | |
| Calving interval | 420 days | |
| Milk production | 19.72 l/cow/day | |
| Fodder & feed | 365 days in feedlot | |
| Lucerne | 48% | |
| Maize | 17% | |
| Silage (rye or maize) | 31% | |
| Roughage | 4% | |
| Replacement rate | 20% | |
| **Ostriches** | | |
| Hatchable eggs per pair | 25 | |
| Mortality day-old chicks | 30% | |
| Mortality to 0–2 months | 30% | |
| Mortality to 2–3 months | 15% | |
| Mortality to 3–6 months | 7% | |
| Mortality to >6 months | 3% | |
| Replacement rate | 12% | |
| Slaughter birds per pair | 8.27 | |
| Feed mix | | |
| Soy meal | 5% | |
| Purchased feeds | 6% | |
| Lucerne hay | 69% | |
| Maize | 20% | |

## Note

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7

# Rural water supply projects appraisal and poverty eradication in Tanzania

*Kassim Kulindwa*

## Introduction

It was announced during the World Summit for Sustainable Development in Johannesburg in 2002 that 1.1 billion people in the world lack sustainable access to clean and safe drinking water, while more than 2.2 billion people are without adequate sanitation. The target by 2015 was declared as a result to reduce by half the proportion of people without sustainable access to safe drinking water and sanitation, a target that was also declared by the Millennium Development Goals (MDGs). Currently, the global water supply outlook exhibits great disparity between developed and developing countries, and there is also a dichotomy in water supply between urban and rural areas (see Table 7.1). The water situation in the large East African country of Tanzania provides examples of just these external and internal disparities. This global perspective, it is time to focus on the national picture of a large country in Africa.

## The situation in Tanzania

Safe and convenient water supply is a basic human need and one of the highest priorities of the Tanzanian government for the rural poor. Combined with sanitation, improved water services would revolutionise rural public health and increase productivity even in the poorest rural areas. Statistics from the 2002 Census report the population of Tanzania as 33.5 million. Despite major increases in the urbanisation process, nearly 75 per cent of the people still live in rural areas. The root cause of poverty is the lack of access to and

**Table 7.1** Global water supply coverage, 2000

| Region | Population (millions) | Urban coverage (%) | Rural coverage (%) |
|---|---|---|---|
| Global | 6,055 | 94 | 71 |
| Africa | 784 | 85 | 47 |
| Tanzania* | 32 | 73 | 50 |
| Asia | 3,683 | 93 | 75 |
| Latin America and the Caribbean | 519 | 93 | 62 |
| North America | 310 | 100 | 100 |
| Europe | 729 | 100 | 87 |
| Oceania | 30 | 98 | 63 |

*Source:* Kilosa District Council, 2001; *Ministry of Water and Livestock Development, 2002.

reliability of safe water, sanitation and hygiene education. This affects the farmers, pastoralists and agro-pastoralists who mostly depend on unprotected water sources for their domestic and productive activities.

Tanzania's national water policy[1] emphasises the increased participation of the private sector in the delivery of goods and services. The decision to construct and rehabilitate water sources also needs to be socially and economically viable. Private sector service providers have to meet their financial obligations before they embark on the decision to supply water. It is possible that this could be at the expense of social desirability and benefit.

Socially, the policy recognises water as a basic need and right of all human beings and, therefore, that the use of water for human consumption should be given first priority including in water-scarce areas. Clean and safe water can also facilitate the improvement of health conditions. As water is also considered an economic good contributing to economic productivity, it requires efficient management. As environmental assets, water sources need protection and conservation. The sustainability aspect requires clear definition of the roles and responsibilities of the various actors and stakeholder groups in maintaining hygiene and sanitation. Finally, the policy envisages that, through community participation, water supply projects will be based on the concept of demand responsiveness by communities, where the choice of type of projects will be determined by communities based on their willingness and ability to pay for the chosen services.

This case study approach for Kilosa district, Morogoro Region in Tanzania discusses the implication of using financial and social cost-benefit analysis for rural water provision.[2] First, the theoretical and methodological underpinnings of cost-benefit analysis are presented. The feasibility of various theoretical and practical aspects of the project are considered within the social dimensions.

Without this broader scope, the rural poor might never get clean and safe water if private operators were the only ones to provide this service using financial feasibility criteria alone! The description of the existing water supply situation and the options and potential in the district are also given. Data from Kilosa district are used to demonstrate that inclusion of the economic aspects of time use and the health aspects of cost savings result in acceptance of rural projects that would be rejected if purely financial appraisal were used.

## The need for explicit inclusion of health effects in cost-benefit analysis

Water is naturally clean and safe until contaminated by external forces, mainly by humans. Contamination occurs in the form of agricultural chemical inputs such as pesticides and fertilisers, industrial waste (both solid and effluent), and municipal waste including domestic waste. These provide doses of pollution which are directed to water bodies (streams, rivers, lakes, swamps, etc.). Responses to these doses manifest themselves as effects felt or costs incurred by those who use the water at different levels. These include organisms in the ecosystem that use water bodies as their habitat, feeding ground or sources of drinking water and recreation. Depending on the type of contamination, the response could be devastating to all humans. Even terrestrial animals using the water for drinking would be fatally affected by pollution doses that are beyond acceptable limits. Where animals are in the human food chain, the accumulated pollutants in their bodies such as mercury and other heavy metals could be transferred to consumers resulting in ill health and even premature deaths.

Furthermore, among human beings, water-borne diseases such as typhoid, cholera and diarrhoea may erupt, sometimes on an epidemic scale, causing great loss of lives, loss of production and decline in productivity affecting both subsistence and cash crops. This may translate into food insecurity for families living on the edge of existence.

Hospital bills and cost of medicine will accrue to the sick and their relatives, straining further their meagre income by diverting it from daily basic necessities and plunging some people into debt because they have borrowed money for bus fares for trips to health centres, or to buy medicines or provide a special diet. Governments too will incur higher expenditures on medicines, mounting emergency preventive and curative campaigns. To meet these unplanned demands on their resources, governments often draw up mini-budgets which reprioritise activities and distort the implementation of sectoral projects.

The sequences of events outlined above are not picked up by cost and benefit data streams for a planned project through either market or willingness-to-pay (WTP) processes, and as a result health benefits are not explicitly included in the total cost.

Thus the computation of the costs and benefits that determine the desirability of a project needs to include social variables not normally taken into account. These include health and environmental benefits that accrue to communities in consequence of improvement of water supply. These various aspects manifest the true value of clean and safe water availability to the rural population and to every water user. Incorporating the social and environmental variables in water supply projects' appraisal is a crucial entry point for poverty eradication and promotion of sustainable development.

The importance of supplying adequate clean and safe water in the most convenient way possible cannot be overemphasised. At presently, water supply sources are inadequate and water demand is suppressed in most areas by the long distances people have to walk to water sources or by the high prices they have to pay to vendors to obtain this precious resource. As a result, the water thus obtained is devoted to only a few, seemingly the most important, uses. Other water requirements are satisfied through the use of less clean, less safe water, causing health problems such as diarrhoea, typhoid, and dysentery and also skin and other diseases.

## Women are affected more

Among the impacts of such water use patterns and their consequences is the reduction of productivity through sickness and a reduction in the time used in productive activities. Women and girls, upon whom falls the major burden of fetching the water, pay an even greater price.

The education of girls is affected by such domestic chores. The timing of water gathering and the amount of time girls spend on fetching water conflict with school attendance. The other impact is the high expenditure related to the treatment of water-borne diseases; this includes the time spent in treatment and consultation, the cost of purchasing medicine and the productivity lost. In most places water vending has become a lucrative business causing people to incur high costs in purchasing water, which most of the time is unsafe.

Water-borne diseases are a major problem in rural Tanzania – malaria, diarrhoea, dysentery, typhoid and acute respiratory infection continued to top the list of diseases affecting the population in Tanzania in 2002 (Table 7.2).

**Table 7.2** Types of illness or injury reported by age group, Tanzania

| Type of illness | Children under 15 years | Adults (15+ years) |
|---|---|---|
| Malaria | 69.3 | 60.1 |
| Diarrhoea | 14.4 | 9.9 |
| Ear, nose and throat | 10.5 | 8.6 |
| Eye | 7.1 | 5.2 |
| Dental | 2.4 | 5.6 |
| Accidents | 2.5 | 5.0 |
| Skin condition | 3.6 | 2.1 |
| Multiple complaints | 18.5 | 19.7 |
| Other | 12.0 | 27.5 |

*Source:* National Bureau of Statistics, 2002.

## Theory and practice of cost-benefit analysis

Cost-benefit analysis is a method to assess the relative desirability of competing alternatives, where desirability is measured as economic worth to society as a whole.[3] Alternatively, economic cost-benefit analysis is a social assessment of the cost and benefits of public investment decisions. There are two types of prices that can be used to evaluate investment projects. The first is the market-determined prices, called market or private prices, which are appropriate for financial or private cost-benefit analysis. A project evaluation using market prices seeks to answer the question of whether a project is profitable for the individual or firm that undertakes the investment. A benefit is defined as anything that increases human well-being, and a cost as anything that decreases human well-being. In turn, human well-being is determined by what people prefer and are able to pay for. Preferences are either revealed through choices and market behaviour or are stated through questionnaire (market and household surveys) procedures. In order to maximise social benefit, a different approach is used to measure preferences by finding out the individual's WTP,[4] which measures benefits, while costs of the project are determined by opportunity costs. These are deemed appropriate for measuring contributions of the project to welfare. In order to obtain the net social benefit (NSB), opportunity costs are subtracted from WTP. Graphically, benefits are measured as the relevant area under the demand curve and costs as the relevant area under a supply curve.[5] In computing the NSB, both consumer and producer surpluses are added together. This is different from the private cost-benefit analysis, which considers market prices and costs for the valuation of costs and benefits. Net social benefits are net benefits that accrue to society as a whole, as opposed

to private net benefits that accrue to individuals or individual interest groups. The different approaches for appraising private sector and social/public sector projects indicate the existence of a divergence of interest and goals between private benefit and social benefit whereby society has broader goals compared to the private narrow definition of benefit.[6]

There are however some social costs or benefits that cannot be captured by the above approach. These include outcomes external to the market transaction that may result in external benefits or costs to others not included in the project and that may require compensation. Others include 'un-priced outcomes' of the project that change the NSB, such as 'improved water quality, improved air quality, better health, and more recreation'.[7] Such aspects may be included into the cost-benefit analysis by imputing shadow prices to costs or benefits to reflect their true value to society. These prices may vary for different time periods as well as geographical settings. Shadow pricing is used when placing a value on project outcomes other than market price. Project outcomes that cannot be bought or sold, such as social value, can be ascribed a monetary value but this requires extra effort to construct shadow prices that reflect the actual situation. Significant reduction in the incidence of disease, as compared to the situation before the project, can be used to determine the shadow benefits and the resulting estimated savings or benefits to society. Reasonable and realistic application of shadow pricing is necessary in order to avoid overly pessimistic or highly undervalued estimates of project benefits and vice versa. Shadow prices are available for effects such as noise, greenhouse gas emissions, and contamination, and even for victims of road accidents.[8] In all the studies surveyed, the environmental costs were also not included.[9]

## The necessity of social dimensions in cost-benefit analysis

In reality though, not many aspects of the social dimensions of cost-benefit analysis are practised for rural water supply studies. The World Bank, which accounts for about half of external financing – about $3 billion per year,[10] uses the economic cost-benefit analysis in appraisal of rural water supply projects (World Bank, 1997a, b, 1999, 2000, 2001, 2002a, b). The other international financial institutions such as the Asian Development Bank and African Development Bank likewise use a similar approach. In addition to WTP, other aspects like time use and health benefits are also considered as unpriced outcomes.

However, there are other studies that do not include the effect of improved supply on people's health. There are two major reasons for such exclusion. The first is the lack of significant health-related benefits (World Bank, 1999),[11] and the second is the lack of adequate and reliable data for such an analysis to be made (World Bank, 1997a, 2000, 2002a, b).[12] Those studies that include the health benefits of safe water provision use different methods such as computing shadow prices of health benefits using cost of medicines and transport to and from health centres (World Bank, 1997b), and loss of production or the increase of it (World Bank, 2001). We attempt to include the health effects through a shadow price of expenditure on medication. This cannot cover all the benefits of health effects such as increased production and productivity due to good health, prevention of deaths among others, but can somehow help to reduce the omitted benefits that are significant.

## The existing water supply situation and potential in Kilosa district

Kilosa district is endowed with a multitude of sources of water. The survey information reveals that rural dwellers obtain their water needs from shallow wells (traditional and improved), rivers and streams, springs and rainwater, and charco (scooped) dams.

According to a social assessment study, 50 per cent of Kilosa district's population is served with clean and safe water through water projects constructed as early as in the 1950s. However, the remainder of the population faces water shortage problems, including inadequate and unsafe water supply.

The type of water supply technologies found in Kilosa district include shallow wells; traditional, hand-dug, hand-drilled, shallow boreholes; charcos and other small dams; spring sources; deep boreholes, mechanised and gravity schemes.

## Profile and water supply situation in two surveyed villages

Survey data for a study on water supply options from two villages in Kilosa district demonstrate the importance of considering economic and social aspects in deciding the feasibility of water projects in rural areas.

Msimba village situated to the south of Kilosa district along the Dar es Salaam–Tunduma highway in Mikumi some 120 km from Morogoro municipality had a total population of 1,856 at the end of the year 2000 living

in 456 households. Of these 43 per cent were able-bodied adults, of which 53 per cent were women.

This is predominantly an agriculture-based economy producing main crops of maize (60%), millet (20%), cassava (10%), simsim (5%) and beans (5%). Maize serves both as a cash and a food crop.

Household structures, as indicators of wealth, show that about 66 per cent of the houses are built using mud walls/poles and grass thatch, while 25 per cent of the houses are made of mud bricks and corrugated iron sheets.

In Msimba, the five most serious local health problems in terms of severity are: malaria, dysentery, diarrhoea, schistosomiasis and scabies. The second and third of these diseases are closely linked to the use of unsafe, untreated water for drinking. Water supply sources in Msimba include shallow wells (both traditional and improved), streams and rivers. Most of the water for drinking and cooking comes from the five working shallow ring wells (two others are defunct). The rivers and streams are relied upon mainly for bathing and washing of clothes and cooking utensils. Such activity on the riverbanks is a matter of concern. Upstream and downstream users do not seem to consider the hygienic aspects of sharing contaminated river water. Upstream users contaminate the water by pollution, including excreta, while downstream users draw water for domestic use – for washing utensils, clothes, cooking, and so forth.

Villagers have a water fund as of February 2001 with significant amounts of money already contributed by villagers. Each able-bodied person is required to contribute Tshs.1,000 per year.

Kiegea village on the other hand is located north of Kilosa district along the Dar es Salaam–Dodoma highway some 100 km from Morogoro municipality. By the beginning of 2001 the village had a total of 3,965 people of whom 53% were women. Able-bodied people were 65% of the total population of which 52% were women.

The villagers are predominantly agricultural, producing maize (40%), potatoes (35%), sorghum (10%) and legumes (15%). Dwelling structures, as wealth indicators, show that (77%) of the houses are made of mud walls/poles and thatched grass, whereas about (18%) are built using poles, mud bricks and corrugated iron sheets. Overall, the village cannot be classified as wealthy!

Healthwise, Kiegea's five most serious health problems in order of severity are: malaria, measles, dysentery/diarrhoea, skin diseases and TB. Again the third most severe disease is water-borne. Water supply sources in Kiegea include four shallow wells with hand pumps used by about 10 per cent of the population, and two spring sources used by about 90 per cent of the people. By June 2001, one deep borehole was under construction.

As from 1 July 2001, each household was required to contribute Tshs.100 per month so as to meet the operational and maintenance cost of the wells.

## Analysis of water supply options

Survey information indicates that, in rural Kilosa, four main sources of water prevail. These are shallow wells, rivers and streams, springs and water vendors.

Most shallow wells supply water throughout the year, although the water can be salty. In the dry season the salty traces increase to higher levels due to the decline in recharge. Water from the wells is generally cleaner and safer than water obtained from rivers and streams. Water from rivers and streams, as well as being used together with livestock, is also used for bathing 'in situ', and the washing of clothes and cooking utensils. Consequently the water is unsafe and dirty. There is no organised method of utilisation to avoid contamination and thus diseases. However, these are the water sources that are relied upon for multiple uses as opposed to village wells, which are mostly used for drinking and cooking. In most places rivers and streams run for the best part of the year, but many of the streams dry out in the hot seasons.

Springwater sources are also very important especially for drinking and cooking. In some areas, such as Msimba and Kiegea villages, these are located far away from the villages. In such cases, villagers on average can take up to four hours per trip – to walk to and from the sources, including queuing and filling time. However, these are the cleanest and safest sources, but the main constraint is that each spring has a low supply capacity. Village wells are normally located near the village settlement areas, meaning that it takes an average of one hour to fetch water, while rivers and streams can be near or far off from the village settlement, so that it takes an average of two and a half hours to fetch water. On average, villagers living in Msimba and Kiegea take one hour to fetch water per day/bucket with a minimum of zero minutes and a maximum of seven hours!

It should be noted that the behaviour of water users in rural Kilosa varies with the seasons, according to the availability of water. During the wet season, rivers and streams swell up and village wells also provide adequate water, which is less saline. During this period most water is obtained from village wells – 78 per cent; rivers and streams supply 2 per cent of the people's needs for domestic use, excluding bathing and washing and livestock use. Spring sources still supply about 20 per cent of the water for people's needs.

Vendors do not make any significant contribution to the water supply options of the villagers during the wet season. In the dry season the vendor's contribution to the water needs of the villagers rises to about 20 per cent on average, where villagers have to pay Tshs 50–200 for a 20-litre bucket of water. Most villagers buy water during this time of the year, essentially for cooking and drinking purposes.[13] This water is normally obtained from far-off settlements where there is tapwater from gravity schemes (Mikumi near Msimba), or from some other villages where there are shallow wells in the valleys, rivers and streams or spring sources.

In most of the villages, water from shallow wells is paid for through annual contributions of between Tshs 200 per year (as in the case of Msimba until June 2001 before it was raised to Tshs 1,000 per household per year) and Tshs 2,000. Kiegea villagers/households contribute Tshs 100 per month. This money is put in a water fund, which is established by the village government as a prerequisite for getting assistance from the government and other donors. This condition is deemed to be necessary for the sustainability of the water projects. If villagers contribute to the construction of the water projects through cash and in kind, a sense of ownership and responsibility is inculcated. Water storage facilities in the village communities are mainly 20-litre buckets and earthenware pots of similar capacity. Storage of drinking water will last overnight or for a couple of days; but water storage for cooking will normally last only until the next day. Survey data show that 97 per cent of respondents store water; 79 per cent of these villagers store water in 20-litre buckets while the rest use earthenware pots and other such storage containers. Storage capacity by household is distributed as follows: up to one 20-litre bucket of water for 54 per cent of respondents, 34 per cent have up to three 20-litre buckets for water storage and 12 per cent have five 20-litre buckets.

Another interesting aspect of water safety concerns treatment. About 44 per cent of respondents indicated that they do not treat their water in any way. This means that they drink this water untreated! Some of them stated that the water they use is safe (from shallow wells and springs), but some admitted that not all the water they use for drinking is from safe sources.

