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Understanding policy implementation:

An exploration of research areas in the water sector

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FOREWORD

This paper constitutes the first phase of a study of policy and its implementation in the water sector. The study, in turn, forms part of a major research project aimed at examining the gap between policy and implementation in South Africa, and identifying ways in which this can be closed. Case studies are being conducted in four sectors – education, justice, water, and health – and of three key policy instruments: the RDP, the Growth, Employment and Redistribution (GEAR) strategy, and the National Crime Prevention Strategy (NCPS). Finally, the findings of these studies will be synthesised and some general conclusions formulated.

The case studies are proceeding in two phases. During the first, researchers have undertaken preliminary research aimed at identifying the main issues in each sector or policy area and formulating research hypotheses. These will be examined and tested during the second phase, which will be marked by substantive, empirical research.

This paper has been divided into two parts: the first deals with the state of water resource management in South Africa, and the second with domestic water and sanitation supply.

Part 1

WATER RESOURCE MANAGEMENT IN SOUTH AFRICA

Tobias Schmitz

INTRODUCTION

Part 1 of this paper deals with water resource management in South Africa. It has two shortcomings: it does not deal with groundwater management, or with water quality. As a result, it cannot claim to be comprehensive; it is a partial sketch of trends. These omissions will be rectified during the second phase of this study.

Given the objective of the project to which this study contributes, this paper concentrates on issues surrounding governance rather than technical matters.

It is divided into three sections. The first reviews recent developments and key policy shifts in water resource management internationally. The second focuses on recent developments, key policy shifts, and emerging issues in South Africa. In the third, some conclusions are drawn in respect of directions taken in South African policy, against the backdrop of international experience.

RECENT DEVELOPMENTS IN INTERNATIONAL WATER RESOURCE MANAGEMENT

Looking back: an era of expansion

Levels of industrialisation and urbanisation can affect the national structure of water demand. Humanity first began to assert control over water when natural or manufactured objects such as calabashes, bladders, and clay pots began to be used to hold and store it. This storage was for domestic purposes and preceded the emergence of irrigation, which involved a much larger scale of water control. Irrigation, when interpreted as meaning stream diversion or lift irrigation (ie requiring considerable technological input for water control), first developed in Mesopotamia under the Sumerians, some 7 500 years ago, starting as a system of river diversion using gravity flow and later evolving into more complex systems. Since this time, irrigation has spread all over the world, and has formed the cornerstone of many civilisations.

The assumption is often made that Africa did not have extensive irrigation systems. This relates to the definition used, which excluded irrigation through the natural flooding of rivers. But less technologically intensive flood irrigation techniques also developed along African river floodplains; emphasis was more on climatological and agricultural expertise surrounding the planting and harvesting of appropriate mixes of plants in accordance with the natural rise and fall of water levels. These systems had less mechanisms of control over water than where furrows were dug and maintained or mechanical means of water transfer were developed, although the construction of earthen or stone bunds to maximise soil water retention was common, such as in Senegal.[1]

Overall, however, physical control over water increased throughout the centuries as new control systems were developed and adopted. For many centuries irrigation - a key manifestation of water control besides urban water management - remained highly la-

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1 See W M Adams, *Wasting the rain: rivers, people and planning in Africa*, London: Earthscan; 1992; and F Pearce, *The dammed: rivers, dams, and the coming world water crisis*, London: The Bodley Head, 1992.

bour-intensive, and this perhaps contributed to its slow growth. In the 20th century, it grew as never before. Postel[2] argues that the rapid global proliferation of irrigation schemes since the 1950s was given a boost by the ready access to oil derivatives on the world market in this period. This meant that the flexibility and power of water pumping technologies was greatly improved (replacing or adding to systems based on draught power, gravitation or human labour). In the wake of this and other developments such as the rapid expansion of dams, global land area under irrigation soared from 94 million hectares in 1950 to 253 million in 1993, producing one third of the world's harvest and making irrigation a cornerstone of world food security[3]. Looking at storage systems, there is an intimate link between the evolution of state-directed development interventions informed by Keynesian economics and the rapid expansion of dams throughout the world. The model often followed was that of the Tennessee Valley Authority, whereby dam building was followed by rapid irrigation development as an anti-poverty measure in the years of the Great Depression.

Alongside irrigation, water was needed for rapidly growing cities, and dams were built to satisfy this need. At the end of the 20th century, half the world's population live in urban areas[4], implying high concentrations of water demand in relatively small areas. In the wake of industrialisation, urban water demands began to grow rapidly and bulk supply systems to towns and cities to add to existing systems for irrigation. Industrialisation added problems of quality to those of quantity in water resource management, and both pollution control and purification technology became part and parcel of water management systems. Industrial effluents and agricultural chemicals which result from the industrialisation of agriculture have polluted surface waters and are beginning to pollute groundwater. Pollution requires expensive purification installations, raising the cost of water to users. Water bodies have traditionally been used as conduits for waste, but as economies grow so does the waste load; the capacity of the natural environment to purify and renew the resource becomes overstretched and pollution needs to be tackled. Within pollution categories, point-source pollution, released into a natural watercourse at an identifiable point, is easier to control than non-point-source pollution, released over a wide area. Typically industrial and municipal pollution results in point-source, agriculture and mining in non-point-source pollution.[5]

Beyond productive sources, household sewerage is a source of microbiological pollution of water that can damage health and reduce the ability of watercourses to sustain life if not properly treated. In many poorer countries urban infrastructure cannot cope with settlement pressures and microbiological contamination of watercourses can result.

As economies grew and diversified, so water demand for municipal and industrial purposes grew, and this was superimposed on existing demand for irrigation. In industrialised nations, industrial water use can account for 41—56 per cent of demand, and there are thus considerable deviations from an average whereby irrigation use accounts for

2 Sandra Postel, Water and agriculture, in F Gleick, *Water in crisis*, Oxford: Oxford University Press, 1993, 56.

3 Ibid.

4 M Falkenmark and G Lindh, *Water and economic development,* in Gleick, *Water in crisis*, 86.

5 L Nash, Water quality and health, in Gleick, *Water in crisis*, 25-37.

some 71 per cent and industrial use for some 21 per cent of global demand.[6] Table 1.1 below shows how the breakdown of sectoral demand differs from continent to continent.

Table 1.1: Sectoral breakdown of water demand for selected regions[7]
(percentage of total regional water demand accounted for by each economic sector)

Region	Agriculture	Industry	Domestic
North & Central America	49.7	41.0	9.3
Europe	32.2	56.0	11.6
Africa	89.4	5.0	5.6
Asia	87.5	6.9	5.6
South America	63.4	20.9	15.9

As economies grow and diversify, there is a growth in the dependence on reliable water supplies for food production, energy production (cooling and steam), waste transport, domestic applications, and so on. Water use becomes ingrained into the social fabric and the building and upkeep of man-made water systems become routine. This has institutional consequences. Both in the case of irrigation and of urban areas, man-made water control infrastructure is constructed to divert water from its natural setting into channels that would satisfy the various categories of human demand. This infrastructure requires construction and management, therefore as control over water grew, so institutions developed that were equipped with the skills to build water control schemes and to control and apportion the resource amongst various players in society. Water management became a profession, with various branches devoted to civil engineering, hydrology, financial management, and the like. A strong supply orientation prevailed, rooted in the control and subjugation orientation towards nature that came with the (European) Renaissance, and coupled to a strong presence of technical rather than social disciplines in water resources planning. The high capital costs of dams and other water control schemes required their justification within political programmes, and they thus became ideological tools, presented to the public as symbols of progress. But, since they were long-term investments in infrastructure, with time horizons of thirty years or more, the assessments of economic gains and social and environmental costs were of necessity experimental and could be strongly corrected by contingencies on implementation.

This supply orientation was enthusiastically exported to Africa in and immediately after the colonial era. This resulted in a strong expansion of irrigation in poor countries: Pearce[8] estimates that by the mid-191980s, public irrigation schemes in the third world

6 T Schmitz, Replumbing the third world: water and the environment, MA course reader, Catholic University of Nijmegen, 1996.

7 *Source*: J J Dohogne, 1994, 16.

8 Pearce, *The dammed*.

had absorbed some US $250 billion in aid transfers, resulting in 75 per cent of the world's irrigated farmland being located in poorer countries.

This had three main negative consequences. Firstly, local knowledge of the environment was rarely consulted in any depth by colonial developers and, later, aid officials, often being considered unscientific. Unfortunately for the development experts, much of this knowledge had developed over the years in response to first hand experiences of rainfall patterns and soil conditions. As a result, many projects floundered because of inaccurate assumptions about local conditions during project planning, and a general inaccuracy with respect to local community aspirations for livelihoods in the local natural environment. Secondly, the river basin planning projects introduced to Africa were direct transplants of models in rich countries and assumed a strong state able to provide inputs, extension workers and subsidies for an emerging agricultural export sector or one devoted to enhancing local food security. Water supply was only one input among a complex of interventions associated with the green revolution, that included the use of high yield variety seeds, pesticides and fertilisers, and general the introduction of industrial thinking to agricultural practises. All this happily assumed a complete revolution in rural productive thinking, and as a result many projects were overly optimistic and fell short of their targets. Thirdly, a theme taken up by the global environmental movement, dam building creates clearly identifiable sets of losers[9]. People residing downstream of a new dam may suffer setbacks as a result of reduced water availability and the removal of natural ebb and flood cycles. Pearce concurs, stating:

> The common image of irrigation making barren land fertile is wrong. Most land taken over for irrigation projects was cultivated before the engineers arrived ... Frequently, too, as in northern Nigeria, water diversions for large state irrigation schemes dry up productive land downstream.[10]

He even questions the net productiveness of irrigation relative to the system it replaces. He cites the influence of the Maga dam on the Logone river in Chad on the water tables of the Logone floodplain, the retreating shores of lake Chad, and the large Yaeres wetland some 250 kilometres downstream of the dam, coining the term 'hydrological drought' to describe the dam's effects. It has destroyed habitat downstream which provided resources for local residents, has dried up significant areas of pasture land, and has replaced recession agriculture with irrigation which has a phenomenal per ha capital cost.[11] In this view, therefore, dams alter the division of power within a region or a country because they alter the balance of access to basic productive resources.

On a more positive note, colonial and postcolonial investments in poor countries did provide infrastructure that created a base for investment and provided the state and/or parastatal organisations with a reliable source of revenue from the sale of water and/or

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9 Terry Cannon, Who controls water? Systems of power and the abuse of nature and people, in P Blaikie, T Cannon, I Davis, and B Wisner, *At risk: natural hazards, people's vulnerability, and disasters*, London: Routledge, 1994.

10 Pearce, *The dammed*, 183.

11 Pearce, *The dammed*, 167-175.

hydroelectricity. Often the construction of access roads were part and parcel of the construction of dams, and they improved farmers' and artisans' access to urban markets, stimulating surplus production.

In summary, this century has seen a rapid increase in global water infrastructure development that built on a more gradual growth in previous centuries. This was spurred on by industrialisation and the ready availability of fuel on the world market, which created new centres of water demand and provided both the technical means and the energy requirements for rerouting water - or what Fred Pearce[12] terms 'replumbing the planet' .