## Methodology of the analysis

Data generated from the descriptive statistics from the households and the WTP questionnaire and other secondary sources was fed into the cost-benefit analysis for the rural water supply project appraisal. The basic formula used for

facilitating the decision on whether to accept or reject the project following Pearce et al. (1989) is:

$$(B_0 - C_0 + S_0) + (B_1 - C_1 + S_1)/ (1+ r)^1 + \cdots \cdots + (B_t - C_t + S_t)/(1+ r)^t > 0$$

where $B_0$, $B_1$, $B_t$ are benefits in time 0, 1 and t, respectively; $C_0$, $C_1$, $C_t$ are costs in time 0,1 and t, respectively; $S_0$, $S_1$, $S_t$ are health effects in time 0,1 and t, respectively, brought about by the project; r is the discount rate. (If there is a negative health externality, then +S is replaced by –S.)

The above is the present value (PV) of costs and benefits after being adjusted by the discount factor $(1+ r)^t$. In order for the project to be accepted, then net present value (NPV) for the project has to be positive and equal to or greater than the internal rate of return (IRR) of the project. The IRR is the interest rate at which NPV equals to zero. It defines the rate to which the net benefits from the project would grow. The social rate of discount defines the rate at which society prefers these net benefits to grow. Hence, all investment alternatives to IRR, which exceed the social rate of discount, are beneficial and therefore desirable. Of these alternatives, that with the highest rate is the most desirable.

A variation of the IRR is the economic internal rate of return (EIRR), which is simply the IRR that considers the flow of indirect economic benefits, which in this case will include time saved in fetching water due to construction of a new water supply project and health effects of supply of clean and safe water. These benefits are not readily available as are the direct financial flows of benefits through the market; they have to be calculated based on assumptions.

## Assessment of economic benefits

Because of the demand-responsive nature of water projects today, it is not possible to know beforehand the type and level of service each community will choose for financing. In the rural areas of Kilosa, consumers use water for drinking, cooking, bathing, washing and productive uses, such as cooking for sale, construction and so forth. The water quality required depends on the purpose or use. Brackish water is used for washing but not for drinking. People in the rural areas rely on a variety of traditional sources, such as rivers, ponds, springs and rainwater. Both the quality and the (time) price of water from these sources are different, and each water source serves different needs.

When alternative sources, such as wells and boreholes, become available, they are potential substitutes for water from other sources. With these new options, people stand to benefit both in time saved and in health, apart from other cost savings.

The incremental quantity of water supplied under the project is divided into two parts: one part deals with replacing the previous sources and quantity of water used, and the other part is a net increase in water consumption. In this context, the benefit of the first part is equal to the savings of economic costs of consumers who no longer use the former water sources. The benefit of the second part is equal to the area below the demand curve between the with-project and without-project use of each consumer.

Consumption aspects, which indicate the quantity of water used and the amount of time and/or money spent for water from different sources without project scenario have been calculated. In the analysis, the minimum unskilled wage rate of US$30/month was used as the basis for deriving the value of time for the rural Tanzanian communities.

## The benefits

The benefits that are calculated originate from the following:

- Benefits from time savings accrued after installation of the project, as it is assumed that earlier the communities used to collect water from long distances using their traditional sources and there was also a waiting time. With the project scenario, it is likely that the time that individuals spend to cover the distance to the new water sources will be less and the waiting time might also decline. The time saved is converted into monetary value; in this study it amounted to 30 per cent of the rural wage.
- Benefits from the increase in the quantity of water consumed can be reflected through consumer surplus, which includes benefits from the increase in income from other productive activities performed during the time saved by not collecting water. And benefits from the use of water from these improved sources can be calculated as an intermediate input.
- Cost savings from getting clean and safe water. This reduces and prevents the incidence of water-borne diseases, which are rampant in rural areas due to non-adherence to hygienic ways of water use, such as boiling water collected from unsafe sources before use.
- Non-quantifiable benefits such as the peace of mind and leisure produced by the knowledge of reliable water supply and time saving.

**Box 7.1** Dangers associated with fetching water

Villagers in Msimba expressed their concern over the issue of young girls and women having to go long distances to fetch water, running the risk of being attacked by wild animals and sometimes even bad people. This means that the benefits of providing clean and safe water include not only peace of mind but also increased security, especially for girls and women.

### The costs

The costs that are calculated originate from the following items:

- The total investment cost, which is converted to a factor depending on the situation as discussed in the assumptions.
- The maintenance costs which are 2 per cent of the investment costs.
- The supervision costs which are 15 per cent of the total investment cost.

## Basic assumptions

The economic analysis of water supply projects is based on experience and evidence from other studies. Most of these assumptions have been grounded by the data from the survey while others are borrowed from other studies as follows below:

- *Time saving:* A reduction in the time used in fetching water is the most significant effect and characteristic of improved water supply situation in rural areas. Therefore this presents the largest potential benefit in the event that a new water supply project is developed, which will reduce walking time, waiting (queuing) and filling time. If the difference between time used to fetch water without the project and that with the project is positive, then there will be time saved.
- *Health cost savings:* Cost saving in terms of money used to buy medication for treating water-borne diseases has been computed. The savings have been arrived at on average per capita per day computed from health centre annual records and the price of prescribed medicines. This represents a positive health effect in terms of expenditure saving on medicine expenses.[14]
- *Unit of measurement of water containers:* The unit of measurement mostly used is the 20-litre plastic bucket. Other containers are used but they all have

around 18–22 litres of water carrying capacity. Hence an average 20-litre measure has been adopted for this study.

- *Cost of water per bucket:* This is one important indicator of water scarcity in the rural areas. Basically, the more serious the water situation the higher is the price of water. In the survey data it is indicated that in Kiegea village, depending on the scarcity, water is sold for Tshs 50–150 per 20-litre bucket.
- *Conversion factor for labour:* This largely depends on the opportunity cost of that labour time that is used for fetching water. In this study, a factor of 0.3 has been assumed. Using the rural minimum wage rate of US$30 per month, the value of time saved is thus calculated.
- *Average income per person per month:* The minimum rural wage has been assumed to be the average income per person per month.
- *Average household size:* In this study the average household size of five people per household has been used. The numbers have been obtained from the field survey data.
- *Average population growth:* The lack of reliable information in the villages and at the district level necessitated the use of growth rates from the 1988 Census (the results of the 2002 Census were not available) document for Kilosa district.
- *Average population using new source:* Based on findings from the WTP survey, those who supported new projects were taken to be the ones who will use these new sources of water supply options. The proportion differed with each option. However, a large number of people showed their intention to use the new sources. So, an 80 per cent rate was adopted to represent the users of new sources of water supply.
- *Average population using existing sources:* These proportions also came from the survey data where respondents provided the information pertaining to sources of water.
- *Proportion of investment cost to supervision:* This is an assumption based on experience obtained from consultations with the borehole drilling agency and Rural Water Supply and Sanitation Project (RWSSP) staff.

## Economic viability of sub-projects for Kilosa district

Kilosa district sub-projects appear to be feasible with the exception of the spring protection sub-project. This is because investment costs are included in the analysis without any incremental benefits. The reason for such a situation is that with spring protection the reduction in the time used in fetching water

**Table 7.3** Investment, operation and maintenance costs for Kilosa sub-projects

| Option | Investment cost US$ | O&M costs US$ |
|---|---|---|
| Spring protection scheme | 967 | 60 |
| Hand-dug/drilled well | 5,950 | 300 |
| Shallow borehole + HP | 7,675 | 600 |
| Deep borehole mechanised | 24,503 | 29,625 |
| Deep borehole mechanised and piped scheme | 64,500 | 35,250 |
| Gravity piped scheme | 99,750 | 6,000 |

*Source:* Survey Data, 2001; Kilosa District Council, 2001.

is marginal; the time used is virtually the same since the distance to and from the water source will remain the same and there will be only a marginal decrease in filling time.

## Investment costs

Investment costs obtained from the field survey (Table 7.3) show that a protected spring is the least-cost option followed by shallow wells (both hand-dug and drilled). Shallow borehole + hand pump (HP) costs are less than the deep borehole mechanised option due to drilling and material costs and also the pump technology. The deep borehole mechanised and piped scheme is more costly than the one without a piped network. In terms of costs, the gravity scheme lies between the mechanised deep borehole and the mechanised borehole and piped water scheme. Moreover, the gravity scheme has lower operating and maintenance (O&M) costs compared to the two mechanised borehole schemes.

The costs shown in Table 7.3 have been adjusted to include pump replacement costs after 10 years and O&M costs for 15 years.

## Investment benefits are more than monetary returns

The envisaged benefits from construction of new water supply projects stream from the fact that new schemes will supply more water, which is clean, safe and closer to users. Hence time savings and health benefits are expected. Depending on the opportunities for productive use of the time saved (opportunity cost), this time could have significant benefits if used in alternative income-generating activities, household chores geared towards hygiene, leisure

**Table 7.4** Benefits of new water supply projects

| Option | Average time saved (US$/m$^3$/ capacity) | Average health cost saved (US$ /capita/ day) | Consumer surplus on amount of water used | Incremental net benefits |
|---|---|---|---|---|
| Protected spring | −0.0102 | 0 | 0.002 | 0.006 |
| New village well (hand-dug/drilled) | 0.0079 | 0.0034 | 0.003 | 0.0291 |
| New piped schemes | 0.0072 | 0.0034 | 0.0282 | 0.0072 |

*Source:* Kilosa study cost-benefit analysis results.

and so on. Furthermore, safe water would result in healthy and more productive individuals and cost saving on medication. Young girls who have been found to be the second primary fetchers of water would have more time to attend school and, therefore, the community would have a greater chance for a better future. In those areas with acute water shortages, villagers stand to benefit in terms of saving money by paying less. This will mean that the dependence on vendors, who are charging villagers high prices and reaping monopolistic rents in some cases, will ease. The findings of the Kilosa cost-benefit analysis summarised in Table 7.4 show savings in terms of new village well and new piped schemes with the exception of protected spring. The villagers also stand to benefit in terms of consumer surplus and incremental net benefits.

Benefits due to productivity increases as a result of an improved health situation could not be estimated. Incremental producer surplus has been based mainly on vendors owing to the fact that most existing village water supply schemes are used without immediate payment per unit but through contribution to water funds for maintenance purposes.

## Summary of cost-benefit analysis results

All sub-projects have been found to be feasible with the exception of the spring protection water supply option for the reasons mentioned earlier. The capacity of each technology has been given in terms of how many people it can serve. Therefore, the number of schemes to be constructed to serve the whole village population, which is assumed to be 2,000 for a small village, is then determined. For a spring protection scheme, 100 people can be served by a single scheme. Shallow wells and boreholes are assumed to be able to serve

**Table 7.5** Rural water supply options: financial appraisal

| Technical option | IRR (%) | NPV US$ | Remarks |
|---|---|---|---|
| Spring protection | 9 | (1,888) | Not viable |
| Hand-dug/drilled wells + HP | 11 | (1,427) | Not viable |
| Shallow borehole + HP | −2 | (25,140) | Not viable |
| Deep borehole mechanised | 1 | (18,711) | Not viable |
| Deep borehole mechanised and piped scheme | N/A | (45,710) | Not viable |

*Source:* Kilosa study cost-benefit analysis results.

approximately 300 people per scheme, while for the rest of the schemes, 3,500 people (an entire village) can be served by a single scheme.

The cost-benefit analysis has been calculated by using survey data from Kilosa district supplemented by secondary data from relevant sources. A socio-economic survey and a WTP survey were conducted in two villages from the district. The sub-project options that have been considered, are: protected spring scheme, hand-dug/drilled shallow wells with hand pumps, shallow borehole with hand pump, deep borehole mechanised, deep borehole mechanised and piped schemes. Different options are relevant in different geographical settings. In Kilosa, most of the mentioned options seem to be possible. It is assumed that water consumption in project communities and from all sources is to a large extent replaced by water from improved sources. Health benefits have also been considered. There is good evidence of the existence of substantial, health-related benefits based on medical records and clinical officers' explanations of the type of water-borne diseases in the surveyed areas and the behaviour of many villagers in not treating their drinking water. It is assumed that health benefits known to users are captured in their willingness to pay for good-quality water.

The time saved per bucket of water used is estimated by the study by comparing the time used without the project and the expected time savings in the with-project scenario. The time thus saved is valued at 30 per cent of the rural minimum wage rate due to the low existing opportunities for using that time productively. The decrease in the time cost of water leads to increased demand for water. For the base case, the results of the cost-benefit analysis are summarised in Tables 7.5–7.7. It should be noted that the spring protection scheme in Kilosa is not viable because it entails more costs than benefits, especially since it does not offer significant time savings or cost savings to consumers due to the fact that the walking time remains unchanged.

**Table 7.6** Rural water supply options: economic appraisal (time use)

| Technical option | EIRR (%) | NPV US$ | Remarks |
|---|---|---|---|
| Spring protection | N/A | (44,216) | Not viable |
| Hand-dug/drilled wells + HP | 31 | 19,941 | Viable |
| Shallow borehole + HP | 14 | 3,772 | Viable |
| Deep borehole mechanised | 16 | 7,051 | Viable |
| Deep borehole mechanised and piped scheme | 26 | 33,568 | Viable |

*Source:* Kilosa study cost-benefit analysis results.

The analysis is done at three levels which are: the financial analysis (Table 7.5) which considers only the financial costs and benefits. The second level involves economic analysis that includes the time use analysis (Table 7.6). This involves the consideration that using more than necessary time on fetching water does have its costs or losses in terms of opportunities forgone of using that time for other useful undertakings, whether leisure or production. The third level (Table 7.7) involves economic analysis that includes both time use analysis and cost savings due to provision of clean and safe water, thus avoiding water-borne diseases that save money for medication. Productivity decline due to illness has not been included in the analysis owing to lack of data. The increase or even maintenance of productivity by being healthy is an added benefit of using clean and safe water provided by a new water project.

It should be noted here that all the three scenarios are different but the last two are more desirable compared to the first one. The first analysis, which considers only financial flows of costs and benefits provided by the market, rejects all the water supply options. All the projects exhibit negative NPVs and IRRs below the discount rate (12 per cent) and a lifetime of 15 years. The implication of this is that all the project options are rejected (see Table 7.5).

The second scenario (Table 7.6), which includes the time use analysis, shows an improved status of the same projects with the same costs but with different benefits. The annual flow of benefits has been improved here due to consideration of the value of time used to fetch water. The difference between the time, which was used before and after the introduction of the water supply project, gives the time savings due to the introduction of the new project. The usefulness of this saved time depends on the opportunity cost of time in the area. If there are greater opportunities for using this time productively for expanding a vegetable garden, casual labour, leisure, studying with children, and so forth, the value will be high. But if there are not many opportunities for using this saved time productively, then the value for this very time will be low.

**Table 7.7** Rural water supply options; economic appraisal (time use + health costs)

| Technical option | EIRR (%) | NPV US$ | Remarks |
|---|---|---|---|
| Spring protection | N/A | (33,010) | Not viable |
| Hand-dug/drilled wells + HP | 42 | 31,383 | Viable |
| Shallow borehole + HP | 22 | 19,255 | Viable |
| Deep borehole mechanised | 23 | 20,847 | Viable |
| Deep borehole mechanised and piped scheme | 31 | 47,782 | Viable |

*Source:* Kilosa study cost-benefit analysis results.

In the third scenario (Table 7.7), including the health cost savings in the analysis on top of the time savings, the flow of benefits is enhanced.

## Conclusions

The conclusion from the cost-benefit analysis reflects the fact that shallow wells and the mechanised deep borehole with piped systems have been seen to be viable with the highest EIRR and NPV values. People expressed their preference for shallow wells. In their perception they were cheaper and easier to maintain. The piped schemes were also favoured, but these have technical constraints in some places especially where surface water is concerned (springs or stream sources). In some places like Msimba, the hills where the spring water sources are inconveniently located are more than 10 km away and in undulating terrain. Where there is ground water available in adequate quantity, the piped schemes are most preferable to the mechanised deep borehole schemes without a piped system. The only spring option in Kilosa has proved to be impracticable (despite being safer from a health perspective). This is mainly due to the greater costs in construction while no change is registered in the time saved since the people have still to walk the same distance as before. On the other hand, even if health benefits were to be considered, benefits would not be significantly improved due to the fact that in most cases the spring water was already clean and in most cases safe as well. Since the spring water is available together with other sources such as wells, stream and river water, the opportunity cost of forgoing this option is relatively low.

As has been shown above, all the five water supply options would be rejected if only a financial analysis of the costs and benefits were considered.

However, consideration of the 'non-financial' benefits of time savings and health cost savings has made it possible for these projects to be accepted as viable. Despite the drive to encourage the private sector to participate in the provision of services including water in the rural areas, they may be fundamentally unsuited to do so: private entrepreneurs will always look for profit, considering financial flows which accrue to them and not the benefits accruing to the society (which include time saved and health benefits). Finally, to be able to carry out cost-benefit analyses for the social dimension, data have to be available. The collection of data health costs and incidences of illnesses is only now being well organised from the grass-roots up through village to national-level health centres in Tanzania.

Second, governments should be involved together with the private sector to provide water supply services to the rural areas. *The role of the state in providing for basic services is still very relevant today*. It is important for the government in Tanzania and other developing countries to be involved in the provision of the basic social services if they really want to reduce rural poverty and to bring about sustainable development!

Third, health data availability, particularly that related to morbidity and mortality and their causes, should be institutionalised and the data should be made available during water supply studies so that the real health benefits of clean and safe water provision could be arrived at more precisely on a comparable basis.

For several reasons it is recommended that more effort should be put into finding ways for those benefits accruing to the society such as time saving and health, as well as the benefits and costs emanating from environmental modification, to be included in the appraisal of rural community water projects. Such an appraisal would reflect the real benefits and even costs of these projects and facilitate the achievement of the sustainable development path.

## The water supply options

- *Shallow well:* This is a hand-dug well. It is a low-cost water supply option. Construction of the hand-dug well is done with simple tools and the depth is usually less than 20 metres depending on type of soil and the water table. The estimated yield is about 0.5 cubic metres per hour. This project could serve 150–200 people.
- *Shallow borehole with hand pump schemes:* Hand-drilled boreholes are constructed with simple hand-operated drilling equipment. The boreholes are lined with PVC casing and a concrete well pad is constructed for the hand pump. The yields and number of people it can serve are almost the same as for a hand-dug well. However, the depths of shallow boreholes range

between 20 and 30 metres and these types of well are normally fitted with hand pumps.

- *Protected spring:* This involves construction around the source of a spring so as to protect the environment and avoid soil erosion caused by human activities. The aim of civil works construction around the water sources or intake is to allow for water collection and hence to improve the flow of water to points where water can be collected. Thus, the protected spring has the advantage of protecting the spring water so that consumers have better water supply in hygienic conditions.
- *New gravity piped scheme:* This scheme involves construction of a water intake and sedimentation facility at a point where water can easily flow to a tank. This water is usually treated using aluminium sulphate and chloride. Water from the tank is distributed through village kiosks or a piped system. The gravity scheme can serve between 300 and 2,000 people.
- *Deep borehole piped scheme:* The depth of deep boreholes is usually greater than 50 metres in basement and sedimentary formations. Medium deep boreholes however, have depths ranging between 30 and 50 metres. In exceptional cases, the depths might be as deep as 200 metres. The borehole's assumed yield ranges from 1 to 20 cubic metres per hour and the borehole can serve between 300 and 2,000 people depending on the yield. This scheme involves also tank construction and a distribution network as in the gravity scheme.
- *Deep borehole mechanised scheme:* Deep boreholes including medium deep boreholes have the same depths as the deep borehole piped scheme above. The only difference is that the mechanised scheme does not involve piped system for distribution purposes. The numbers of people it can serve are also in the same range of between 300 and 2,000 people.