Reaching the limits of supply

Between 1945 and 1971, 8140 large dams (more than 15 metres high) were completed globally, bringing the global total to some 12 000 large dams.[13] By 1995 this figure had risen to 36 000.[14] If smaller dams are included, there are more than 100 000 on earth today. Every day, a further two large dams with a wall higher than 15 metres are being completed, and by the end of the twentieth century, some two thirds of the world's total stream flow are said to be controlled by dams.[15] As the most logical sites for dam construction progressively become occupied by dams, so the remaining possible sites become less favourable in social, environmental and economic terms.

There is a gradual process of elimination, through cost-benefit analyses, whereby suitable sites are selected and therefore less suitable ones remain. In consequence, the supply orientation is entering a phase in which the negative effects of dam building are rising and are calling the benefits into question. The social upheaval and organised opposition associated with the Narmada project in India and the Three Gorges Dam in China are examples of the rise in controversy over new megadam projects. This does not mean that water infrastructure development is grinding to a halt -- but there is a gradual reduction in the remaining options for supply augmentation.

On the other side of the equation, both population and economic growth are contributing to continued increases in demand for water. The world economy grew at an average rate of 3,1 per cent a year from 1980 to 1990, and an average of 2 per cent from 1990 to 1995. And the world population grew from 4 429 million in 1980 to 5 673 million in 1995.[16]

This means that while there is a fixed total supply of freshwater on earth, and many countries are moving towards the upper limits of local supply capacity, population and economic growth indicate that the demand for water is likely to continue to increase. Water scarcity can be defined as the condition that exists when local demand exceeds the available supply of fresh water. If options for supply augmentation are dwindling while

12 Peace, *The dammed*.

13 A van de Laar, *Water development for power and irrigation -- the environment and sustainable development*, Working paper series no 141, The Hague: Institute of Social Studies, 1993, 5, 6.

14 Rijkert Knoppers, *De keerzijde van de dam* (The other side of the dam), Utrecht: Van Arkel, 1995, 22.

15 Van de Laar, Water development for power and irrigation, 7.

16 World Bank, *World Development Report 1997*, Washington: IBRD, 221, 234.

demand is growing, clearly scarcity is on the increase. Unfortunately, however, it is not possible to gauge the rate of this increase properly because traditional approaches to water scarcity have used a scale that measures changes in per capita availability of water. This only measures availability in relation to population growth and not economic growth. The table below shows declines in *per capita* water availability per region.

Table 1.2: global percentage decline in per capita water availability per region, 1955--90

Region	Decline (%)
Latin America	55.1
Western Europe	17.1
Eastern Europe	25.2
Africa	59.3
Middle East	78.5
South Asia	54.8
Southeast Asia	54.4

Source: Figures calculated from UNEP, Global update on water availability, 1995.

These figures are based on a United Nations survey of water availability. As can be seen from the low figure in Western Europe, they reflect water availability as a measure of population growth, because population growth in Europe has been slow in the period from 1955 to 1990.

Table 1.3: Average annual global per capita water withdrawals per region / cubic metres per capita per annum

Withdrawal for domestic purposes		Withdrawal for productive purposes	
Low income countries	24	Low income countries	315
Middle income countries	58	Middle income countries	578 (302)
Upper middle income countries	76	Upper middle income countries	480
SA	47	SA	348
High income countries	141	High income countries	520

Source: figures calculated from World Bank (1997): World Development Report. Washington: IBRD

Table 1.2 above shows that the size of an economy significantly affects withdrawals for domestic and productive purposes. Both rise as the economy becomes richer. An aberrance shows up under the withdrawals by Middle Income Countries for productive purposes, but this is corrected when the Soviet Union and Eastern Europe are removed from the calculation (figures between brackets) .

Beyond this, the main significance of the table lies in its measurement of per capita water withdrawals. In doing so, it shows up the importance of economic rather than demographic indicators of scarcity: not only do per capita figures of withdrawal vary strongly between rich and poor countries, but it is overwhelmingly for economic rather than domestic purposes across the world. As a result, water scarcity measures should be based predominantly on economic rather than on population growth. This means that the figures of per capita decline in availability in table 1.1 should be corrected: in particular the declines of western and eastern Europe are completely off the mark (Eastern Europe shows the greatest per capita consumption of water in the world). Table 1.3 below shows that if water availability is calculated as a function of national economic product, the decline is much more dramatic than in demographic terms.

Table 1.4: Global percentage decline in water availability per region, 1960--82[17]

Region	% decline
Latin America	94.1
Western Europe	90.0
Eastern Europe	.....
Africa	92.8
Middle East	98.2
South Asia	81.6
Southeast Asia	96.6

Source: Figures calculated from World Bank, World development report, 1989.

At any rate, both tables 1.1 and 1.3 show a strong decline in water availability for most regions in the post-war era. When taken together with the rising pollution and costs of pollution of many rivers, there is evidence of a mounting crisis in supply for human consumption, for production, and for the maintenance of our natural environment. This has led to a critical re-examination of the ideas upon which water resource management was built in the years of the supply orientation. This process of review has produced a number of management responses in which the problems inherent in the supply orientation are dealt with in some measure. Three related clusters of response are presented in the next subsection of this paper, water demand management, integrated catchment management, and water harvesting.

Water demand management

The emergence of water demand management

The most direct and obvious way to counter emerging scarcity is to cut back on demand. The attempt to do this has led to the emergence of a new field of water demand management which, in the last few decades, and fuelled by scarcity, has begun to enter into the jargon of writings on water resource management. For instance, chapter 18 of Agenda 21, endorsed by participants of the UN Conference on the Environment and Development (UNCED) in 1992, recognised demand management as a central aspect of responding to growing world water scarcity and set out a series of demand management responses to be achieved by 2000. However, there is no fixed model of what water demand management actually entails: the concept exists but its precise content in policy terms is still unclear. For instance, according to Falkenmark and Lindh[18], water demand management in water

17 Expressed in terms of water availability per million dollars of GDP, 1960—82.

18 Falkenmark and Lindh, *Water and economic development,* 89.

scarce developing countries is crisis driven, and no satisfactory models for socio-economic growth under conditions of scarcity exist.

Water demand management seems to have begun with the management of quality: Postel[19] reports dramatic water efficiency gains in industry in Japan, the United States and the former West Germany in the wake of strict pollution control regulations in the 1970s. Japan managed to triple its industrial output per cubic metre of water input between 1965 and 1990, and Sweden achieved a fourfold increase in water productivity between the early 1960s and the late 1970s[20].

Demand management from a quantity point of view seems to have arisen a little later. Israel reached the upper limit of its supply capacity in 1991, igniting a debate between water demand management protagonists and proponents of the supply orientation who see value in recycling more wastewater[21]. Also, Ghezawi[22] reports the emergence of water demand management in Jordan , Egypt and Tunisia in recent years.

Thus water demand management is a new phenomenon, which is set to grow rapidly as supply options become less practicable. With what kinds of practises is it associated?

Water demand management practices

A review of the literature [23]seems to indicate that there are three interrelated *reasons* for the emergence of water demand management in any given area, and five main *instruments* through which it is implemented.

The first *cause* is water scarcity itself, which limits further supply options in a given area (such as a town), and therefore induces some thought on measures to reduce demand. The second *cause* (related to scarcity) is the rising cost of supply options. This can mean either the cost of the next supply augmentation scheme, or of upgrading water purification works (less water used means less purification needed before release into natural systems, and downstream users, environmental groups or government regulations may be pressing upstream users to maintain quality). The third *cause* is environmental decline: a supply area may be induced to reduce its demand to maintain basic ecological functions of a given habitat by restoring or not further reducing its water bulk. Pressure on decision

19 S Postel, *The last oasis: facing water scarcity*, London: Earthfscan, 1992, 136-45.

20 Ibid, 138-9.

21 Falkenmark and Lindh, *Water and economic development,* 82.

22 Ali Ghezawi, Water demand management networking in the Middle East and North Africa, in D Brooks, E Rached, and M Saade, *Management of water demand in Africa and the Middle East*, Ottawa/Johannesburg: International Development Research Centre (IDRC), 1997, 15-7.

23 Drawn from L Forde, Water demand management and conservation, Water Supply and Sanitation Collaborative Council of the World Water Forum, http://www.wsscc.org/wg_conservation.html, 1997; also S Postel, E Rached and M Saade, Management of water demand in Africa and the Middle East, Ottawa/Johannesburg: International Development Research Centre (IDRC), 1997; DWAF, Water conservation and demand management national strategy framework, Pretoria: DWAF, 1999; World Bank, Country experiences with water resources management -- economic, institutional, technological, and environmental issues.

makers from environmental groups may assist in allowing a decision in favour of water demand management rather than pursuing further supply options, if these still exist.

There are five types of policy *instrument* which can assist a given area in implementing demand management: pricing, education, technology, environmental management and regulation.

Pricing is a much-debated demand management tool. In economic terms, the intention is to raise the price and thus reduce demand. The reason provided (by Geoffrey Stiles) for pricing as a demand management tool is that water is 'generally underpriced relative to its intrinsic and economic values'[24]. Beyond this, it is often provided at low bulk prices, which puts a premium on high consumption. Water pricing for demand management should make consumers pay in proportion to volumes used[25] -- Easter notes that 'without adequate water charges to cover operation and maintenance costs plus the costs of the original investment, the rest of the society is subsidising those receiving the water'[26]. But subsidising water supplies to a sector in society is common and is implemented in line with government targets for economic development or equit0y. Subsidising supply to an area must be separated from the rising scarcity of water which necessitates gradual introduction of pricing mechanisms in areas where it was free or cheap. In the latter case pricing may be applied for demand management while in the former it need not be: subsidised delivery to some can coexist with scarcity if that coincides with the society's perception of optimality. Water pricing is also contentious, as it can be regarded culturally as a common good which is not for sale. Maclean and Voss declare that 'many arid and semi-arid countries remain reluctant to endorse it because water is so essential for life itself that it is not treated as a commodity'[27]. Thus the very scarcity of water, in this view, contributes to resistance to its commodification through pricing.

Education is an important tool in demand management: raising public awareness of water scarcity is a precondition to encouraging change. Therefore many water demand management strategies include public awareness campaigns, which focus on technologies and tips for demand reduction, at the household level but also on irrigated farmland. According to Forde[28], investments in public education yield very high returns in water demand reduction.

Technology offers a partial return to the engineering discipline in water resources management which dominated during the supply orientation, but cannot be implemented in isolation from other aspects of demand management if it is to succeed: the perceived need for water efficient technology is linked to public awareness of water scarcity. In the urban demand centres, demand is often reduced by encouraging (or enforcing) the retrofitting[29] of household and office appliances. Examples are toilets with small flush cisterns

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24 Stiles, in Rached et al, 3; see also Postel, *The last oasis: facing water scarcity*, 165-82.