## Notes

1. See Ministry of Water and Livestock Development (2002).
2. This chapter has benefited from data generated by the water supply project of the Ministry of Water and Livestock Development in the rural areas of Kilosa District, Tanzania, in the year 2001 for which I am are very grateful.
3. See Sinden and Thampapillai (1995).
4. Stated WTP would ideally represent the social benefit of the availability of water and not necessarily the availability of 'safe water'. In this study, the villagers' main concern was the convenient availability of 'clean' water within their village for its use and not necessarily the health benefits accrued due to the use of safe water.
5. See Sinden and Thampapillai (1995) for a graphical representation.
6. See also Pearce, Barbier and Markandya (1989).

7. Sinden and Thampapillai (1995): 57.
8. See Shadow prices for the environment, http://www.cedelft.nl/eng/shadow.html, Shadow price method for balancing environmental and economic aspects of BAT by Marc D. Davidson http://www.cedelft.nl/bat.html.
9. In this aspect there is also the controversy over how to treat the discount rate since environmental aspects are intergenerational, whereas the present way of treating discounting is seen 'to shift the burden of costs to future generations, and precludes future generations from inheriting created natural wealth' (Pearce Barbier and Markandya, 1989).
10. At present, of the $60 billion invested in water in developing countries each year, about 90 per cent comes from domestic sources while half of the remainder comes from the World Bank. Nancy Alexander (2002) 'Who Governs Water Resources in Developing Countries? A Critique of the World Bank's Approach to Water Resources Management', *News & Notices for IMF & World Bank Watchers* 2/7.
11. In the Ghana case, the health benefits were not included separately because there was no evidence of the existence of substantial health-related benefits.
12. See the World Bank studies on Rwanda, Tanzania and Nepal. The Morocco study estimated the benefits by using experience from elsewhere in the world that diarrhoeal diseases in children up to five years of age can be reduced by about 50 per cent in the village covered by the project.
13. Most of the respondents in Kilosa could not report on how much they spend on water during dry seasons due to non-record keeping and fuzzy memory. On the other hand the dry spell lasts only for a short period. It should be noted that almost all the respondents in the three districts do depend on vendors during dry seasons at different dependency levels.
14. Cost of transport to the health centre was not included since the centre is within the village and most of the villagers access it on foot or by bicycle.

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8

# Easing the burden on women? Water, cholera and poverty in South Africa

*David Hemson*

## Introduction

Public health intervention through the provision of water and sanitation and hygiene education has a vital influence on the health and well-being of poor rural communities. Improving access to water is thus an important aspect of an anti-poverty strategy as the poor are the people most vulnerable to disease. This is well known, expressed in numerous communiqués from international conferences, and part of the common understanding of development agencies and people internationally. Yet the relationship between the provision of water services and improvements in public health is not simple and direct; sanitation lags far behind water delivery and there are often considerable delays before the health impact is tangible. Where water provision is combined with sanitation and water consumption improves considerably, health impacts can be decisive in community health. The benefits are, moreover, greater than the immediate benefit in the decrease in water-borne diseases particularly in relation to children.

Since women universally in rural areas have had the obligation of ensuring water provision to the household, the time saved in the collection of water frees women, particularly, to give the necessary time to food production, income generation, self-improvement and leisure. All this can have an important impact on the health of children and their nutrition. A class and gender perspective ensures that the real relations nationally and within community and household receive attention, and that there is a focus both on health improvement and on the reduction of the drudgery of water and fuelwood collection. This is an important aspect to the debate about the extent of water delivery

and about the appropriate level of service. The question is the extent to which the provision of public health services can enable the advancement of communities which suffer from a 'backlog' in services and more broadly improve the opportunities for rural development. In the interregnum between deprivation and access, rural communities are extremely vulnerable to water-borne diseases and the prospects for moving out of poverty conditions are under threat.

These issues are explored here in the context of the recent history of service delivery and the cholera epidemic in South Africa. It is argued that delays in service delivery have burdened the rural poor and that the cholera epidemic of 2000/01 was a dramatic confirmation of the gap between the promise of change and the reality in rural communities.

Possibly more than any other issue, the delivery of clean water to the rural poor has been made the hallmark of transformation by the post-apartheid government. Speech after speech has spelt out the pledge to provide what is promised by the Constitution – 'access to water' (Section 27.1) – and this has been reinforced with the President signing the Water Services Act, 1997 (Act 181 of 1997) into law on 19 December 1997. The main objectives of the Act are to ensure and define the rights of access to basic water supply and basic sanitation services. Policy has since concentrated on how this can be achieved and on the most appropriate agency for delivery. The now historic Reconstruction and Development Programme (RDP) pledge to provide 25 litres per person per day from a standpipe within 200 metres has, together with the pledge of one million houses within five years, represented for many the most visible and concrete promise of delivery. This was intended to be the first step on the ladder from abject poverty to health and water security.[1]

These promises were set out in the RDP (1994) and the momentum of delivery generated under the first Minister of the Department of Water Affairs and Forestry (DWAF), Kader Asmal, was widely regarded as the outstanding success in delivery of the first post-apartheid government. In this respect, the government appeared to be meeting the demands of people in the depths of the rural areas for changes in their favour. In particular, women have been targeted in the policy as the beneficiaries in terms of representation on water project steering committees and through easing the burden placed on them in the rural areas to provide water to their households (Hemson, 2000).

A review of gender-balanced policy in water delivery (Mjoli, 1998) acknowledges the intention of improving the lives of women and raises the question of the very slow progress in improving the participation of women within the water sector internationally. These policy positions aim to break the marginalised position of women in the management of water supply and sanitation.

She argues conclusively that water and sanitation projects are more sustainable when women have ongoing responsibility for their operations and maintenance, as they are more committed since they are adversely affected by project failure. Water policies thus should have a gender-based approach to ensure sustainability (Mjoli, 1998: 40–2).

Although there are claims of accelerated delivery and progressive gender policies, what has been the effect of service delivery particularly in water and sanitation? This chapter focuses on the effects of access to water and sanitation on the social conditions of the poor, and how the provision of free services, and the possibilities opened up for freeing women from some of the drudgery of maintaining a rural household are leading to poverty alleviation.

## A consistent pro-poor policy?

At the very core of rural development is access to services, the social provision of basic needs and a level of self-organisation. The RDP was both the election platform of the African National Congress in 1994 and the government's basic socio-economic policy framework, and despite many changes in policy in the post-apartheid period it still exists as a reference point in studies of poverty and rural development. This document now has something of a mythological character as it is revered only at elections and effectively subordinated by neo-liberal policies. In the RDP, the language of basic needs, which is still fundamental to the question of social inclusion in South Africa, is fundamental; inclusion is achieved through the provision of services particularly to the poor.

Policy formulation can be contradictory as there is inconclusive evidence of pro-poor results in income and employment. The growing recognition of continuing poverty among the black majority has led to policy explorations, such as income support grants and increased social provision through child grants. There have been increasing pronouncements by the President and ministers for the provision of basic services on a free basis, that is, through cross-subsidisation on a local government basis with national financial support. The extensive demarcation of municipal boundaries has now succeeded in creating 'wall-to-wall' local government, probably for the first time in Africa, in an attempt to provide a mix of rich and poor in the drive to provide the necessary revenue base and to make some form of local cross-subsidisation possible. A strategy of decentralisation of delivery, albeit with great ambiguities in constraints and capacity, is being followed.

Water delivery and management in South Africa are affected as elsewhere by the trend towards involvement of the private sector, privatisation in all its

various manifestations, and uneveness in delivery. The emphasis on cost recovery has had a definite effect on delivery, in particular, by inculcating an attitude of caution in promoting new projects in very poor areas.

The effects of the neo-liberal policies summed up in the Growth, Employment and Redistribution (GEAR) document on the rural poor have yet to be fully researched. The drive towards privatisation in all its preliminary components – corporatisation, outsourcing, management of contracts, sale of a proportion of state assets – has had an ambiguous legacy. Ostensibly it is leading to a form of black empowerment and the creation of a new black middle class and entrepreneurial talent. For the rural poor, however, there is evidence of lower remittances from the urban areas as low-wage migrant workers are displaced from unskilled work, and from the previously state-owned rural forestry, tea and other enterprises. This is placing a greater burden on women who are largely responsible for sustaining the rural economy and homesteads.

Most of the rural poor are still effectively governed through forms of traditional authority and are only gradually being drawn into modern municipal government. Services in the more remote rural communities have, until very recently, been administered as projects locally managed by representative committees with rural populations meeting the costs of operations and maintenance. This is the 'standalone' model which is progressively (although unevenly) being replaced by a vision of municipal services throughout the country, being administered by municipal employees. The previous water committees on which women had a 50 per cent participation are being replaced by ward committees with councillors taking the main responsibility. In the urban areas, the broad programme of post-apartheid social inclusion is tempered by the policies of cost recovery which have led to the exclusion of substantial numbers of South Africa's poor from services. Recent studies (McDonald and Pape, 2002; UNDP, 2004) highlight the water and electricity cut-offs, and evictions and property seizures undertaken to ensure payment. The emphasis on cost recovery has placed an added burden on women-headed and larger families (Smith and Green, 2005). The resistance to these processes has had a pronounced effect on government and, together with the stark evidence of cholera, is one of the reasons for government promising free basic services for all. This is now being introduced while many of the features of a previous order remain.

It is well established that the poor in South Africa are concentrated in the rural areas (although the extent of poverty in urban areas is increasingly recognised) and most poor households are female-headed; the question is what change has come through the evident changes in public policy and power relations. In rural areas, particularly, the effect of austere financial policies

contradicts the ready assumption that the lives of the poor have improved through the advent of a post-apartheid reform government.

A study of poverty trends in KwaZulu-Natal concludes that there is a growing trend towards more female-headed households among the poor, that an expenditure-based definition of poverty indicates a rising proportion of poor households, increasing from 34 to 42 per cent between 1993 and 1998, and that the severity of poverty has also been deepening. There is a tendency for the poor to remain poor and for those households just above the poverty line to fall into poverty (Roberts, 2000). Most significantly this study concluded that the many policy initiatives oriented to the reduction of poverty were both insufficient and inadequate in their conceptualisation, planning and implementation.

It has become commonplace in the writing on water services that women's rights and participation are crucial to sustainable development, particularly in the water sector. Women have the main responsibility for the provision of water and maintenance of household health, and their views and contributions bring experience and expertise to bear in the effective management of water resources. In a review of 88 assessments it was argued that demand-responsive, gender- and poverty-sensitive approaches lead to positive service outcomes. In particular, they conclude that a higher level of participation in establishing a community-managed rural water supply is significantly associated with a better-sustained service (Dayal, van Wyk and Mukherjee, 2000).[2] Those services which are more gender- and poverty-sensitive also are more effectively used. Women's activity in participating in the public management of services, such as water projects, is crucial to the sustainability of services in the rural areas.

In the South African rural context the predominant feature of male economic activity (and increasingly also of women's) is migration to urban centres. As the de facto heads of households and caregivers, women are at the centre for prospects for sustainable rural development. Their capacity to provide for the health and well-being of their families is, however, limited by the drudgery of everyday activities to sustain the homestead.

## Deepening disparities?

Despite a policy direction attempting to meet the needs of the urban and rural poor, South Africa continues to be characterised by extreme urban/rural disparities. Although the inner-city informal settlements, and the semi-rural periphery of the city share some disadvantages, there are enormous and growing differentials in service and probably in incomes between those living in the

cities and the rural poor situated in the communal areas. In the informal settlements of the city (in Durban, a proportion as high as 30 per cent of its total population), the consumption of and payment for water generally indicate levels of consumption well below those set by the RDP. There is the anomaly that the benefits of progressive policies are often the last to be applied to the poorest, a contradiction which will be examined in detail shortly. Marginal, often disfunctionally administered, and often violent, the communities of the urban poorest generally have somewhat greater access to services and to opportunities for livelihood, but also deep levels of poverty.

The defining element of the rural poor is undoubtedly the lack of social inclusion as defined through access to water and sanitation services provided by the state. The deprivation of water services results in a very low consumption of water and poor hygienic conditions, which make the poorest most vulnerable to disease. In addition, those services which are available come at a considerably higher cost than to the urban poor.

Although there is now much wider application of the policy of free basic water (as will be developed in the chapter) this has been considerably delayed in benefiting the poorest. An examination of the tariffs for water in cities, small towns and rural communities after the announcement of the policy and its deadline for implementation demonstrates the considerable difficulties in securing access alone for raising water consumption for the poor.

Table 8.1 shows that the poorest have paid the most. The tariffs faced by rural communities are considerably higher than the uppermost range of urban tariffs, which is one of the reasons for the low consumption among rural communities even when water services are available. In comparison with the 6 kl free supply available to urban households (based on the daily provision of 200l for a family of eight) with the objective of providing 25 litres per capita per day (pcpd), consumption in the rural areas is much lower, on KwaZulu-Natal projects ranging from 3 to 10 litres pcpd, well below the established RDP minimum standard of 25 litres pcpd. Although the free basic water policy has now been extensively discussed and deadlines were set for its implementation by municipalities before the end of 2002, the implementation of the policy has been slow and very uneven.

This can also be compared with the level of consumption for hygiene uses which include bathing, washing dishes and clothes, and cleaning and toilet flushing in a study of East African communities. A survey has concluded that unpiped households suffer from lower hygiene levels as a consequence of not having water piped to the household (Thompson et al., 2001: 28). Indeed the quantity of water used for hygiene purposes by piped households is more than twice that used by unpiped households and this difference is fairly consistent across all categories of hygiene use.

**Table 8.1** Examples of tariffs, South Africa

| Area | Form of service | Tariff |
|---|---|---|
| Ethekwini, formal housing | House connection 0–6 kl | R0.00/kl |
| Impolweni informal settlement | Standpipes | R10.00/kl (1c per litre) |
| Dolphin Coast concession | Standpipes | R3.94/kl |
| Rural KZN communities | Standpipes | R5 to R12/kl |

*Sources:* Impolweni (personal information, March 2002), Dolphin Coast (Hemson, 2001), unpublished DWAF Business Plans and reports accessed in 2004.

Although unfortunately what data there is for South Africa is not fully comparable, the level of consumption in urban informal settlements is somewhat higher at 25 litres per person per day (Stewart, 2001), which (at 23.7 litres) is more or less at the level of urban consumption from communal taps in East Africa. The consumption in rural projects in South Africa, however, appears to be considerably lower, ranging from 3–10 litres pcpd compared to the 20.5 litres average in East Africa (Thompson, 2001: 26). There is growing evidence that the lower levels of income have an adverse effect on poor people maintaining health and hygiene; in particular, lower levels of handwashing are associated with these low levels of consumption.

## Benefits accruing from water, sanitation and hygiene education

Through public health intervention there can be improvements in the health and nutrition of rural people, particularly in relation to children. This happens first, in the reduction of morbidity and mortality-producing diseases such as diarrhoea, and, second, in the lessening of water collection time, allowing an allocation of that time to child health and nutrition-enhancing activities (Burger and Esrey, 1995: 153). The time and effort accorded to childcare is enormously expanded when children are sick and in this sense the well-being and productive activities of women are closely related to the health of children. Gender-sensitive policies equally lead to the prioritisation of children's needs.

In South Africa the benefits of intervention in water and sanitation are assumed rather than demonstrated and unfortunately not much research has been undertaken to investigate specific interventions and to assess their results. Research generally has not established a clear relationship between the provision of water projects and better health outcomes; the difficulties are considerable and involve both data management, research interest and questions of access. Surprisingly, in contrast to previous cholera epidemics, there has been

no rigorous epidemiological study of the most recent one, although the author has conducted a social survey indicating why the poor have been most vulnerable (Hemson, 2007).

Without making an exhaustive examination of the problems an explanation of one aspect is made here: water-borne diseases particularly among children are routinely recorded in visits to clinics and the most recent data is often available at the clinic. Once the data has been passed on to provincial health authorities for compilation, the data disappears from view and is practically irretrievable. Although health statistics published from the compilations of records from clinics or hospitals eventually appear in national records, it is difficult to get local or provincial data. The datasets of the periodic Demographic and Health Surveys are also not released until many years after the surveys are complete and serve as historical records rather than contemporary assessments.

All this leaves the linkage between water and sanitation intervention and health improvement at the level of assumption or generalisation. The literature elsewhere shows that an assumed direct relationship is not confirmed in research. A study of water supply and health conditions in Lesotho, for instance, has concluded that although water-related disease is a significant component of reported disease, especially for children, improved water supplies had little impact on health (Feachem et al., 1978: 175). Research around these issues is continuing.

This apparent paradox has a number of explanations, but two will be discussed here. The first is that the level of consumption for hygienic use is critically important; for health benefits to accrue it is not enough for there to be piped water alone, but sufficient water should be available and consumed to provide for all these uses and probably some 'waste' (i.e. an amount in excess of the minimum requirement for each use). In a review of a number of studies Burger and Esrey (1995: 164–5) conclude that 'water quantity appeared to be more effective than water quality in contaminated environments and that water quality might not have an effect until most major routes of contamination were eliminated'. In addition, there is increasing interest in the contamination of stored water (which is becoming an increasingly important aspect of domestic consumption) and in ensuring handwashing and elementary hygiene.

The second is that rural water projects generally provide standpipes rather than yard connections and that water consumption is highly unequal with only some households reaching the threshold of consumption providing the anticipated health benefits. Studies confirm that where there is lower per capita consumption, the use of water for drinking and cooking is relatively inflexible and the families use far less in washing and bathing (Thompson et al., 2001: 27).

One of the most durable relationships in water consumption which have been explored is the relationship of water to travel time. Yard connections lead to much higher levels of water consumption than for households even near sources of water; but among those households utilising standpipes there are wide variations.

The summary of research carried out in East, West and Southern Africa, Nicaragua, India, Sri Lanka and Bangladesh in the 1970s and 1980s has revealed a surprising consensus on water-use patterns (Cairncross and Feachem, 1993). In the implementation of water schemes, consumption increases dramatically when standpipes are within close range of the household. But when water is further away or involves a return trip, including queuing, exceeding half an hour, consumption drops off dramatically. In between, an approximate range of 3–30 minutes, there is a 'plateau' as consumption is surprisingly constant. In either a rural or an urban setting, an increase in the number of public taps reduces the drudgery and work of collecting water and saves time, but does not lead to increased water consumption and the health benefits anticipated.

This relationship between distance and consumption is not widely understood in South African practice and helps to explain why there is a low level of consumption (a proportion of the RDP standard of 25 litres) in rural water schemes. In a comprehensive number of standpipe schemes in developing countries only a small proportion of households consume as much as 50 litres, and the vast majority consume considerably less with an average consumption of 12–15 litres per person per day (Cairncross and Feachem, 1993). Although there has been little study of water consumption in South Africa, these figures are indicative of the experience of projects in rural communities. It seems that only with yard connections and free water supplies will levels of consumption approximating the RDP standard objective be reached.

## The cholera epidemic and the rural poor

The progress of water delivery in South Africa has been marked by milestones of millions of people provided with access to water services. When the ANC government came to power in 1994, there were some 12 million people without access to piped water within 200 metres and by 1999 the third millionth person provided with water was celebrated. Progress in serving the rural poor seemed on track as methods of planning and funding were improved. Delivery was said to have accelerated significantly. By the year 2000, the Department of Water Affairs and Forestry estimated that some 6 million people had benefited from the community water and sanitation programme (DWAF, 2001: 6).

Despite this, the backlog of unserved communities in the rural areas and shack areas has remained surprisingly constant.

It seemed that this advance in water infrastructure would have the desired effect in protecting the rural population against water-borne diseases which had been prevalent under apartheid. The outbreak of an epidemic of cholera in the province of KwaZulu-Natal in August 2000, however, provided a graphic illustration of the vulnerability particularly of rural and peri-urban communities of the poor. It justified the rising criticism of cost recovery, and urged a reconsideration on the rollout of water services and far more attention to sanitation.

The disease has historically caused terror; it devastated First World cities in the nineteenth century when it was described as ending in *mort de chien*, a 'dog's death', which often came as a fairly rapid conclusion to agonising cramps, diarrhoea, exhaustion and final decline. Cholera, it is now widely appreciated, can be eradicated by fairly elementary public health measures such as provision of sanitation and clean drinking water and the encouragement of hand washing. South Africa is one of the most developed states in Africa and the incidence of cholera was something of a surprise.

The outbreak in August 2000 in KwaZulu-Natal province gave rise to 106,389 cases and 229 deaths in five provinces within a year, and continuing periodic outbreaks. According to the WHO Global Task Force on Cholera Control this was the biggest outbreak internationally of the time; all in all, the South African outbreak accounted for 80 per cent of all cases worldwide in the reporting period (IRIN, 2002). It was significant continentally, internationally and in terms of its policy implications locally.

Newspaper reports, the Minister of Water Affairs, and subsequent research have identified the application of cost recovery methods by municipalities, which have substantially reduced water consumption, particularly in peri-urban areas, as if not the trigger then certainly the accelerator of the epidemic. During the transfer from 'homeland' projects (of the puppet Bantustan regimes) to municipalities, electronic controls have often been placed on standpipes to extract tariffs from communities, a practice which resulted in a dramatic decline in consumption (Cottle and Deedat, 2002). It is generally agreed that the adjoining peri-urban areas around Ngwelezane township in Empangeni were the epicentre of the cholera outbreak. Ronnie Kasrils, then Minister, stated that poverty was the cause of the epidemic because people could not pay for water services:

> The problem is that when we try to implement cost recovery, many of the poor cannot pay. The consequence, when they are then excluded from the taps, has been seen with the cholera outbreak in KwaZulu-Natal. (Kasrils, 2000c)

The epidemic spread with surprising rapidity not only in the province but beyond.

The following factors have been identified as indicating social and environmental vulnerability (IWQS, 2000; IRIN, 2002; Kasrils, 2000d):

- The incidence of water-borne diseases in communities in the catchment area.
- Use of untreated water for domestic use in the catchment area.
- Settlements without sanitation infrastructure to ensure effective disposal of human waste.
- The decline in wetlands in catchment areas.
- The poverty of rural communities.
- A lack of coordination between departments dealing with water and health.

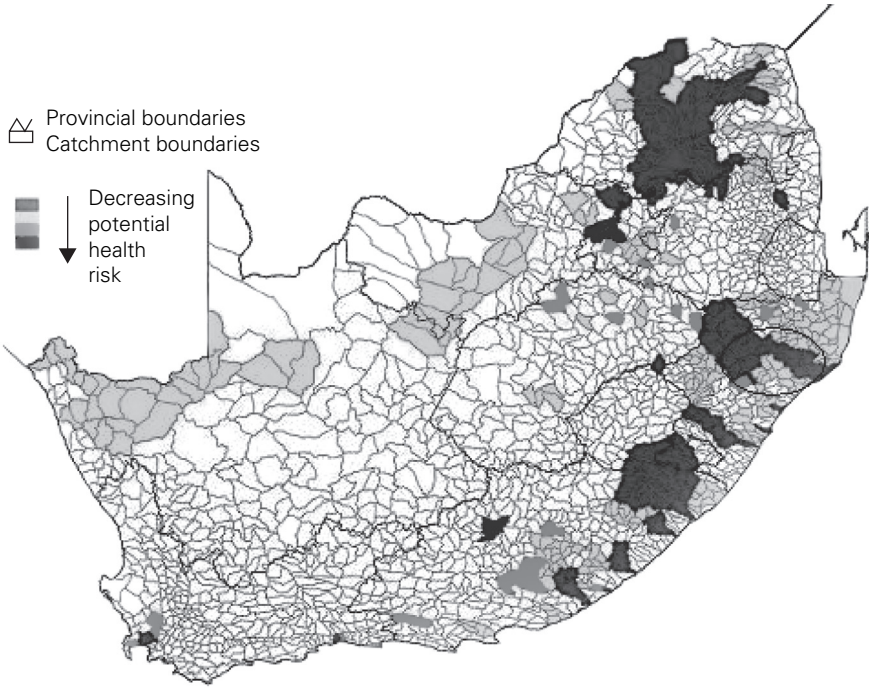
Soon after the outbreak, the Department of Health and that of Water Affairs launched a public campaign of information urging rural people to either boil water or to add a teaspoon of bleach to 25 litres of water. Advice was given on oral rehydration. Medical intervention largely took the form of tented rehydration centres being set up largely by the military in areas of greatest infection and water trucks providing clean drinking water to rural communities on an emergency basis. These interventions had their own problems, particularly in ignoring the existing problematic water projects and encouraging dependency on emergency provision (Hemson and Dube, 2004).

A substantial amount of research and mapping had previously drawn attention to the vulnerability of the provinces' rural areas to water-borne diseases. The cholera outbreak occurred after the compilation of a sensitive microbial water quality study which, although using social and environmental indices rather than direct sampling from water sources, gave a fairly accurate indication of the areas most at risk (IWQS, 2000).

In addition, a paper read at a water conference in May/June 2000 warned of the health threat posed by effluent discharged from rural hospitals and identified cholera from these sources as early as January 1999 (Simpson and Charles, 2000). Despite this thorough and timely research, the warnings were not heeded by municipalities, departments of state or health and water professionals. The field of water quality studies and health intervention in water and sanitation is unfortunately characterised by high levels of independent and uncoordinated activity by public bodies, a feature which received adverse comment from the WHO team invited in to investigate and advise on the treatment of the epidemic (WHO, 2001).

In Figure 8.1, the circled area to the right indicates the epicentre of the cholera where there were 80,084 cases, some 70 per cent of the total within the

**Figure 8.1** Identified catchment areas at risk of cholera




*Source:* Van Niekerk, 2000: 9.

province up to February 2002. In the report accompanying the map, the catchment areas in this region were given the highest priority for intervention.

Despite a high level of intervention by the military, the Department of Health and that of Water Affairs and Forestry, the epidemic proved difficult to contain and spread from the first incidents in Empangeni to virtually all 10 health areas in KwaZulu-Natal and to other provinces. The total number of cases from the start of the outbreak in August 2000 to December 2002 is 128,468 in all provinces (Table 8.2). A brief review of the statistics reveals that the incidence of the disease was heaviest in the coastal northern areas of the province, the areas reported to be most vulnerable in the microbial water quality study (see Figure 8.1). Although areas inland and south are also indicated as vulnerable to water-related disease, the levels of incidence of cholera here were considerably lower.

The rapid spread of cholera throughout the province was attributed to the holding of large gatherings in the rural areas (with movement of numbers of people from one rural area to the other) and the extensive labour migration from rural areas to the urban peripheries.

**Table 8.2** Cholera incidence, South Africa, 2000–02

| Period | No. of cases | No. of deaths | Case fatality rate (%) |
|---|---|---|---|
| 15.08.2000–31.07.2001 | 106,389 | 229 | 0.22 |
| 01.08.2001–31.12.2002 | 18,224 | 122 | 0.67 |
| Total | 124,613 | 351 | 0.28 |

*Source:* Department of Health website, accessed May 2004.

The South African government has been applauded for the relatively low fatality rate which was 0.30 per cent of the infected; 395 had died by late 2002. The lower rate was achieved with a high level of expensive medical intervention on an emergency basis, rather than by means of direct mobilisation of rural communities around a human rights strategy to achieve the right to clean water and sanitation. There was, however, accelerated development as communities experiencing high levels of morbidity laid claim to entitlement to more developmental assistance, and DWAF responded to the crisis by accessing greater funding from the Ministry of Finance. Following the epidemic there has been a succession of emergency interventions particularly in sanitation and speeded-up delivery.

The epidemic may be compared to the previous outbreaks in the 1970s and early 1980s. In these episodes more than 99 per cent of cases were reported to have occurred in areas with an annual rainfall of >600 mm with peaks in numbers towards December and the early months of the new year (Mugero and Hoque, 2001). There were reportedly no major outbreaks even among poor communities in drier regions of the country. Figure 8.2 indicates the rainfall zones of South Africa and shows a high degree of overlap with the prioritised vulnerable areas of the microbial water study. The difference between the latest epidemic and previous outbreaks is the extent to which cholera has spread inland and south, penetrating into drier and higher regions.

While the primary focus of administrators and public health officials was on the provision of clean water, the cholera epidemic exposed another fault-line in the provision of sanitation particularly in rural areas. The figures from the Census conducted about a year after the cholera outbreak (October 2001), when there had been intervention to improve conditions, reveal very large gaps.

In Table 8.3 the data is presented by district municipalities; in Umkhanyakude (just south of the Mozambique border) there were 56.8 per cent of households without any form of sanitation, and similar conditions

**Figure 8.2** Mean annual rainfall of South Africa

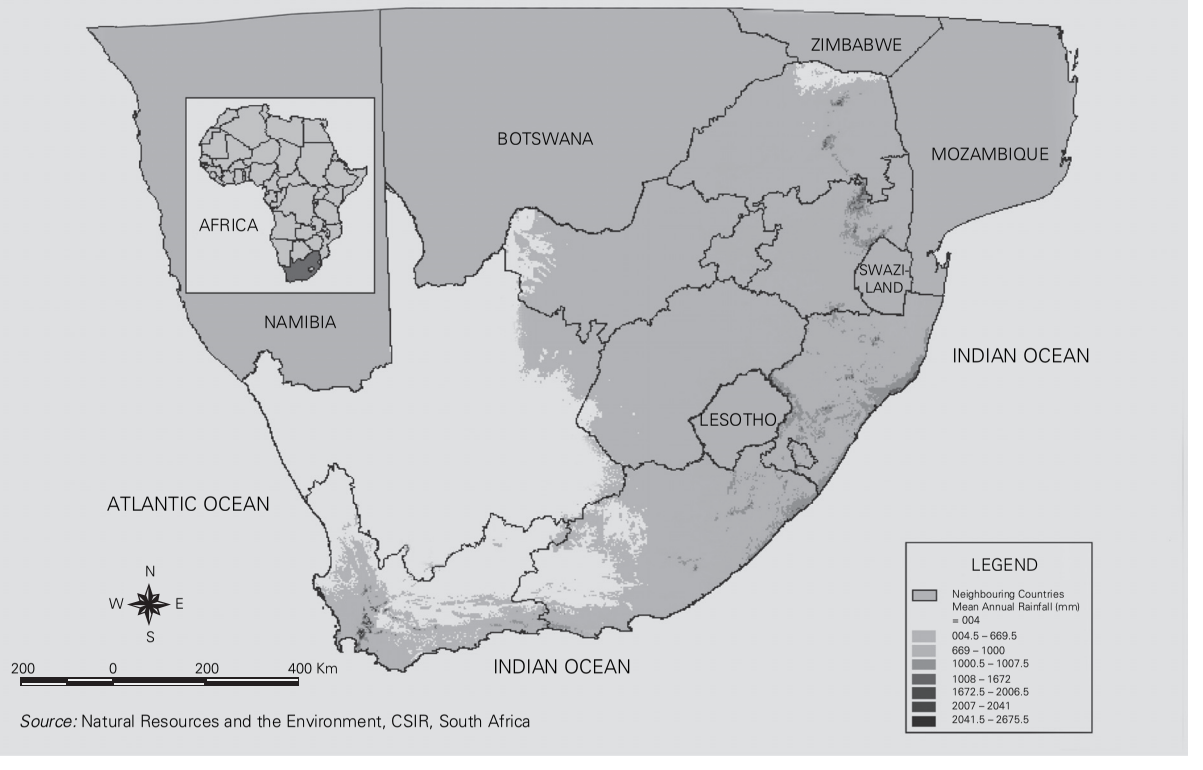


**Table 8.3** Access to improved sanitation (ranked by 'none') in South African municipalities

| | Improved | Unimproved | None |
|---|---|---|---|
| DC27: Umkhanyakude District Municipality | 28.5 | 14.7 | 56.8 |
| DC24: Umzinyathi District Municipality | 32.4 | 24.6 | 43.0 |
| DC26: Zululand District Municipality | 34.0 | 26.6 | 39.4 |
| DC28: Uthungulu District Municipality | 43.2 | 27.0 | 29.9 |
| DC29: Ilembe District Municipality | 44.3 | 37.3 | 18.4 |
| DC23: Uthukela District Municipality | 40.1 | 41.5 | 18.4 |
| DC21: Ugu District Municipality | 41.9 | 41.0 | 17.1 |
| DC43: Sisonke District Municipality | 42.0 | 46.4 | 11.6 |
| DC25: Amajuba District Municipality | 62.1 | 31.4 | 6.5 |
| DC22: Umgungundlovu District Municipality | 58.7 | 35.5 | 5.8 |
| Durban: Ethekwini Municipality | 75.8 | 20.1 | 4.1 |
| Total | 55.9 | 28.0 | 16.2 |

*Source:* Census 2001 data, Statistics South Africa (STATSSA) website.

existed in the northern Umzinyathi and Zululand municipalities. Throughout KwaZulu-Natal 44.1 per cent of the population did not have access to improved sanitation (they either had none or had 'long drops'; unimproved pit latrines). These people were concentrated in rural areas where a majority of households do not have improved sanitation. The tendency to use the bush or streams to defecate in was, undoubtedly, one of the most prevalent practices working towards the distribution of the cholera bacterium. Only in the urban centres of Umgungundlovu and Ethekwini municipalities is the target of ending unsanitary conditions in sight with backlogs of 41.3 and 24.1 per cent, respectively, and the availability of the resources of a metropolitan council.

The cholera epidemic has had a decided effect on water policy and management. The outbreak occurred on 15 August 2000; by 18 September 2000, President Mbeki first announced, at a trade union conference, that all households would be provided with 6,000 litres of water a month free, and on 19 September, Minister Kasrils issued a press statement declaring the minimum of 6,000 litres a month lifeline tariff. On 1 October 2000, an article appeared in a Sunday paper explaining that the epidemic had been spread by the charging of a R51 registration fee for tokens exchanging metered standpipes for those which had previously been free (Salgado, 2000). By 13 October, Minister Kasrils announced that his Department had provided 45 portable water tanks to the Eshowe and Empangeni areas, as well as four tankers and the objective of providing 50 litres of water per person a day. An inter-ministerial committee followed soon thereafter to plan the free basic water provision.

For a long period there had been vigorous debate among academics and trade unionists that the policies of cost recovery were excluding a considerable proportion of the poor from services, but government had resisted the idea of free services to the poor. The rapid change in policy to provide free basic water and also accelerate sanitation delivery was undoubtedly occasioned by the epidemic. The results of the new direction in policy have, however, been uneven as will be explained below.

## Women, time poverty and social intervention

The cholera epidemic placed the burden of disease on the poorest. Studies of poverty in South Africa have pursued the idea of how 'entitlement shocks' (e.g. loss of productive assets) and 'entitlement losses' (e.g. severance of relationships upon which one relies for assistance) affect households (Carter and May, 1999a). Disease has many manifestations in the region with high levels of HIV/AIDS infection as well as the epidemic of cholera and involves profound consequences for individuals, households and society bringing elemental shocks and losses for rural communities and threatening or destroying entitlements. As a study of the impact and cost of an epidemic of dysentery argued: 'The most defenceless and economically marginal segments of society are usually the most susceptible and therefore suffer the greatest' (Pegram, Rollins and Espey, 1998: 11).

Disease carries costs to the homestead in a number of ways. The incidence of disease affects women in two dimensions; first, as they are more vulnerable to water-borne diseases through longer exposure to untreated water, and second, as additionally being burdened with caregiving. This was so even in the case of the *shigella dysenteriae* epidemic in 1995/6 which, like the more recent cholera epidemic, spread southwards into the Eastern and Western Cape and northwards into Mpumalanga. The *shigella dysenteriae* epidemic required tens of thousands of patients to be hospitalised and resulted in about 1,000 deaths (Pegram et al., 1998), and in this sense was as or more destructive of rural communities than the cholera epidemic.

When the time of rural women is taken up with the elementary aspects of sustaining the household, disease can have a severe impact on time and energy. The study of the cost impact of diarrhoea and dysentery (Pegram, Rollins and Espey, 1998: 14–15) estimates that a caregiver would have to devote 1–5 days (depending on the severity of the disease) to the treatment of diarrhoea and 2–8 days to dysentery. In addition, there would be the expense of a number of trips to the local clinic or more distant hospital.

The onset of cholera can be dramatic and absorb the reserves of time available for the sustenance of the household. The diarrhoeal diseases of childhood are less dramatic but also absorbing of the resources available for nurturing, sustaining and developing children and the household.

The existing method of assessing the effect of diseases such as diarrhoea has been to apply the measurement of values to the cost of treatment at health centres and other costs to the state, to the household, and to the individual. This has helped provide some overall costing to commonplace diseases and to weigh up the costs to the state and society of delays in providing levels of provision in water and sanitation which would substantially reduce the incidence of water-borne diseases.

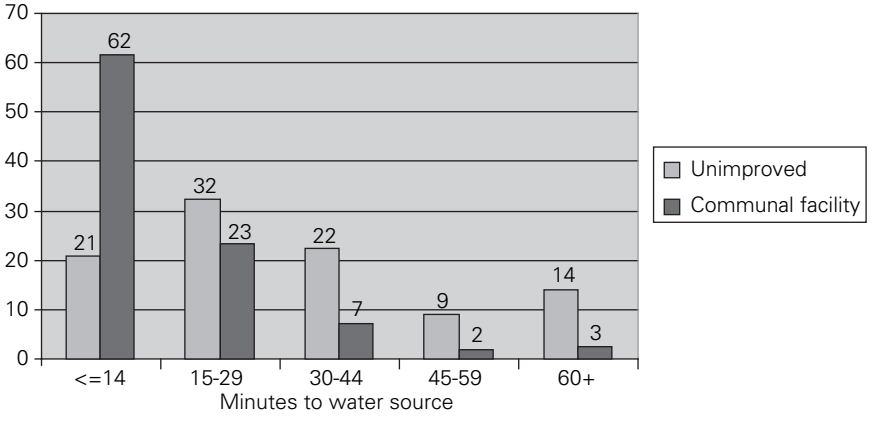
Researchers into poverty are aware of the burden of water and fuelwood fetching and have employed the term 'time poverty' to describe the constraints on the household's ability to effectively employ resources to which they have access to generate a livelihood (Carter and May, 1999b: 16). A large proportion of women's time is spent in the drudgery of securing the basic needs of the household.