25 From Forde, 1997, 1.

26 Ester, in World Bank 1992, 11.

27 In Rached et al, 43.

28 See Forde, 1997, 3.

29 Retrofitting means the replacement in existing buildings of the original technology by modern, more efficient, technology.

and low-flow showerheads. In irrigation, land levelling can produce spectacular results in raising water use efficiency, but farmer education is a prerequisite. Other methods are surge irrigation, low energy precision application and drip irrigation, which can be further enhanced when used with soil moisture monitoring[30]. In industry, wastewater recycling technologies provide ways to reduce throughput.

Environmental management is a curious but valid method. The underlying philosophy is that changes in land use practises will lead to changes in water supplies in a given catchment. An example can be taken from South Africa, where environmental management is fast becoming part and parcel of water demand management: the Working for Water Campaign of the Department of Water Affairs and Forestry generates employment through the removal of non-indigenous vegetation in catchments. This reduction in 'non-indigenous demand' releases runoff into channels downstream. And limitations placed on afforestation in various catchments around the country are in place because of the (detrimental) effects of forests on runoff.

Regulation assumes the ability of a government to intervene in water uses. If a public authority is unable to control water abstractions in excess of collectively agreed quantities, and cannot implement appropriate disincentives such as fines for infringements, water demand management cannot be properly implemented. A water right, according to Hoogendam, is an 'authorised claim to a benefit stream of a water resource'[31]; it expresses a social relation embedded in relations of power and authority. Different groups may make claims to the same water resource using different normative frameworks. If the technology does not exist, there is no labour to operate it, there are no concrete rules for distribution, or no labour to distribute water and implement the rules, water rights cannot operate.[32] Therefore reducing demand is difficult without efforts to ensure its legitimacy, the technology it requires, concrete rules about who must reduce consumption by how much, and above all in government's case without the staff to implement change.

Part of the regulation of water use is the question of the efficiency of a particular allocation of water in society. Different allocations across economic sectors lead to different outcomes as the economic return per unit utilised varies between sectors. But changing water allocations has an associated social cost, quite apart from the fact that economic sectors cannot simply be done away with because their value added per unit of water is less than another sector's.

Linked to allocations is the concept of 'virtual water', the water transfers involved in trans-boundary movements of goods and services. Local demand can be reduced by importing water-intensive goods and services from other countries: to grow an adequate diet for a human being for a year requires some 300 tonnes of water.[33] There are therefore large water gains to be had from the importation of food from water-rich countries.

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30 See Postel in Gleick, 1993, 61-62.

31 P Hoogendam, Water rights: interaction in a normative domain, University of Wageningen, 1995, In P Mollinga, Irrigation and development: reader for K200-310, University of Wageningen, 1996, 4.

32 See Hogendam, 1995.

33 R Clarke, *Water: the international crisis*, London: Earthscan, 1993, 3.

Integrated water resources management

The evolution and spread of catchment-based approaches to water resources management is intimately related to the development of global water scarcity. The supply orientation generally did not involve planning at the level of the catchment as a whole, and water resource developments were discrete and localised interventions. But as water became scarce and more polluted, it became progressively more important to know where developments were situated relative to each other, as one could strongly affect the performance of another. Integrated planning of water resources at the catchment level therefore became more and more necessary.

The protection of the quality and supply of freshwater resources was discussed at the UNCED conference in Rio de Janeiro in 1992, and chapter 18 of Agenda 21 that emerged from UNCED is devoted to this topic. Of the seven programmes proposed for the water sector, the first is integrated water resources management. Section 18.3 of agenda 21 states that:

> The widespread scarcity, gradual destruction and aggravated pollution of freshwater resources in many world regions, along with the progressive encroachment of incompatible activities, demand integrated water resources planning and management. Such integration must cover all types of interrelated freshwater bodies, including both surface water and groundwater, and duly consider water quantity and quality aspects. The multisectoral nature of water resources development in the context of socio-economic development must be recognised, as well as the multi-interest utilisation of water resources for water supply and sanitation, agriculture, industry, urban development, hydropower generation, inland fisheries, transportation… and other activities.[34]

The widespread endorsement of this perspective is a testimony to the growth of integrated water resources management as a philosophy. Integrated Water Resource Management (IWRM) could be summarised as the attempt to replace existing (politically determined) water resource management areas by (naturally determined) catchment areas. It necessitates planning at the level of catchment areas that is integrated in the sense of scientific interdisciplinarity appraisal, full public participation, and temporal flexibility. The components of IWRM are explained below .

Firstly, it stems from the idea that water resources can only be managed sensibly and effectively at the level of the hydrological cycle. It is at the level of the river basin that atmospheric water, surface water, groundwater, estuaries and coastlines are connected. Water falls onto the land in a catchment as precipitation, and collects and flows over and under the land towards a single point of convergence, which can be the confluence with a larger river basin, or with the sea. The water flowing through a catchment can flow through and across land that has many uses. Therefore, any impact of land on water in one location can be transmitted to another: pollution picked up in an urban environment can be transmitted to a lower-lying wetland, and abstraction of water for farming can

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34 UNCED: Agenda 21, chapter 18: Freshwater resources. www.un.org / esa / sustdev / agenda21 chapter18.html.

reduce flow downstream. Water resource planning at a level below that of the catchment may be impacted on by developments upstream, and will in turn impact on human and environmental users downstream. Where water is abundant, abstractions upstream will not significantly affect users downstream, and pollution upstream will be diluted so that the impact on users downstream is lessened. But where water becomes scarce, abstraction by users upstream will adversely affect the production capacity of human and biological users downstream, and pollution upstream will similarly negatively affect downstream. Therefore, the catchment is a natural unit for water resources planning under conditions of scarcity as it integrates all localised impacts on water resources in a catchment into a catchment management plan. In practise, some catchments have been artificially connected through interbasin transfer schemes such as the Lesotho Highlands Water Project, and in these cases catchments are no longer the natural unit for planning.