The majority of women who fetch fuelwood live a kilometre or more from the source and spend about 2 hours (128 minutes) on average per day on this task. In comparison to water, more people reported collecting fuelwood, which was further away than a water source from their dwellings (STATSSA, 2000). Taken together, fetching and carrying water constitutes a major daily activity. Although the RDP standard (now the basic level) stipulates a water source within 200m of the household, the average time engaged in securing the family water supply within this range is 44–47 minutes (STATSSA, 2000). The length of time taken to fetch water indicates that the household's supply of water for hygienic purposes is unlikely to be near the level which would provide the necessary health benefits.

Taken together, the drudgery associated with fetching wood and water amounts to 173 minutes on average; up to 3 hours' time for rural women each day. The matter can be investigated further by using the annual General Household Survey conducted by STATSSA: a question on the length of time taken to travel to the water source is cross tabulated below.

In line with the emphasis which is being placed on rural poverty in this chapter and the general preponderance of lower levels of service to the poor, a set of eight levels of access to water in the survey is presented in Figure 8.3; access on site or at the dwelling have been selected. These include the following: tanker, borehole, flowing water, stagnant water, well, spring, and 'other' which are aggregated into a single category, 'unimproved'. These levels of

**Figure 8.3** Length of time to water source, South Africa




*Source:* Water services, www.durban.gov.za, personal information March 2002, report on Dolphin Coast Concession, 2001, and departmental report on KZN water projects.

access are contrasted with that of the public tap in terms of the distance from dwelling to water source.

These levels of access are cross tabulated against the time taken to get to the source. (This, it should be noted, is not the full time taken to reach the source, collect water, and return, just the time to the source.) The data indicate a considerable benefit from access to a communal facility; 62 per cent of those with access to a project spend 14 minutes or less on getting to their water source as opposed to only 21 per cent of those at an unimproved source. Over the range 15–29 minutes, the proportion of households reporting that the time taken to access an unimproved source increases and is larger than the proportion who can access an improved source in the period (at 32 per cent to 23 per cent). Unimproved sources play a more important role in every subsequent time interval, i.e. more time is needed to reach a water source where there are unimproved sources. Figure 8.3 shows that there is a considerable saving to women and children (usually, although not exclusively girls) with the advent of a water project in rural communities. To this extent water provision is relieving some of the burden of rural women and allowing them greater time for social and productive activities.

In addition there should be health benefits associated with accessing better-quality water, although this cannot be assumed.

## Free basic water: the results

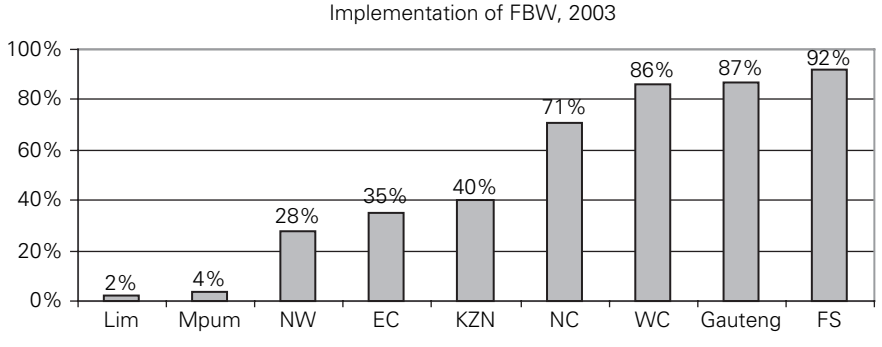
The free basic water policy, properly and fully implemented, to provide 6,000 litres per month particularly to rural households would bring a substantial improvement in current consumption and probably considerable health benefits. Unfortunately the matter is not quite so simple. In Figure 8.4 the statistics are presented for the proportion of people benefiting from free basic water (FBW).

Although the intention of FBW has been to meet the needs of the poorest, there has been an ongoing challenge to this objective. The statistics on access show how slowly FBW has been implemented in a number of provinces. In Figure 8.4 the most urban provinces of the Western Cape, Gauteng and the Free State are to the right-hand side and report the highest level of implementation: between 86 and 92 per cent. To the left-hand side are the more rural provinces which have the lowest levels of implementation: Limpopo, Mpumalanga, North West, Eastern Cape, and KwaZulu-Natal. Some of these provinces had extraordinarily low levels; in Limpopo, for instance, reportedly only 2 per cent were provided with FBW, and in Mpumalanga only 4 per cent.

The statistics indicate a weak form of equity intervention. This unevenness is further evident in Table 8.4 which is drawn from the DWAF website. Data is presented there on the proportion of the population, poor and non-poor, receiving free basic water in 2007.

In Table 8.4 a total of 36.8 million people are presented as receiving FBW: 15.6 million of these are poor and the remaining 21.2 million are non-poor.

**Figure 8.4** Proportion of South Africans accessing free basic water, August 2003, by province




*Source:* Department of Water Affairs and Forestry website, accessed August 2003.

**Table 8.4** Population served with FBW, 2007

| | Population | Poor | Non-poor |
|---|---|---|---|
| Receiving FBW | 36,846,534 | 15,631,603 | 21,214,931 |
| Not receiving FBW | 11,760,109 | 7,070,471 | 4,689,638 |
| Total | 48,606,643 | 22,702,074 | 25,904,569 |
| Percentage (%) | 76 | 69 | 82 |

*Note:* A poor family is defined as one receiving an income of less than R1,000 (approximately $140) per month.

*Source:* http://www.dwaf.gov.za/FreeBasicWater/ accessed 2 February 2007.

The poor appear to be last in the queue: more poor people (7 million) than non-poor are *not* receiving FBW according to official figures. Expressed in percentages, among the non-poor more (82 per cent) were receiving FBW than among the poor (69 per cent). In 2003, the figures were 27.5 million benefiting of whom 12.4 million were poor; at that time less than half of the poor people were receiving FBW. While progress is being made, this explicitly pro-poor policy is being implemented in ways which appear to be excluding a considerable proportion of those who should be benefiting.

## Conclusions

In this chapter the relationship between water services and women's work is explored to indicate the extent to which household caregivers are being freed from drudgery to provide care and engage in productive income-generating activities. The current situation is that women have to carry out the menial and time-consuming tasks of fetching and carrying both water and fuelwood. The cholera epidemic, other water-borne diseases and the rising incidence of HIV/AIDS place severe stress on the capacity of women to sustain families and undermine anti-poverty initiatives. Intervention through the provision of communal facilities has reduced the time burden on women, but not necessarily increased the level of consumption to improve family health.

In South Africa, water delivery to the rural poor has been targeted as a priority in the government's programme of poverty alleviation. The provision of water services is the most quoted achievement of the post-apartheid period. Although national surveys show that women have benefited considerably in obtaining shorter times and distances to water sources, there has not been rounded progress. Unfortunately improvements in health and well-being of rural

communities have not been recorded; indeed there has been the most visible struggle to control an epidemic, which has required the assistance of WHO. Progress, it appears, is impeded by neo-liberal policies in two direct ways: first, more conservative budgets have limited the capital for additional projects and, second, cost recovery has made it more difficult for the poor to access sufficient water for their health needs. The accelerator of the cholera epidemic, it is argued, has been the drive to recover costs from the poor (Cottle and Deedat, 2002). The epidemic has forced attention to be directed to the deficiencies of policy and practice; the widespread neglect of sanitation, the inter-departmental conflicts, and the need for health and hygiene promotion; but most of all it underlines the necessity to focus on the needs of the poor.

Interventions that provide piped water but do not substantially increase household consumption appear not to reduce the transmission of waterborne diseases and achieve a relatively few direct health benefits. In addition to poor management, this seems to be the reason why communities that are relatively well served with water schemes are not secure from epidemics of dysentery and cholera.

At the World Summit on Sustainable Development in 2001 there was extensive discussion of water as a basic human right. Despite the promises of politicians and officials, Archbishop Desmond Tutu has argued that no issue has ever been more neglected, adding, 'it has been neglected because it is of concern mainly to the poor and the powerless' (UN-HABITAT, 2004).

In this chapter policy options are explored which lead to the strengthening of women's social position and their ability to engage in decisions relating to basic water services. The impediments to such progress are also examined. Improved access to clean water would improve women's health and the prospects for rural development. All this would impact on children through the reduction of environment-related health problems.

Anti-poverty research should give greater attention to the burden on women who are increasingly the heads of households in rural communities and secure the human needs for shelter, water, warmth and preparing food. Removing the burden on women enables a fuller life for their children. Women's health and the prospects for rural development, it is argued, depend on such provision.

The achievements of water provision and, particularly, free basic water to women in rural areas have been staggered and are unclear. In communities where projects have been implemented the statistics show that there is a cut-back on the time taken in collecting water which has benefited women. Unfortunately it is also true that the management of rural water schemes has

been poor and subject to more frequent breakdowns than in urban areas. In most of the rural schemes water is not treated, so there are also questions about quality. Ironically, in the transition from communal and 'standalone' schemes to municipal responsibility there has been very limited participation by women in the management of water issues. This has been explained by the fact that local government tends to be more conservative and less open to women's participation than either national government or community affairs. A study of the involvement of women in planning, for instance, has concluded that

> Our case studies showed that the inclusion of women and gender within local government was partial and uneven, and that there were significant differences between municipalities according to their capacities, resources and local politics. (Todes, Sithole and Williamson, 2007: 122)

Under these conditions improved access to water sources has not always brought the expected improvement of life to rural women.

Anti-poverty research should give greater attention to the burden on women, who are increasingly the heads of households in rural communities and who secure human needs for water, warmth and preparing food.

## Notes

1. These standards are now regarded as the 'basic level' of service in the latest policy document, the Strategic Framework for Water Services (DWAF, 2003). Over time the RDP intended to raise personal consumption to 50 litres of water per day but this objective has not been revisited in the Strategic Framework.
2. However, they also concluded that gender and poverty sensitivity did not lead to significant difference in sustainable service, possibly by leaving important segments of the population unserved and by having less impact on the use of treated water.

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9

# Water pricing, inequality and economic welfare: how can the new South African water policy support the well-being of the urban poor?

*Carl-Erik Schulz*

## Introduction

Better access to water was one of the main promises of the government in democratic South Africa after the 1994 elections. Lack of safe water supply was a problem for a large part of the population. In the first census (1996) 25 per cent of the blacks in the urban areas did not have access to tap water. In contrast only 27 per cent of the African population in the rural areas *had* piped water in their dwellings. However even in the urban townships there are problems with the water supply and many families can hardly afford to pay for the service. This raises the economic management of residential water supply as a major problem also in the urban areas. This chapter will focus on how to ensure efficiency and equity in water distribution to the urban poor.

In most countries, water pricing has been determined mainly on the basis of financial or accounting criteria. However, in recent times there has been growing emphasis on welfare economic considerations in order to produce and consume water efficiently, while conserving scarce resources, especially in developing countries. A great deal of attention has been paid to the use of marginal cost pricing policies in the water sector, where the World Bank has been one of the spokesmen for marginal cost pricing, eradication of subsidies and privatisation. Yet there are almost no applications of marginal cost pricing in the water sector. On the other hand, South Africa has decided to implement an increasing block tariff (IBT) pricing structure, including a free-of-charge basic water supply of 25 litres per person per day. There are several reasons for this pricing policy. A minimum supply of water is part of the basic needs of people, and access to water is a main source of conflict in many areas.

However, more important is the situation that water supply is an important political issue, linked to the problems of extreme income inequality in many developing countries. Few countries in the world have a more skewed distribution of income and wealth than South Africa. A system where the willingness to pay decides the pattern of distribution of goods will not work in an acceptable way if large parts of the population have too little income to buy basic goods.

This is the background situation in South Africa. The focus in this chapter is on the distribution of residential water, mainly in urban areas. Other important issues, like the supply of water for irrigation or manufacturing, are not addressed. The existing system in South Africa has historical roots and the welfare implications of an IBT system are discussed in this context.

A residential water pricing system can be used to promote a number of objectives or criteria, like: economic efficiency, equity and fairness (which includes fair allocation of costs, assurance of price stability and provision of a minimum level of service to meet the basic water needs of those who cannot afford the full cost). Additional criteria, like revenue sufficiency tariff structure, simplicity and resource conservation can also be addressed. Standard analysis of the economics of water demand is addressed in Bauman et al. (1998) and Dinar (2001).

Although equity is one of the generally recognised objectives very few of the water demand studies reported in the literature discuss equity issues. Rietweld, Rouwendal and Zwart (2000) conclude that a two-part pricing structure with a uniform price equal to the marginal cost of production, combined with a fixed access charge, would lead to an efficient allocation and that the IBT structure fails its aim of helping the poor in the case of Salatiga city in Indonesia. Renzetti (1992) finds that implementing a revenue-constrained two-part price which consists of a fixed charge to make up a deficit and a marginal price based on off-peak short-run and peak long-run marginal costs results in an overall increase in welfare compared to average cost pricing. The starting premise for Renzetti, however, was that marginal cost pricing will maximise social welfare. Eberhard (1999) also points out that Renzetti's method is not able to analyse welfare distribution between households, a topic that is important in a developing-country context.

This study focuses on how to build a water tariff system that supports welfare for the poor part of the population. To do so there is a need to address ethical issues and discussions on both the efficiency and the fairness of the water distribution. As a demonstration model a local community is used for this study, to support the analysis and to emphasise some main principles. Even then several important questions pertaining to the water supply, including long-term considerations, tax distortions and different cost structures in the

supply, had to be left out, to make the model simple and to concentrate discussions mainly on the effects of the IBT.

Basically, this chapter starts by providing background information on urban South Africa; next a model approach to the problem is presented. The analysis demonstrates how the results depend on some of the main assumptions that were made in the simplified model. Within this context some policy recommendations are made. The technicalities are documented in Moilanen and Schulz (2002). A water demand study from Cape Town (Jansen and Schulz 2006) is used to illustrate that the theoretical findings also will have practical use.

## South Africa and urban water

South Africa's water resources are limited and in global terms are scarce. The average rainfall (470mm per year) is just over half of the world average. The situation is worsened by population growth and the demands of a vibrant economy, and compounded by inequities in allocation, largely on racial grounds, and inefficiencies in usage. Water resources in South Africa are not spread evenly across the country. The country suffers also from severe periodical droughts and floods. Most of the big cities and industrial centres of the country are situated far from big rivers, and in several river catchments the water requirements exceed the natural availability of water. Within the next 30 years, the available water resources will be insufficient to meet projected demands at current usage and price levels (DWAF, 1997b). More than anything else, this water resource characteristic will exert a strong influence on the development of a water pricing policy in South Africa.

South Africa is moving from a 'supply side' to a 'demand side' management. Water pricing is playing a key role in managing the water resources in an equitable, efficient and environmentally sustainable manner. This approach can be used to assist in the allocation of water between different uses and users, to encourage the more efficient use of water and to promote the sustainability of the water resource. The 1997 White Paper states:

> There is a limit to the development of new dams and water transfers that we can afford or sustain. Our present use of water is often wasteful and inefficient and we do not get the benefits we should from the investments in our water. Water conservation may be a better investment than new dams. We will have to adopt such new approaches to water management if our aspirations for growth and development of our society in the 21st century are not to be held back as a result of limited water resources. (DWAF, 1997a: 23)

With respect to water pricing and equity the White Paper states:

> It is important that the introduction of realistic pricing for water does not further penalise disadvantaged communities who were already penalised during the apartheid era. White communities were given a strong economic advantage under apartheid through access to cheap water, while economic development in black communities was restricted by a variety of factors, one of which was lack of access to affordable water. In the interests of equity and social justice, this aspect will have to be considered in the question of water pricing. The price to be levied for water reserved to meet basic needs must merit particular attention. (DWAF, 1997a: 23)

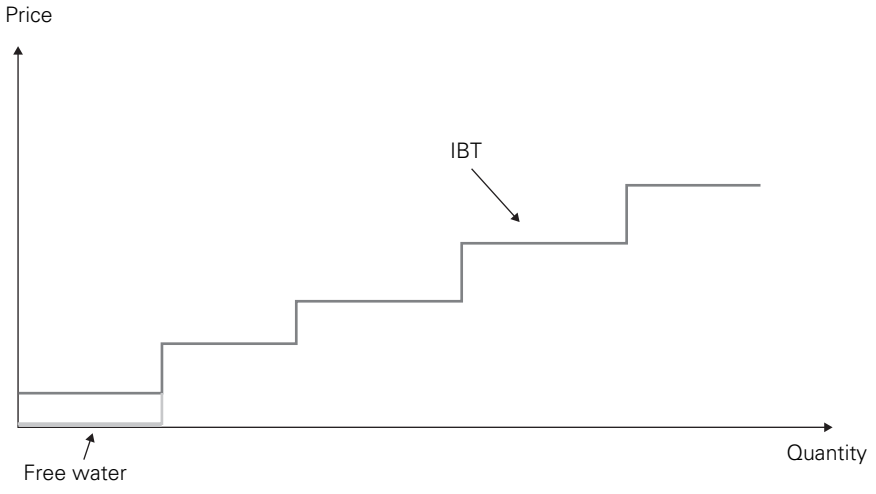
The South African standard on a 'basic' level of water supply, sufficient to promote healthy living, draws on the World Health Organisation standard of 25 litres per person per day. On the assumption of eight persons per household, South Africa sets a standard of 6,000 litres per household per month entitled to get a basic supply of water free of charge. There is no commonly accepted definition of poverty in South Africa, and local governments will have an important role to play in defining local poverty indicators and identifying which households fall within the local definition (DWAF, 2001).

From 2002 a combination of IBTs, usually with the first block free, and targeted rebates to poor households have been used in South Africa to provide pro-poor subsidies. The principles of the IBT are demonstrated in Figure 9.1.

## Water distribution in Durban

During the CROP workshop in Durban (April 2002), the Durban Water management system for the urban poor was demonstrated. Starting from 1991, Durban Water tried to change its management system for water by giving more priority to the needs of the poor. An IBT system was introduced, based on a free supply from communal standpipes, while supply to the individual plots was charged. This system was also implemented for the informal settlements, like Cato Crest in the middle of the city. In a water-abundant area like KwaZulu Natal, the problem is the distribution of water from the source to the consumers. A communal standpipe may lead to high pressure on the net due to water running day and night. A first step to regulate water consumption was to introduce a bailiff operator who bought the water wholesale from Durban Water and sold it on for a small profit to local dwellers at a price of

**Figure 9.1** The increasing block tariff



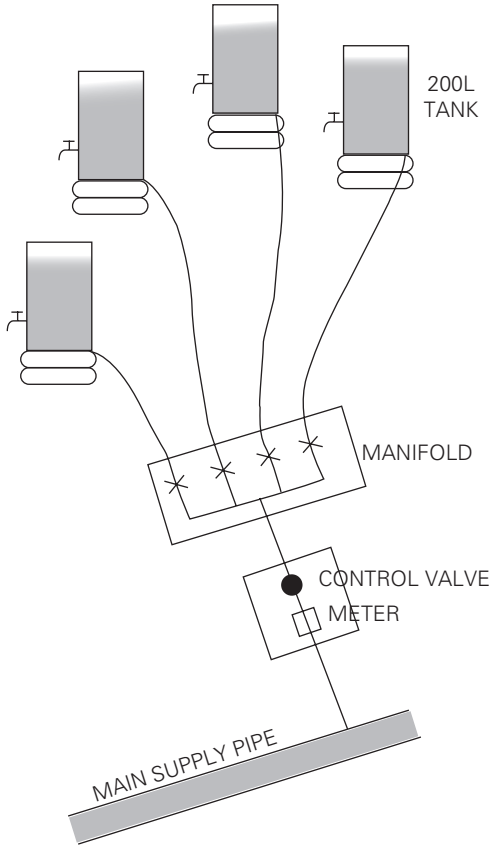

R4.00/kl. The next step was to offer water in a ground tank for each plot. Based on a daily supply of 200 litres, the household paid for the tank and the nearby pipe, while Durban Water supplied water to a manifold. The price was now set to R1.67/kl. Almost all of the households preferred this option to the bailiff system, since it ensured supply of water to their house on a regular basis. The next level of quality was a roof tank, which allowed some supply of pressure for household use, even if the daily supply was restricted. The highest level was ordinary piped water. The costs of administering the billing of the ground tank system was soon found higher than the cost of the 200 litres consumed per day.

From 1997, water to the ground tanks was supplied free of charge, and from 1998 all consumers enjoyed the first 200 litres for free, with no access fee. Figure 9.2 illustrates how the ground tank system is organised.

Three different tariff systems were introduced for water distribution, as demonstrated in Figure 9.3. This changed consumption in the way demonstrated in Figure 9.4. The water consumption of the poor increased, while the consumption of the rich decreased. This was exactly as intended.

Only consumers using more than 200 litres per day were charged in this system, and only these customers were disconnected for non-payment. The Durban Water policy was used even in informal settlements. Their experiment succeeded in changing the consumption patterns in the city and in putting in place incentives to restrict consumption and ensure the distribution of water.

**Figure 9.2** The ground tank system




From 2002 onwards a similar policy has been implemented for the rest of South Africa. This raises interesting questions for research. First of all, it is important to find the best way to build an IBT. What quantity of water should be supplied in the low-price segment? Should the low-price segment of water be delivered free of charge, or is it better to levy a very low price? How large should the steps be set? Even more problematic is how to define the welfare consideration behind the IBT? Is it advisable to use access fees? Can the municipality use the water supply to fund other activity? To answer these kinds of questions it is necessary to build a small model of the community and to try to emphasise the principles of distribution.

**Figure 9.3** The Durban tariff structure for domestic water

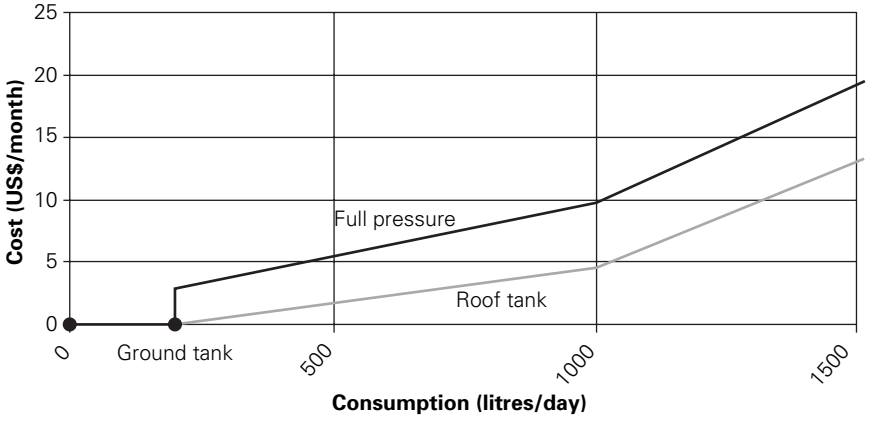
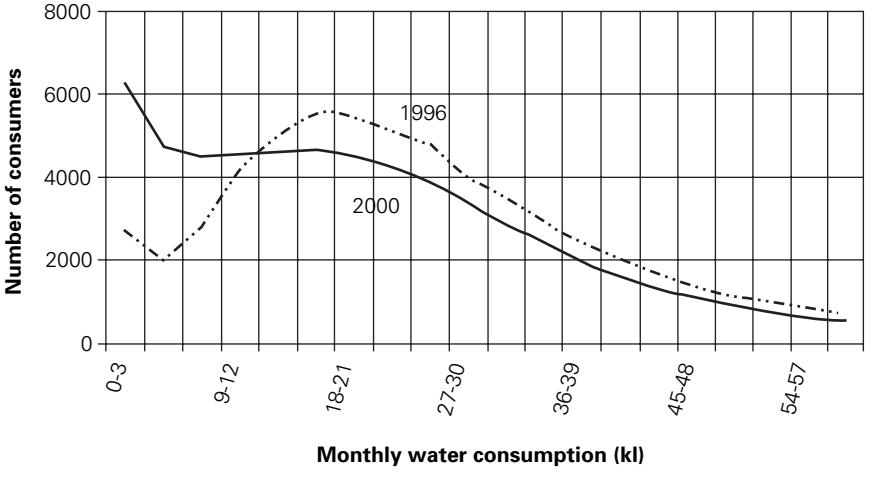



**Figure 9.4** Changes in the distribution of water consumption in Durban, 1996–2000




## The basics of the model

The model considers a local urban community with three levels of decision makers for residential water distribution: *the local government* sets the rules for a *water utility*, which supplies water to *the consumers*.

Since issues of equity are considered, the concentration is on the short-run market for residential water consumption, while long-run investment decisions and the water consumption of agriculture and industry are not included. For simplification, only two representative consumers are used; one is a rich consumer, and the other a poor consumer. The focus is on the principles, and to further simplify, the IBT has only *two* steps: a low-price segment, and a high-price segment.

The three decision makers shall act as follows:

### The local government

The local government sets the rules for the water utility. The municipality decides on:

- the concept of welfare to be used and how to measure welfare;
- access fees for water;
- the surplus/deficit constraint for the water utility.

### The water utility

Water is supplied by a *water utility*. It is assumed that the utility accepts the decisions of the municipality and supplies water accordingly. The utility must also take the behaviour of the consumers into account. The water utility management includes:

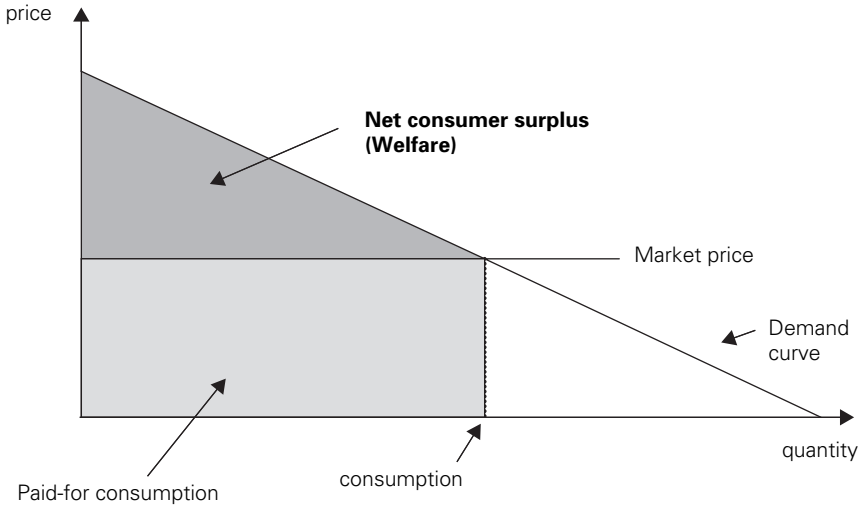
- maximisation of welfare from water use according to the rules set out by the municipality;
- keeping inside the budget constraint set by the municipality;
- full knowledge of the costs of water supply;
- using a two-step IBT;
- decisions on the price for each step segment and the volume or size of the low-price segment.

### The consumers

The final users of water are the consumers. For simplicity, the study assumed two representative consumers, one rich and one poor. They decide on their own consumption based on their income and prices.

- The poor consumer uses exactly the low-price quantity (by assumption).
- The rich consumer consumes also in the high price segment.
- The demand curve for the poor consumer is steeper than that for the rich one.

**Figure 9.5** The measurement of welfare




## The social welfare function

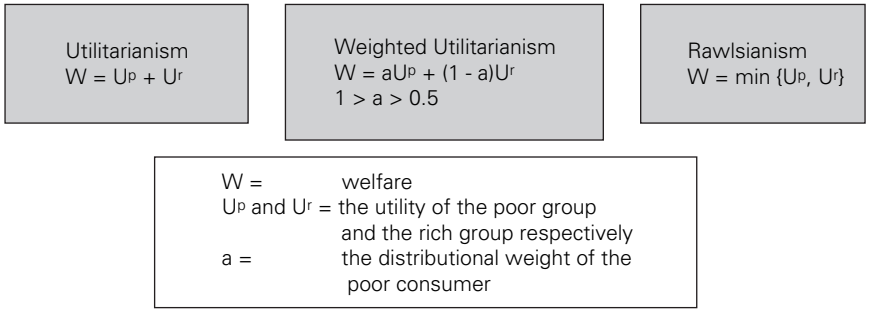
Throughout the analysis the Marshallian Consumer Surplus is used as a measure for the utility of each consumer. However, since each consumer pays an access fee, this must also be deducted from the Consumer Surplus. Figure 9.5 demonstrates how the welfare is measured.

We specify three main approaches to welfare, the Utilitarian, the Weighted Utilitarian and the Rawlsian approaches. The local government must decide which of them to use for their water policy. Figure 9.6 demonstrates the three approaches.

*Utilitarianism* originated in the writings of David Hume and Jeremy Bentham and found its most complete expression in John Stuart Mill's writings. Classical utilitarianism declares that society's welfare should be represented as the sum of the welfare of different individuals. Utilitarianism ranks states in terms of the value attained by social welfare, and a social decision maker should have the state where welfare is maximised as an objective (Perman, Ma and McGilvray, 1996). An egalitarian additive utilitarian social welfare function is used – the utility of each consumer is given equal weight in the welfare function. Hence additional water adds equally to welfare regardless of the income of the consumer.

The utilitarian social welfare function is a special case of a *weighted utilitarian* social welfare function: one where the individual weights are set equally. In

**Figure 9.6** The three different approaches to welfare




the weighted utilitarian case the weights determine the relative importance attached to individual utilities in determining social welfare, as set by the local government. The weighted utilitarian social welfare function is an additive function of individual utilities, giving more weight to the poor consumer.

Rawls's objection to the ethic of classical utilitarianism is based on the claim that 'by being indifferent to the distribution of satisfaction between individuals (and only being concerned with the magnitude of the sum of the utilities), a distribution of resources produced by maximising welfare could violate fundamental freedoms and rights which are inherently worthy of protection' (Perman, Ma and McGilvray, 1996).

Rawls asserts that if people had to choose principles of justice from behind a 'veil of ignorance' that restricted what they could know of their own position in society, they would not seek to maximise overall utility. Instead they would safeguard themselves against the worst possible outcome: first, by insisting on the maximum amount of liberty compatible with the like liberty of others; and second, by requiring that wealth is distributed so as to make the worst-off members of the society as well-off as possible (this principle is called the Difference Principle):

> [S]ocial and economic inequalities are to be arranged so that they are both (a) reasonably expected to be to everyone's advantage, and (b) attached to positions and offices open to all. (Rawls, 1971)

It has been common among economists to try to infer what the Difference Principle would imply for the nature of a social welfare function. Solow argues (Perman, Ma and McGilvray 1996: 35) that a Rawlsian SWF for a society of individuals at one point in time is like the one in Figure 9.6.

## The urban residential water demand

Empirical findings support that internal water uses (toilets, washing, drinking, etc.) are inelastic to changes in water tariffs relative to external uses (car wash, lawn sprinkling, gardening, etc.). Indoor uses are collectively known as basic needs/requirements or hygiene uses, while outdoor uses can be collectively termed as recreational uses. Munasinghe (1992: 253) argues that 'many poor communities already consume only the bare minimum volume for basic human needs and would not be able to cut back on consumption to any appreciable extent'. Table 9.1 refers to some empirical findings, mainly from developed economies.

A study by Renwick (1996) estimated price-elasticities of −0.53 for low-income, −0.21 for middle-income and −0.11 for high-income groups; that is, the lower the income, the more elastic the demand curve is. Mansur and Olmstead (2006) demonstrate that for US households, outdoor consumption is far more elastic than indoor use and rich households are more sensitive to price changes. However, their 'poor' group has a monthly income of up to US$4,500, which is of small relevance for developing countries. It should be noted that demand elasticities from the developed world are only of limited use because the consumers represent only the wealthier end of the consumer range (Munasinghe 1992: 253). Jansen and Schulz (2006) verify that the water consumption of rich households is much more elastic than for poor ones (see Table 9.2). They base their study on data from 275 households in four townships and one rich suburb in Cape Town, using monthly water meter readings over a period of five years and adjusting for differences in household characteristics.

**Table 9.1** The price elasticity of demand for total short-run water use in various international studies

| Researcher/s | Year | Location | Price elasticity |
|---|---|---|---|
| Carver and Boland | 1969 | Washington, DC | −0.1 |
| Agthee and Billings | 1974 | Tucson, Arizona | −0.18 |
| Martin et al. | 1976 | Tucson, Arizona | −0.26 |
| Hanke and de Mare | 1971 | Malmö, Sweden | −0.15 |
| Boistard | 1985 | France | −0.17 |
| Thomas and Syme | 1979 | Perth, Australia | −0.18 |
| Veck and Bill | 1998 | Alberton and Thokoza, South Africa | −0.17 |

*Source:* Veck and Bill, 2000.

**Table 9.2** Estimated price elasticities for different income groups in the townships and suburbs of Cape Town

| Income group (monthly income) | Estimated price elasticity |
|---|---|
| Rand 0–1,000 | −0.324 |
| Rand 1,001–5,000 | −0.306 |
| Rand 5,001–10,000 | −0.391 |
| Rand 10,001–20,000 | −0.452 |
| Rand 20,001– | −0.967 |

1 EUR ≈ Rand 9.5
*Source:* Jansen and Schulz, 2006.

We observe that the highest-income group decreases their consumption 0.97 per cent if the price of water increases 1 per cent, keeping their water bill close to constant. The low-income groups only cut 0.3–0.4 per cent with a 1 per cent price increase.

## The short-run demand structure

On the basis of the existing studies we model the demand of the two groups as shown in Figure 9.7. For simplicity we assume linear demand curves. In South Africa water is metered even in the urban townships. Metered water rules out the problem of indirect purchasing.

## The supply of water

Water is supplied by a water utility, with a management policy as mentioned earlier. The two-step IBT pricing makes it possible to supply some water at a low price (lower than the marginal cost of supplying water), while the price of the second block is set to satisfy the budget constraint for the water utility. The IBT implies that the water service can price-discriminate between the two households on their marginal water use. This means that the water utility must be able to prevent arbitrage among them. Figure 9.8 illustrates how an IBT works to regulate the demand of two different consumer groups.

The volumetric payment is combined with a fixed monthly access fee, an 'assurance of supply' charge. The income these tariffs generate supports the fixed cost of water supply. The fixed tariff of the poor household group is lower than the one of the rich because the fixed tariff is based on income level.

**Figure 9.7** The demand curves of the two groups

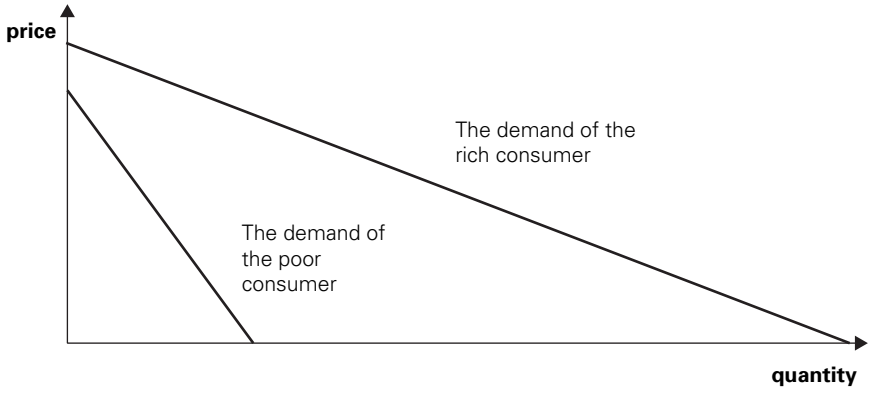
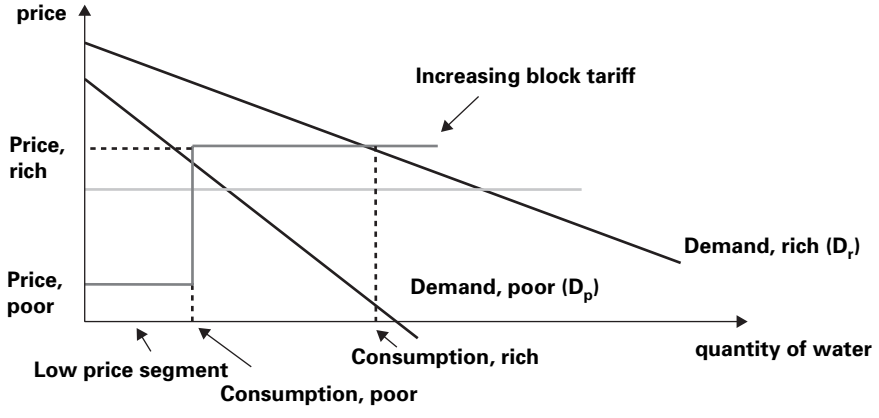



**Figure 9.8** The increasing block tariff (two steps)



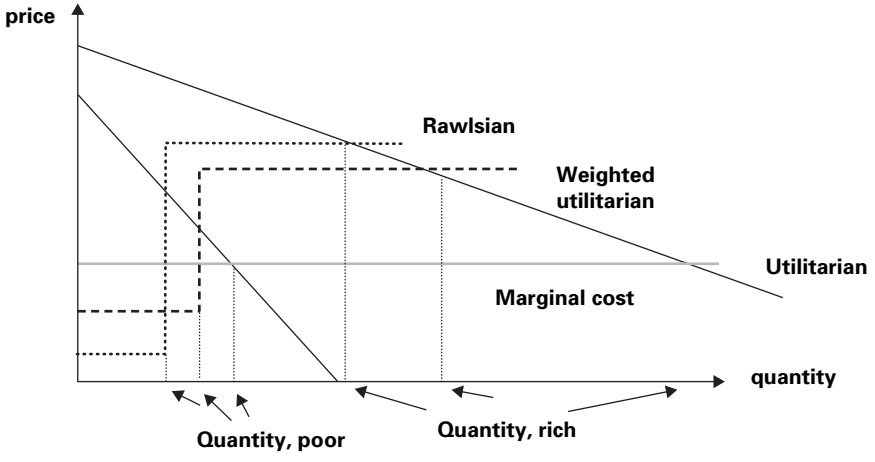

The utility supplies water at constant marginal costs and an additional fixed cost. Both seem reasonable for the short-run supply. It is assumed that the utility has full information on the demand structure of each group. The budget constraint for the water utility is like this:

Total revenue of sales + access fees − running costs − fixed costs
= Surplus (or deficit), as set by the municipality

## Comparing the IBT price structures

The maximisation problem can now be solved for each welfare approach. For the formal solution – see Moilanen and Schulz (2002). Based on the

**Figure 9.9** The optimal IBT for the three welfare specifications



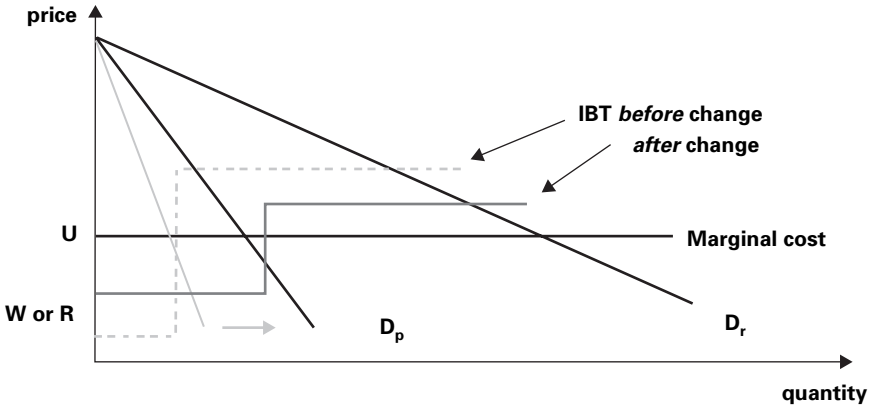

results, it is possible to compare the three different welfare-maximising IBT water pricing structures and to discuss the differences between them. The IBT structure for the three approaches will be as in Figure 9.9. The Utilitarian case has the same price for both steps, the Rawlsian has a relatively small first-step volume, combined with a low price and a large price difference to the second step, and the Weighted Utilitarian approach is in between the two extremes.