Secondly, IWRM attempts to take account of all aspects of the complex physical and ecological system within a catchment, including human effects, in planning. Catchments varied habitats, each of which have their own localised ecosystems. Also, catchments harbour different kinds of human activity, from farming to mining and urban development. The attempt to integrate all these systems into a plan at catchment level requires many kinds of knowledge: biology, geography, chemistry, or town planning. Therefore, planning must be interdisciplinary so that decisions relevant to the environment are based on considerations that are as comprehensive as possible.

Thirdly, planning should be participatory and planning teams should be accountable so that detailed information about the environment and grassroots activities or impacts are accounted for in plans at higher levels. Typically, catchment management authorities function as a small core of specialists interacting with stakeholder forums which allow input from a wide variety of sources. Leadership is vested in the administration of the authority, but should be supportive and consultative rather than regulative and top-down. This encourages users to utilise resources in a sustainable manner. Catchment management plans are established on the basis of consensus among stakeholders and within government.

Lastly, catchment management plans need to be flexible and adaptive to take account of the continuous changes in the human and natural environments.[35]

Problems in integrated water resources management

While the principles underlying IWRM are relatively straightforward, several clear problems need to be overcome for its effective implementation. Mitchell[36] mentions that progress in implementing IWRM has been hesitant and unsystematic, and that as a result

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35 This section draws on B Mitchell (ed), *Integrated water management: international experiences and perspectives*, New York: Belhaven Press, 1990; P Ashton, *The philosophy and practise of integrated catchment management: implications for water resources management in South Africa,* Pretoria: Water Research Commission, 1996, 1-6; T Schmitz and P Ashton, *Equity and integrated water resource management in South Africa: ensuring equity and access for poorer communities in the establishment of catchment management agencies*, Pretoria: Department of Water Affairs and Forestry, 1998, 10-12.

36 See Mitchell, 1990, 3.

many practitioners in the field have adopted an incremental approach. What are the main obstacles?

Firstly, there are serious political obstacles to managing water resources on a catchment basis since catchments cross-cut international, provincial and local authority borders. Shifting the boundaries of political jurisdiction from established patterns and towards a new one generally meets resistance from bureaucrats and politicians. Therefore, in practise, IWRM involves some form of compromise between spatial management structures. In trans-boundary water resource management, river basin management institutions are often hollow, having highly technical tasks and very little political clout. In South African catchment management, representatives of the various regions through which a river flows sit together on catchment management fora: an inclusive strategy is used to create collusion.

Secondly, the goal of integration is scientifically sound, but choices must still be made that restrict the potentially huge amount of data that could be considered relevant to catchment management. As with the integrated rural development programmes initiated throughout the poor countries in the 1970s, an attempt is made to relate everything to everything in a management plan, and this carries the real danger that complexity impeded implementation. Both Ashton and Mitchell[37] testify to this complexity, and Mitchell emphasises the need for scoping and focusing in IWRM.

Thirdly, IWRM is a compromised form of integrated catchment management (ICM), the attempt to manage all environmental resources in the geographical unit of the catchment, based on the idea that habitats and ecosystems in it are interlinked and should therefore be managed as one whole[38]. However, integrated catchment management is an ideal difficult to realise in practise. Firstly, the functioning of ecosystems is still not well understood, so that their proper 'management' [39] cannot but be based on speculation. Secondly, management of natural resources is often functionally divided between land, water, forestry, wetlands and the like. De facto integration of all these institutions is a daunting and politically sensitive task[40] given the political obstacles to IWRM mentioned above. Often, therefore, a lead agency is identified to manage the integration effort or, as in South Africa, an incremental strategy is followed whereby IWRM is commenced with the intention to later broaden out into ICM.

IWRM, therefore, faces several obstacles. But the attractive logic of integrated planning at catchment level has led to many attempts to introduce it despite the apparent obstacles: IWRM systems are in operation in Australia, Canada, England, Japan, Namibia, Nigeria, Poland, the United States and Zimbabwe[41].

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37 See Ashton, 1996; Mitchell, 1990.

38 Fuggle & Rabie, Environmental management in South Africa, Cape Town: Juta, 1992, 315.

39 Ecosystems in fact manage themselves, but nowadays human intervention is often neccessary to retain them because of excessive encroachment, fragmentation, pollution, etc.

40 T Schmitz, Current boundaries among line departments need to be transcended, *Synopsis* 3(3), 1999.

41 See Ashton, 1996; Mitchell, 1990.

Water harvesting

Both water demand management and integrated catchment management are responses to scarcity generally associated with national policies, although they can be implemented at the level of individual catchments or, in the case of demand management, at the micro level. Water harvesting, on the other hand, is strongly associated with grassroots control over water and, although it is known to have had state support in the past, it can be implemented very well just on the strength of resources available in the local household, farm or village.

Fundamentally, both integrated catchment management and water demand management focus on the use of surface water and groundwater. They focus on water that nature has collected into sites that can be developed, such as underground aquifers or existing river channels. All water that evaporates or becomes soil moisture is thus wasted.[42] Water harvesting, by contrast, focuses on rainwater and floodwater. Table 1.5 shows the potential of water harvesting techniques compared to catchment and demand management.

Table 1.5: Global freshwater flows over / through landmass
(*thousands of km³ / year)*

Source	Volume / percentage of total
Precipitation	119/100%
Evaporation	72/60%
Runoff	45/38%
Groundwater	2/2%

Source: adapted from Middleton, 1995, 7.

The table shows that current water resource development focuses only on runoff and groundwater, a mere 40 per cent of available freshwater. Water harvesting attempts to access all available precipitation.