We conclude that the quantity of water consumed both in total and by the poor group is largest in the pure Utilitarian case. For the two other cases the water utility sets the per unit price in the first block at lower than the marginal cost. Observe how both the size of the low-price segment and the price step differ for the three regimes. So far we can also conclude that it is possible to find substantial differences in the water policy based on the choice of welfare approach used by the municipality.

## How different factors influence the optimal IBT

Now, we want to study how different factors influence the IBT for each welfare approach. How will the demand structure, the cost structure or the weight of each consumer group influence the IBT structure? To illustrate this, we turn to comparative statics of the model. We change different parameters of the model, and compare the changes to the welfare maximisation problem.

**Figure 9.10** The effect on the IBT price structure of increased price elasticity of the demand of the poor consumer group




For details, see Moilanen and Schulz (2002). For this purpose it is convenient to simplify the model by setting the price that leads to zero water consumption equal for each group. We also start with a budget balance (no-profit) constraint for the utility. In Figures 9.10–9.12 we demonstrate the direction of the changes for the Weighted Utilitarian and the Rawlsian approaches together. This is to simplify the figures, and because the analysis finds that the direction of the changes in these figures is similar for both approaches.

First, we study the effect of a steeper demand curve of the poor, while the demand also increases like in Figure 9.10. This can reflect a situation with better access to water for more than basic consumption, for example a switch from ground tank supply or communal tap to indoor tap. We denote U for the Utilitarian case, W for the Weighted Utilitarian case and R for the Rawlsian case.

Figure 9.10 demonstrates that for both the W and the R cases, the low-price segment will increase while the price difference between the two steps decreases for a more elastic demand of the poor. We also observe that the price of the first segment increases. The standard U solution is of course unaffected, since there is no price difference in this case. However, the increased demand of the poor will give a larger total consumption.

The case of a less steep demand curve for the rich is demonstrated in Figure 9.11. This can reflect a situation that the rich group has easier access to outdoor use of water. We see from the figure that the effects are the opposite of the previous case. A smaller and cheaper first step is the result, while the

**Figure 9.11** The effect on the IBT price structure of increased price elasticity of the demand of the rich consumer group

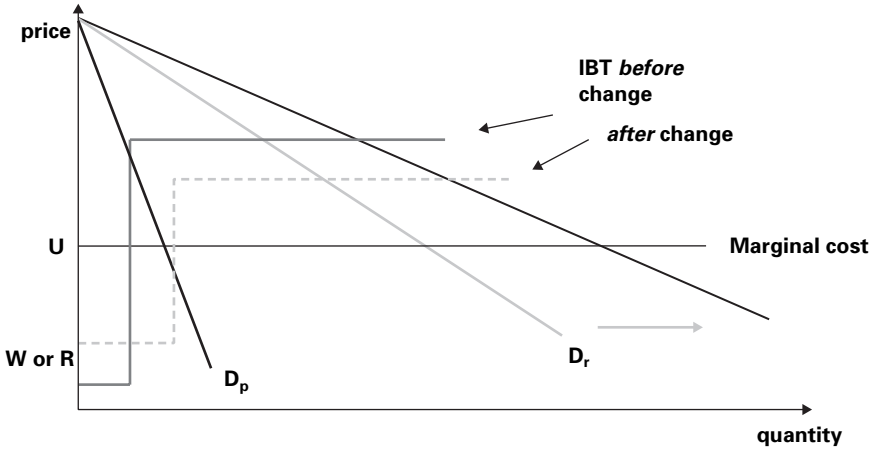
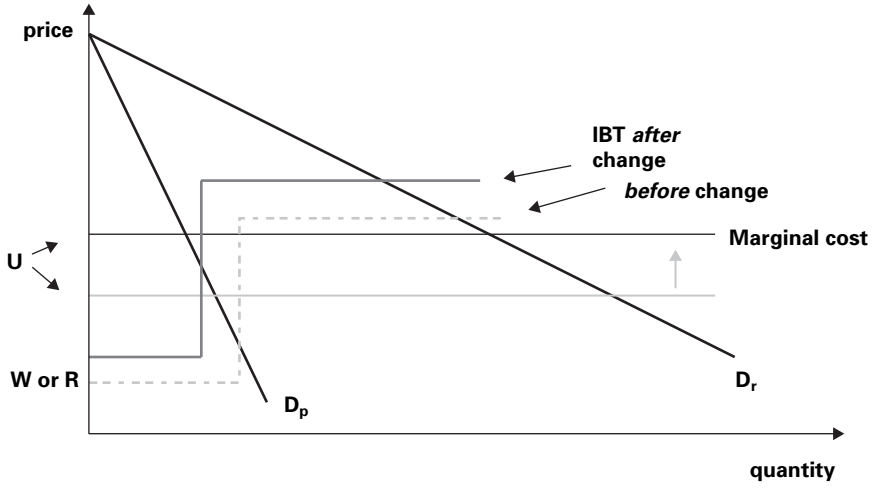


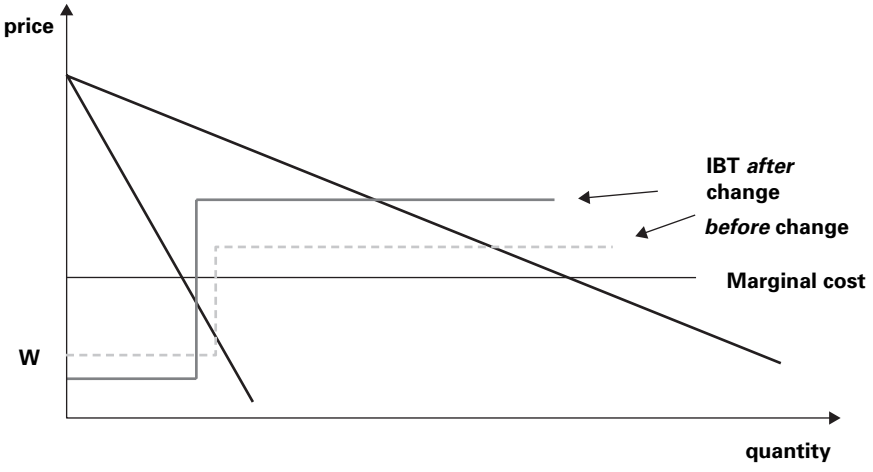

**Figure 9.12** The effect on the welfare-optimising IBT pricing structure of increased marginal costs of supply




second step is priced higher. Still the results are only valid for the W and the R cases.

The effect of increased marginal costs for the water utility is shown in Figure 9.12. This reflects a situation like a new pipeline system with higher maintenance costs per unit of water delivered, and funded by the utility.

**Figure 9.13** The effect on the welfare-optimising IBT water pricing structure of increased distributional weight of the poor consumer group



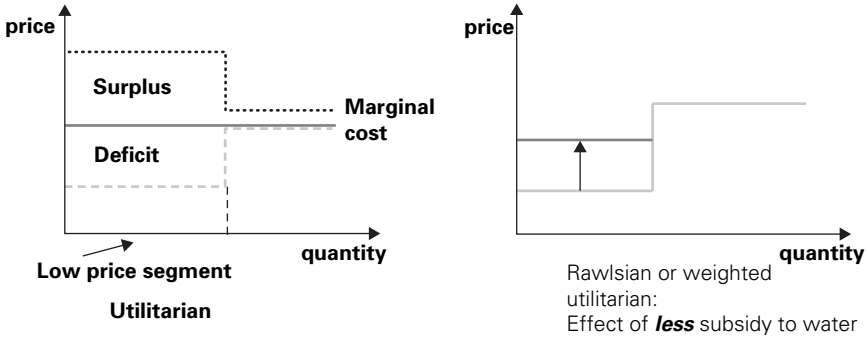

Now the first step is more restricted, and the price of both steps increases. Increased marginal costs restrict the option for redistribution. It works this way for the W and R cases, while for the U case the price and the consumption are restricted for both consumers.

In the Weighted Utilitarian social welfare function we can also increase the distributional weight of the poor consumer, a. If so, we are moving towards the Rawlsian situation. Not surprising, the price difference between the steps increases, while both the volume and the price of the first step decrease. In some way we can say that the subsidy to the poor is concentrated, as shown in Figure 9.13.

## The budget constraint of the water utility

The budget constraint set to the water utility is important for the price of the first block. Some municipalities may want to run the water service with a surplus to support the overall local budget. If this surplus from water sales is funded by sales, and not by the access fees, a situation arises like in Figure 9.14. For the Utilitarian case, running the water service with a surplus implies that the price of the first block must be higher than for the second one. Hence, if a local government is tempted to support the local budget from the surplus of the water service, it will ask the utility to charge the poor more than the rich

**Figure 9.14** The effect of changes in the budget constraint of the water utility




for water. This may also force consumers in the poor group out of the formal market.

The model can easily be used to study the effect of changes in budget constraint in the two other cases as well. Solving the models for these cases makes no difference for the optimal volume in the low-price segment and the price and volume of the high-price segment. However, the price of the low-price segment must increase to accommodate a situation with less budget deficit (or a higher surplus) for the water service. This is so in both the Weighted Utilitarian and the Rawlsian cases. The conclusion is that if the local government wants to fund its budget from a surplus from the water utility, the utility will react by increasing the price of the low tariff block.

## Policy implications of the results

We have modeled the water management in a way where the municipality is free to decide on how to define welfare, and to instruct the water service to maximise welfare. However, the municipality must accept that the water service works inside the set budget, and they must take into account that households will respond to changes in the prices and the tariff.

Some important policy implications can be derived from the theoretical analysis. If the municipality prefers the *Utilitarian Welfare Approach*:

- Marginal cost pricing for all consumers (the same marginal price for all consumers) is the best.
- There will be no redistribution to the poor group.

- Differentiated Access Fees may be used to fund lump sum transfers or to cover fixed costs.
- Efficiency is focused.
- Equity is not focused.

If the *Weighted Utilitarian Approach* is preferred:

- Price differentiation is *welfare-improving*.
- The IBT is justified as welfare-improving, and a first best policy.

If the *Rawlsian Welfare Approach* is used:

- There is more differentiation of the prices, but a smaller quantity of the low-price segment.
- The IBT is justified as a first best policy.

In sum the utilitarian approach supports the mainstream rules of a focus on efficiency in the water supply, while redistribution and equity are not addressed.

The two other approaches yield more detailed policy implications:

- 'Water for free' is not usually the best policy – a positive price in both segments may very well be a better policy.
- The 'marginal cost of supply' is important for the pricing policy.
- A stronger emphasis on the poor consumers implies increased differentiation of water prices, that is, a steeper IBT.

It is in some way a surprise that 'water for free' (a small free quantity to all households) is not always supported. However, it is possible to support a free quantity by using a welfare function with strong emphasis on a small, extremely necessary supply of water.

For all approaches we observe that marginal short-run costs for the aggregated supply is an important part of the factors deciding the price set to the rich consumers. This opposes the principle that the price shall only cover the historical costs of each group. In the long run, all variable costs must be included for *all* consumers. For all analyses, increased variable costs due to increased supply (like a new dam with long-distance supply) shall affect *all* consumers equally in the short run, and not only the new participants in the market (like new townships with access to tapped water).

A policy shift towards more emphasis on the poor consumers leads to more price differentiation. This conclusion is based on our economic welfare considerations.

We find that if the municipality decides on using the water service to fund other budgets, *this will destroy the IBT system, and it will lead to a policy that harms the poor group*.

For two reasons it seems dangerous to allow local communities to run the water utilities with a surplus. First, an access fee can keep the poor group out of the market for water. Second, the price of the first block is a major way of funding lump sum transfers, and if the surplus requirement of the water utility is large, this will undermine the low price for the first segment. The reason for this conclusion is that the total revenue is vulnerable to price increases in the high-price segment.

We also observe that the government must carefully keep an eye on changes in the demand structure.

- A less steep demand curve for the poor consumers results in a *larger* low-price segment, but *less* difference between the two prices.
- Less steep demand for the rich group results in *increased* price differentiation.
- Better knowledge of the demand structure is needed to find the best pricing policy.

Demand changes like better access to piped water through private taps will probably increase the use of appliances by the poor consumer. This may lead to a less steep demand curve and will influence the price policy of the water utility. We conclude that knowledge of the demand structure of the groups of consumers is essential in order to model the best market policy of the water utility. It is not enough to know the cost structure of the water supply; the demand side must also be focused upon.

Lack of data on consumer demand structure is a real problem for the government. However, the Cape Town study by Jansen and Schulz (2006) gives some information (see Table 9.2). The results from this study are in line with the theoretical model discussed in this chapter: *the water demands of rich households are much more responsive to price changes than those of the poor*. This study concludes that the price mechanism will *mainly* work to restrict water consumption by the upper-income segment of the market. This segment cut their consumption by 10 per cent if they face a price jump of 10 per cent. Since the high-income consumers also have the largest consumption of water, an adjustment of the higher steps of an IBT may work very well.

This policy was successfully used by Durban Water in the late 1990s. In Cape Town, the low-income groups change their consumption somewhat, but not much, if they face an increased marginal price. This means that price changes for this group mainly influence the revenue of the water service. Price rises for the basic water supply will work more like a *tax* for these groups. A 10 per cent price increase cuts the consumption of the poorest households by 3.2 per cent, while their bills increase by 6.5 per cent. Hence, *price is a bad management measure for restricting water consumption by poor households*. Price increases may have implications for equity, especially in circumstances where many people cannot afford even to pay for the basic consumption of water.

The small response to price of consumption among the low-income group indicates that cheap water does not lead to enormous waste of a scarce resource. It looks like other factors are important to decide on their consumption. The lack of appliances and opportunities (no garden, no pool, no car) does not explain fully their low consumption. However, it is possible that the IBT structure is important as an incentive not to waste water senselessly. The poor know that as soon as they consume more than the free segment they have to pay for additional water.

Does this support the argument that the IBT is useless for equity purposes? We do not conclude that. The arguments support the conclusion that cheap or free water for the poor is affordable without wastage, and that pricing to restrict water use among the poor is not working well. The IBT may be important as an institution to ensure no running taps. But quantitative measures are probably better for improved service. They can restrict consumption of scarce water without leading to financial problems for the poor, and they can also be made as a service ladder. A system with low pressure (ground tank, roof tank) and restricted service free of charge or at low price, and an IBT structure for full-pressure service may work.

If rich households react in line with the results from the Cape Town study (with the same percentage cut in water use as the percentage price increase) the water bills for this group will be unaffected by any price change – only consumption changes. This makes it easier to regulate consumption during a drought, but impossible to redistribute from the rich to the poor from the volumetric payments. Only differences in access fees can support redistribution.

The social manager of water must have a lot of knowledge of the water demand structure to impose a socially efficient water pricing structure. Financial reasoning alone cannot determine this and may lead to pricing policies that are bad for water distribution.

The theoretical model – and hence the policy conclusions – are based on specific assumptions. This must be considered when policy adjustments are being made. Some important assumptions are:

- The residential water consumption is metered – that is, mainly in urban areas.
- The focus is on short-run problems – where investments are 'sunk costs'.
- There is no discussion about general problems of other funding of local municipalities.
- The supply and the demand structure are very much simplified.
- Problems of exclusion from the formal water supply system have not been included.
- More steps or more groups of consumers can be added to the IBT.
- It is possible to study other welfare approaches.

Even if the results build on model simplifications, the results are rather rich for policy considerations. The selection demonstrates that welfare considerations are important for the water pricing system, and this on its own is an important input for further discussion.

## Note

This chapter builds on the theoretical results from Moilanen and Schulz (2002) and empirical results from Jansen and Schulz (2006). I thank Durban Water and Reg Bailey for information concerning the water management of Durban.

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# 10

# Conclusion: water for the poor pays

*Adolfo Mascarenhas*

**Preamble**

'The Spirit of God moved over the water', and then on the third day was the gathering of the water … and 'God saw that it was good'. Fortunately for people, there was no thought of privatisation. Then on the fourth, fifth and sixth day, God went on to give life to the plants, animals and humankind. Water is life. All people have a God-given right to both water and life.

The whitened skeletons of livestock in the simmering sand of the Sahara snuffs life just like the deluge in New Orleans or the millions who experience floods in Bangladesh, England or Mozambique. The legendary sailor in the tumultous southern ocean muttered, 'water, water, everywhere nor any drop to drink'. When water is polluted, and denied in whatever way, when we keep silent despite international conferences, we hasten the 'curse of water'.

Since, unlike the sailor who killed the albatross, we are not lashed to the mast or delirious, we can afford to think clearly on the issue of water and poverty.

## The rich have water

Although this volume is about 'poverty', its unconventional approach is through water. While people survive and live with poverty, perhaps all their lives, they simply cannot last without water for more than a few days. The livelihood of millions is threatened every time there is a flood or drought.

The first chapter by Kulindwa and Lein piloted us through the often intricate and murky waters to establish the link between water and poverty. Basically, wealthy countries, like the Scandinavian countries or North America, use an abundance of water in contrast with most African countries; even when water is naturally available, the latter use a pathetic fraction of what is used by

their wealthy counterparts. The citizens of many countries do not have water because they are poor; they are reduced to a life of disease, squalor and poverty because water has not been given its rightful attention. Nowhere is this more apparent than in the contrast between the wealthy suburbs of African or Asian cities and the conditions prevailing in the slums. Water should be regarded as a basic necessity and a right. Any policy that aims to make this right tradable for an enterprise or a corporation to extract rent is putting its poor citizens and its development at great risk.

The link between water and poverty in poor countries is fundamental in all forms of production and domestic use. There is very little infrastructure in most rural areas and so countless hours are spent collecting and transporting water required for domestic purposes. The burden of collecting and transporting water is a responsibility of women and girls. When men and boys collect water it is for sale. This division of labour is found in an extreme form in Nigeria, where the preponderance of 'water boys' in the city centres especially in the North has security and economic implications. 'Their presence has helped… to aggravate ethnic and religious crises' (Aderinwale and Ajayi, in Chapter 4 of this volume).

Much time is spent on trying to establish the link between water and health, or development and poverty. The problem is not the link but to ensure that resources are available for all people to have adequate water to live decently. This means balancing the cost and the benefit of bringing in management and control. A few years ago in a suburb in Dar es Salaam, a large proportion of children were infected with bilharzia because the main source of domestic water was a pond. On a larger scale, such conditions prevail in most lakes and water bodies. We really do not care to know.

The poor will continue to have insufficient water as long as the belief persists that there are no alternatives or that the costs are too high. While imaginative ways have been concocted to spend money for instance on arms, there has been a failure to invest in water. The responsibility to invest in water rests not only with the ministry or the government but also with local governments and NGOs, but ultimately it is also a responsibility of every household.

## From crisis to crisis

Chapter 2 by Hemson incisively explores the 'water for all' syndrome and why so little was achieved in the various initiatives including the 'Water Development Decade'. As the debates begin afresh, relations between water

and health are rediscovered, the urgency is renewed and the scepticism thickens; it is time to learn from the intricacies and the defaults of the past. In this respect, Hemson's rendition should be required reading for all scholars, bureaucrats and politicians interested in water and sanitation. Even then the ethical message may not sink in because water is now big business – be it consultancies for researchers, tenders and engineering contracts, suppliers of equipment – and the subject of shady deals with some powerful politicians.

However persistent these problems may be, there is a need to analyse, clarify and expose the curse related to water and its control. The neglect of water and the placing of its management in the hands of profit-making corporate bodies is really a crime. It leads to the neglect of water management for all. This neglect leads to a curse, which extracts a heavy price.

An appalling number of people have died from water-related diseases – more have died than in all post-World War II conflicts. As a public health crisis, it is more serious than AIDS and deserves far more attention and resources than it has received so far. The lack of political resolve in water and sanitation delivery was 'perhaps the greatest development failure of the twentieth century', which would lead to the deaths of as many as '76 million people, mostly children … by 2020'.

Faced with 'inertia at the leadership level', the global water crisis will reach unprecedented levels in the years ahead. UNESCO (2003) predicts a 'growing per capita scarcity of water in many parts of the developing world' because of population growth, pollution and expected climate change. Despite these compelling arguments in terms of public health and survival, a very general commitment to delivery was made at the Earth Summit in Johannesburg but without the concomitant pledges, the necessary investments or the political will. While the crisis still remains with us, governments, NGOs and, above all, communities can take critical steps to ensure that water is a basic and fundamental right.

## Slogans and doctrinaire positions

The lofty pronouncements made at the various international meetings of the UN bodies eventually weaken, and this takes us to the present doctrinaire positions of the World Bank, which now calls the shots. For instance, the World Commission on Water for the 21st Century, chaired by a very senior World Bank staff member, frankly called on governments to step aside on the grounds that the private sector, which alone has the money for huge investment,

should take the lead. Governments, it said, should keep out of the water business, except as regulators and protectors of the environment. Water Aid quickly added that the private sector has a 'crucial role to play' because the developing countries do not have the capacity for regulation, have not yet achieved community participation, and lack entitlements and enforcement of rights. In these conditions, the strong promotion of the private sector is contentious and radically reshapes basic relationships between civil society, business and government. From Tanzania to the United Kingdom, privatisation of water supply is no longer regarded as a panacea!

## Do the poor have any rights?

In an Orwellian sense, the rights approach can be a smokescreen to hijack the 'water for all' agenda. Therefore, it may be necessary to visit the basic needs approach of the 1970s and 1980s. Wisner, for instance, exposes the link between the needs rhetoric and the emergence of neo-liberalism in the early 1980s partly as a way of blunting the radical thrust of a demand for a New International Economic Order (Wisner, 1989).

Now amidst sharp controversies over the partnerships in the water sector, it is relevant to ask whether it is possible to establish human rights for the downtrodden and poor and ensure social justice, rather than to be concerned about offering concessions to the private sector? These arguments lead towards the reform and strengthening of the state, which ultimately is the only agency capable of meeting the costs of bringing water and sanitation to the billions of poor in need. The private sector certainly is not prepared for such welfare measures. In the longer term the state is the only possible guarantor of financial commitments and rights.

## The slogan 'water for all' has mesmerised us all

It is time to think again about water and the delivery systems. Rather than agonise about the shortage of resources alone, the time has come to act and to learn. Increasingly, the arguments are now for greater resources to be provided, a more critical attitude towards privatisation and more strident advocacy in the face of unchanging policies of the most powerful nations. This problem is now so severe that it requires a strategic approach that emphasises equitable and sustainable management of water resources.

## Learning from the ground

The book chapters demonstrate how water-related poverty is entirely manmade and a denial of the basic biological entitlement. In the context of a few strategically chosen countries, this book brings together new perspectives on the relationship between water supply and poverty. It incorporates both urban domestic and agricultural use, and relates water deficits among the poor to the water-related diseases that follow. A new period of realism has emerged following the World Summit on Sustainable Development (WSSD) in Johannesburg; modest targets are set at an international level, far greater responsibility is given to national states to provide the required funding, and there is pressure for greater participation of local communities. The Tanzania study shows that on economic criteria alone, none of the five options for rural water supply are viable. The Bangladesh study states that while provision of water and sanitation does help, it is not enough to get out of the vice of poverty.

## The privatisation of water

The drive to privatise water supply in Third World countries was short-lived. Cogent and urgent arguments against have come from unusual quarters. In this book there are varied analyses of the complexities of the relationship between poverty and water in the current global situation where the incomes of the poor are either stagnating or in decline. The accounts by researchers re-examine the options and come up with new arrangements for sharing water more equitably and getting out of poverty. The book echoes the general sentiment that water is too critical a factor to be determined by the profit margin of the investor. Under the present circumstances the state should play a dominant and more effective role in this sector to ensure better health, a sense of social well-being, and improved productivity in society.

In South Africa, Goldin notes that although there was a fundamental reshuffling of allegiances, conditions of trustworthiness have not yet been established. Buzz words such as 'participation' or 'empowerment' remain rhetorical rather than practical experiences. The attitudinal components of social capital, in particular trust and shame, play a vital role in shaping the linkages between government and civil society, in the establishment of governance and democracy, and in water management institutions in particular. If there is any partnership it should be between the government and the communities above anyone else.

## It is simply not enough to have policies

In the context that there is a positive relationship between access to safe water and the incidence of poverty, Aderinwale and Ajayi in Chapter 4, entitled 'The Link between Poverty and Water Supply', examine the situation in the most populous state in Africa. The Nigerian example points out that in four cities, after three years of implementation, the government targets are far from being achieved. There is no visible progress in terms of increase in water supply or poverty alleviation. Therefore, it is imperative and urgent that a review and improvements of the existing strategy and policy framework be undertaken. Policy reforms include decentralisation, divestment, community participation, effective determination of the cost of water, and private sector involvement, especially in conservation and management of watershed areas.

Policies in many countries receive undue attention. But the context in which they were written and in whose interest they were crafted is as important as is the implementation process. Few water and sanitation projects have a monitoring and evaluation component. It would make a difference if these were in place; but more than that, the time has come for a mechanism that would make politicians and bureaucrats answerable to people.

## Water helps, but there is need to look beyond

Haakon Lein, in Chapter 5, 'Water, Agricultural Development and Rural Poverty in Bangladesh', takes a bigger picture by slicing through the conventional profile of Bangladesh, a country that is 'overpopulated', economically backward and well known for disasters and famines and noted as a developing country stuck in endless poverty with few prospects of progress. Although the United Nations Development Programme's Human Development Index (UNDP HDI) ranks Bangladesh as number 139 out of 175 countries, during the 1990s Bangladesh had substantial economic growth and made significant progress in the reduction of poverty. The rural areas have seen a greater reduction in the depth and severity of poverty, suggesting that growth has been more pro-poor in rural than in urban areas (World Bank, 2002: 5). The health and nutritional situation for children has improved substantially, and the under-five mortality rate has gone down from 239 in 1970 to 77 in 2001 (UNDP, 2003). If these trends continue, Bangladesh and the Maldives will be the only countries in South Asia that meet the Millennium Development Goals (MDGs) for reducing the under-five mortality rate by two-thirds by 2015. If climate change does not throw off calculations, such trends will come sooner rather than later and remove these countries from the 'poor' category.

The single most important factor has been that Bangladeshi farmers have been relatively successful in gaining control over the water resources by expansion of dry-season irrigation based on privately owned tube wells and pumps combined with the spread of new high-yielding rice varieties. Contrary to the conventional beliefs, the evolution of a private water market, including a Proshika's irrigation programme, based on groups of landless and near-landless rural people owning minor irrigation equipment, has benefited the poor and opened new opportunities for agricultural growth, employment and a reduction in food prices. Irrigation development in Bangladesh, as in other countries of Asia, has been part of a more general 'groundwater boom' based on an informal, private and fairly unregulated exploitation of groundwater. But agricultural growth alone will not solve the rural poverty problems of Bangladesh. In the coming decades two out of three jobs in rural areas will have to be found outside agriculture.

New evidence suggests that if smallholders apply half the water used by commercial farmers, they generate water values that are ten times higher than those of many commercial farmers on the Fish-Sundays. The opportunity cost of expanding the smallholder sector is minute and the potential benefits are huge. The amount of water on which the commercial sector in the Fish-Sundays scheme failed to generate a profit in 1999 is more than enough to meet the demand from the smallholder sector. It would release 5,700 ha irrigated land from commercial farms, which is enough to create 24,000 smallholdings, increasing the existing number of smallholdings sevenfold. On these plots families would grow enough to reduce poverty by one-third for the 24,000 families. Having 24,000 families benefit rather than a few local elites will make a big difference to poverty alleviation.

Just at a time when the Republic of South Africa is thinking in terms of increasing jobs through irrigation, Tanzania is experimenting with privatising the rice-growing 'State Farm' in Mbarali to a few 'investors' and preparing to evict several hundred farmers who had moved into the former 'State Farm'. What makes it even more ironic is that Tanzania has emerged as Africa's leading producer of rice. Increasing yields of the smallholders by improved seeds, better water management and modest use of fertilisers would increase farmers' incomes and increase food security.

## The value of targeted research

This book shows the value of conducting independent, targeted research. It demonstrates that at the global level, international organisations have many

balancing acts to perform and these are not always in the interests of poor people. But water supply is big business estimated over the years to be worth over $700 billion! Solutions prescribed by the World Bank seldom work unless local factors and conditions are considered. Thus in Bangladesh, contrary to the conventional beliefs, the evolution of a private water market, including a *Proshika*'s irrigation programme, has benefited the poorer class and the multiplier effects have been considerable and diverse.

The strength of this book is that the authors approach the problem in a variety of ways. Even the three studies from South Africa are discrete and approach the issue from an ability to negotiate, evidence that small-scale irrigation farmers would benefit more than loss-making commercial farmers and (Schulz's interpretation) how the new policy caters to the well-being of the urban poor. It is necessary to document both positive and negative experiences in order to get the context right and to figure out whether the poor really benefit from improved water supply.

## Need to review policies

Water policies need to be periodically reviewed. In Nigeria, after three years of implementation, the government targets are far from being achieved. There is no visible progress in terms of increase in water supply or poverty alleviation. Therefore, it is imperative and urgent that a review and reinforcement of the existing strategy and policy framework be undertaken. In former apartheid South Africa, despite the World Bank pushing for marginal cost pricing, eradication of subsidies, and privatisation, the government has taken other measures. Policies during the apartheid regime heavily favoured the white commercial farmer. It is a question of distribution of the benefits from agriculture among large and smallholder farmers. One could either choose to collect revenue from big farmers in terms of tax and then redistribute or do an *a priori* distribution by enabling smallholders or promoting more smallholders to produce so as to effect equity in the distribution of benefits while collecting taxes from them.

One of the conclusions from the chapters is that a positive intervention to ensure the basic right to water is overwhelmingly worthwhile: water for the poor pays in many ways. However, given the propensity for outright corruption and for conflicts of interests – between politician/bureaucrats and public rights, between reasonable disbursement on real military needs and grossly inflated expenditures; between decent poverty alleviation measures and fraudulent government budgets – it would be naïve to assume that much can be expected even during the period apportioned for the achievement of the MDGs.

An increase in the demands and militancy of civic organisations on water issues, coupled with governments that are answerable to the people, would help to make water available to many more poor people. The price would still be modest and profoundly more beneficial than wasteful use of military hardware.

Despite the pessimism there is reason for hope. Hurricane Katrina, which hit the USA, was a wakeup call for all people with a conscience. It demonstrated how callous most bureaucracies can be (with a little bit of indifference from politicians) towards the majority of poor; how despite enormous wealth and massive technology at the government's disposal, the poor were essentially left to fend for themselves. But with several prime parts of England subsequently submerged under water, with the ferocity of recent floods in Bangladesh, India and Nepal, there is less need for debate and a more urgent requirement for a course of action to meet the challenge of the curse of water. We can no longer turn a blind eye to climate change and related water issues. Rich and poor nations alike will have to take a radical course of action. This more than anything else might be a turning point. Only then will we be able to join with Professor Asit Biswas, the laureate at the Stockholm Water Prize in 2006, in raising a toast 'to a water-secure world within our lifetime'.

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# About the contributors

**Ayodele Aderinwale** is the Executive Director of the Africa Leadership Forum. A political scientist and development professional, Mr Aderinwale has a rich history of consultancy and has consulted for major international agencies including the European Union, the International Institute for Democracy & Electoral Assistance, the United Nations Development Programme and the Canadian International Development Agency. He is a writer and motivational speaker. He has published series of books and academic papers on a variety of development and governance issues. His recent publications include *Nigeria and the Reconstruction of Social Capital* (2003), *Value, Ideology and Nation Building* (2003), *CSSDCA An African Agenda for Peace and Prosperity* (2002). Mr Aderinwale is currently the chairman of the Board of Directors of Business School Netherlands – Nigeria, as well as the chairman of the African Capacity Building Foundation (Parlianet) and a member of the Commonwealth Peoples Forum 2003 steering committee. Mr Aderinwale is also a close adviser and confidant of the President of the Federal Republic of Nigeria.

**Olumide A. Ajayi** is the Deputy Director and Chief of Programmes of Africa Leadership Forum. He is a development analyst and an economist. He previously worked for more than eight years in the Nigerian private sector as a senior executive. More recently he has undertaken research and consultancy services for the Commission of African Union and the Food and Agriculture Organisation (FAO) of the United Nations. He has over the years published several academic papers in different areas of development. His recent papers include: 'An Assessment of Government Incentives to SMEs in a Globalized

World' (2002), 'Re-invigorating Nigeria's Economy without the International Monetary Fund' (2002), 'Roles for Sub-Regional Organisations, Supra-Regional Organisations and the United Nations in the African Union' (2002), 'Gender Equality and the CSSDCA Process: Creating a New Framework of Engagement for African Women' (2003).

**Beatrice I. Conradie** is a senior lecturer in economics at the University of Cape Town, where she teaches microeconomics and environmental economics. She successfully defended a PhD dissertation on 'The Value of Water in the Fish-Sundays Scheme of the Eastern Cape, South Africa' at Colorado State University in the USA at the end of January 2002.

**Jaqui Goldin** has worked for many years in the field of survey research and poverty eradication. Over the past three years, her focus has been on networks and linkages and the ways in which social interactions constrain and inform development with a particular focus on the gap between policy and its practical implementation. She has a keen interest in mixed methodologies and in bridging the divide between quantitative and qualitative research methods, as well as in using research methods as tools for development. She works closely with government and NGOs as a development consultant using her research expertise in project evaluations and survey work. Goldin's doctoral thesis is a joint project between the University of Bergen's Department of Organisation Theory and the University of Cape Town's Department of Political Studies.

**David Hemson** is a research director at the HSRC (Human Sciences Research Council) and undertook his doctorate at the University of Warwick. He has lectured in history, African studies, sociology and social policy at the universities of Tanzania, Natal and Durban-Westville, respectively. He has directed the Social Policy Programme, an innovative postgraduate initiative to produce policy makers and administrators to meet the needs of post-apartheid society. Hemson has undertaken research and written on the evaluation of sustainable water delivery in rural areas, service delivery and public health, public–private partnerships and privatisation, industrial relations and labour markets, rural development and welfare policy, as well as maritime transport policies. He has worked as a trade union official and keeps up a keen interest in the labour movement and in the transformation of the huge inequalities in wealth, income and society generally in South Africa. He has a particular interest in the development of social organisations among the rural poor as a critical component of rural democracy.

**Kassim Kulindwa** is a senior research fellow and lecturer in economics at the Economic Research Bureau, University of Dar es Salaam. He was visiting researcher at CROP between September and December 2003. His publications include *Structural Adjustment and Sustainable Development in Tanzania* (DUP, 1995); 'Foreign Trade and the Environment in Tanzania' (*Utafiti Journal* 4, 1998–2001); *Economic Change, Governance & Natural Resource Wealth – Tanzania* with David Reed (Earthscan, 2001); 'Economics of Water Resources: Key Issues and Challenges' (*Tanzania Journal of Population Studies and Development* 7/1 and 2, 2000); *Global International Waters Assessment (Giwa) Scaling and Scoping Report Sub-region 47 – East African Rift Valley Lakes, Socio-Economic Dimension of Biodiversity Loss in Tanzania* (DUP, 2002); *Mining for Sustainable Development in Tanzania* (DUP, 2003).

**Haakon Lein** is an associate professor at the Department of Geography at the Norwegian University of Science and Technology (NTNU). His main research interest lies within the field of natural resource management and rural development, as well as climate change and disasters. He has since the 1990s been involved in research on the role of water in rural development in Bangladesh as well as water management reforms in Tanzania and China (Xingjiang). His latest publications include: 'Managing the Water of Kilimanjaro: Water, Peasants and Hydropower Development' (*GeoJournal* 61 (2004): 155–62), and (with Shen Yuling) 'Land and Water Resources Management Problems in Xinjiang Uygur Autonomous Region, China' (*Norwegian Journal of Geography* 59/3 (2005): 237–45).

**Adolfo Mascarenhas** was the first Tanzania director of the Bureau of Resource Assessment and Land Use Planning (BRALUP) and the founder director of the Institute of Resource Assessment at the University of Dar es Salaam. Since 1966 BRALUP has pioneered several research projects on water. In 1978–79 he was appointed as the first non-engineer consultant by UNICEF/WHO to draft the policy paper on *Water and Sanitation as Part of Primary Health Care*. On his return he was entrusted through BRALUP, by two donors, with the task of implementing the UNICEF/WHO policy in five regions in Tanzania. Professor Mascarenhas's major interest and publications have been in the field of natural resources, famines/disasters and regional planning. He has retired from the university and now works independently on environment and knowledge for developmental issues in Tanzania, Kenya, Uganda, Ethiopia and South Africa.

**Carl-Erik Schulz** is professor of economics at the University of Tromsø, Norway. He has previously been head of the Department of International

Economics at the Norwegian Institute of International Affairs. From 1995 to 2004 he was affiliated to the University of the Western Cape (UWC), South Africa. His recent research has concentrated on trade and ecology, and in recent years he has built the economics part of a master's degree in integrated water management at UWC, including studies in water and poverty.

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