An example is given by Agarwal[43] of an ancient Indian military fort, built on a hill, with no sources of groundwater or surface water nearby. Yet it had water which sustained 50 000 people, based on the ancient *kund* traditions. Kundis are artificial catchments whereby a local microcatchment is built or a natural microcatchment developed, by lining it with concrete, creating a bowl with a channel in the centre, leading to a well covered by a dome to prevent pollution and evaporation.

These traditions existed all over India but fell into disrepair under colonialism. They are currently being vigorously re-established. Other initiatives are known to exist in

42 A Agarwal, Introductory speech to the (Indian) national conference on the potential of rainwater harvesting: traditions, technologies, policies, and social mobilisation, 1998, www.oneworld.org / cse/html / extra/twhsanil.htm.

43 Ibid.

Germany, Israel, Japan, Kenya, Nepal, Sri Lanka, the United States, and Zimbabwe[44]. Despite the current groundswell towards water harvesting, however, the movement is still in its infancy. Water harvesting is a powerful tool for water resource management in the interest of sustainability and equity, which can exist even without state support. It can raise drinking water and productive water availability all over the world at low cost, and in the light of the current global water crisis it merits considerable attention, which it is unfortunately not receiving.

RECENT DEVELOPMENTS IN SOUTH AFRICAN WATER RESOURCE MANAGEMENT

In section one, recent developments in international water resource management were treated in broad brushstrokes. In an era of globalisation, world events have a strong bearing on local developments. Local policies are informed by international policy developments, and by the world climate in which policy making occurs. Section two therefore looks at developments in South African water resource management against the background of the global movement sketched above, involving a move from the supply orientation and towards new management options in the face of increasing scarcity and pollution of water.

South Africa's age of infrastructure expansion

Very little is known about precolonial traditions in water resource management in South Africa. However, this does not mean that these traditions did not exist - it merely means that there is very little research on the topic. Research by Jacobs[45] and Khorrombi [46] shows the existence of traditions of water resource management that predate colonialism, but colonialism rode roughshod over them and imposed forms of natural resource management that were developed in and were appropriate to Europe rather than South Africa.

Because of the highly capital intensive nature of water resources development, state controlled infrastructure development has dominated throughout South African history, although private development certainly did occur. Shortages of water have manifested themselves from the earliest colonial developments onwards, and water resource development has therefore responded to recurrent crises in supply. The variability and relative aridity of the country's climate imposed continuous restrictions on local development opportunities unless the means could be found to augment water supplies which provided an important precondition for economic development.

The first civil engineering contract for water resource development was in 1670 for the construction of an aqueduct from Van Riebeeck's reservoir to the Jetty at Table Bay

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44 See session 6 of the Centre for Science and the Environment's conference on the potential of rainwater harvesting, New Delhi, 3-5/10/98.

45 Nancy Jacobs, Correspondence on research on the environment, production, and social difference in the Kalahari in the 19th century, 1999; See also *Journal of Southern African Studies,* 25(3), September 1999.

46 K Khorrombi, Correspondence on master's thesis, Venda traditions in water resources management, 1999.

[47]. Initial developments were financed by the Dutch East India Company and later taken over by the Departments of Irrigation of Transvaal and Cape Administrations in 1904. Until the late 19th century, however, the Cape Administration neither had the interest nor the resources to develop infrastructure in the interior. It was only with the declaration of Union in 1910 and the sudden rise in investment in the interior that came with the discovery of gold and diamonds, that state directed infrastructure development began in earnest. The Department of Irrigation came into being in 1912 with the Irrigation and Conservation of Waters Act, and one of its main goals was the construction of impoundments for the development of irrigation. This was hampered by the First World War but accelerated after 1918, such that by 1945 there were 53 government dams across the country[48]. This development was a double-edged sword. It was social in character for destitute whites such as soldiers returning from the war, who were settled on irrigation plots or put to work on the construction of labour intensive irrigation schemes. It was highly destructive for black farmers settled in areas served by dams, who were evicted in the wake of the 1913 Land Act and resettled on dryer, less fertile, land. Riparian law, introduced into South Africa through British interpretations of Roman-Dutch law, related control over water to ownership of land adjacent to water sources. This set in motion a key element of monopoly capitalism in South Africa whereby the intensive concentration of land ownership in the hands of a small group of white commercial farmers was matched by their effective control over much of the national water bulk (Forster[49] puts it at about 65 per cent) backed by a national department whose key brief was to support irrigation rather than other economic developments. Apartheid, as Turton states, was about state directed resource capture and, in terms of water, institutionalising a particular hydropolitical privilege.[50] The aridity and unproductiveness of the 'homelands', with the forced removal of black South Africans to these resource poor areas, was a key feature of apartheid. In essence, the supply orientation, in the specific manifestation of its rooting in South African soil, was internally generated rather than externally imposed. This makes it an exception on the African continent.

The South African economy was destined rapidly to grow in a direction not envisaged by the institutional arrangements of the Irrigation and Conservation of Waters Act. The rapid growth of mining and the concomitant growth of concentrated urban demand in the semi-arid interior created a new logic of water resource development that soon required a new water law. For instance, new water demand centres were not necessarily adjacent to watercourses, and yet riparian law disadvantaged non-riparians in their access to water, the water courts only allocating to non-riparians if all riparian needs had been satisfied. Thus for instance the continuous crisis in water supply on the Witwatersrand - gold was discovered far from significant water sources - could only be solved by pumping water up from the Vaal River 48 kilometres away, but the appeals by Rand Water officials to

47 DWAF, Overview of water resources availability and utilisation in South Africa, Pretoria, 1997.

48 DWAF, Management of the water resources of South Africa, Pretoria, 1986.

49 S Forster, Critical water issues affecting rural development in South Africa, Johannesburg: Land and Agricultural Policy Centre, 1994.

50 Private correspondence, 1999.

the Department of Irrigation to obtain rights to this water fell on deaf ears as downstream riparian farmers were given preferential treatment[51]. A need grew for a law in which the water demand of municipalities, mining and industry were no longer subservient to the needs of agriculture. Also, private control over water had led to the development of excessive groundwater abstractions or impoundments in some areas, and more state control over the resource was needed. Lastly, water quality began to become an issue, and thus water quality legislation needed to be introduced.

In 1956 a new Water Act was promulgated, and the name of the Department of Irrigation was changed to the more neutral Water Affairs, serving a by now industrialised and diversified economy as a whole rather than agriculture alone. The access rights to water of non-riparians, and in particular those of local authorities, were significantly improved[52]. Any use of water for industrial purposes contained the requirement that purification was an integral part of its usage and that water should be returned to natural watercourses in a condition conforming to quality standards set by the minister[53]. Unfortunately, however, this potentially helpful article was severely hobbled by a lack of clear statements in the law on retributions for non-compliance, and for many years water quality managers had to rely principally on moral pressure on producers to somewhat contain pollution levels. South Africa's 'hydraulic mission' tolerated pollution to create the necessary space for the expansion of the mining industry and the emergence of a go-it-alone, coal-based, energy strategy.

In terms of quantity, government water control areas could be declared in areas considered in danger of overabstraction, and limits were placed on the size of dams on private property, to allow more water to flow to downstream recipients[54]. Although adapted many times to changing conditions, the 1956 Water Act remained in place during the entire apartheid era and was only overhauled with the emergence of democracy.

As the economy and population grew, demand grew exponentially, and the development of infrastructure grew exponentially with it. Table 2.1 below summarises this.

Table 2.1: expansion of dams in South Africa, 1889 - 1986

Period	Dams constructed	Storage capacity added (million m³)
1889--99	2	6.46
1900--9	8	16.28
1910--19	12	76.95
1920--9	19	39.24
1930 --9	21	31.02
1940--9	20	59.90

51 Taken from Rand Water Board annual reports for 1913 and 1914.

52 See articles 12 and 13(1) of the 1956 act.

53 See article 21(1)(a) of the 1956 act.

54 See articles 16(1)(a) and (b) and 28(1)) of the 1956 act.

1950--9	71	491.81
1960--9	89	362.60
1970--9	104	14480.79
1980--6	109	12132.99

Source: calculated from DWAF 1986: annex.

The table shows a 'messy' approximation of an exponential growth in dam construction in South Africa between 1889 and 1986. By 1997 the Department of Water Affairs and Forestry could claim its disposal over a storage capacity of 27 000 million cubic metres, holding more than 50 per cent of the mean annual runoff[55]. It is estimated that a further 13 250 million cubic metres could be developed inside the country. However, table 2.1 shows that at the existing pace of development this will take at most a decade to accomplish before full supply capacity will have been reached. Looking to foreign sources of water, the Lesotho Highlands Water Project could provide a further 6 500 million cubic metres of storage, of which 1 950 million cubic metres is already being used[56].

Reaching the limits of supply in South Africa

Like other countries, South Africa has enthusiastically embraced the supply orientation for most of its water management history. In keeping with world trends, as the most logical sites for dam construction in South Africa have progressively become occupied by dams, so the remaining possible sites have become less favourable in social, environmental and economic terms. To take the example of the largest recent development in infrastructure expansion, the Lesotho Highlands Water Project, both social and environmental issues associated with it have been taken up as concerns by local and international lobby groups. The social costs of the dams have included loss of livelihoods with inadequate compensation for some 20 000 dispossessed villagers in the Maluti mountains. The environmental consequences have included increased soil erosion in the Ash river as a result of the decanting of impounded water into this tributary of the Vaal, using it as a conduit of water to the Vaal dam.

On the economic front, continued and uncritical expansion of supply infrastructure has met criticism from the water boards, who point to large losses through leakages in municipal areas and question the utility of large infrastructural works when proper management could substantially bring down consumption and negate or postpone the need for new infrastructure[57]. South Africa's pre-1994 state machinery was technocratic and hostile to notions of public consultation such as on infrastructural works, so that the negative social consequences of dams were not subjected to scrutiny, as they would be in a

55 See DWAF, 1997, 9.

56 Joint Permanent Technical Commission, *The Lesotho Highlands water project*, Maseru, Lesotho: JPTC, 1991.

57 From an interview with Constantinidis, 1994.

democratic culture. The typical discurive elites during the supply orientation phase were white Afrikaner male engineers, producing a mindset on water delivery that was biased in terms of race, ethnicity, gender and even scientific orientation. Some attempts have been made after 1994 to set this record straight before moving forward, such as through the Southern African Hearings for Communities Affected by Large Dams. And current departmental policies are set to broaden out from the existing discursive elite to stakeholder-based consultations on water management, in which cutting back on demand and on pollution will be major issues.

In political terms, the current DWAF was built on a ministry in which the construction of new infrastructure was the order of the day, and the careers of many civil servants were and still are associated with the supply orientation. It cannot therefore be expected that this orientation will disappear tomorrow, however, it is interesting to note that as new management options and structures (such as the directorate of demand management) enter the department, so internal contradictions will begin to appear in the ministry. Also, issues of redeployment of personnel into new functions can be expected to become more and more pertinent.

Nevertheless, water scarcity is mounting in South Africa, as it is everywhere else. Table 2.2 below shows some of the vital statistics against the background of international developments.

Table 2.2: percentage decline of water availability in South Africa in the global context

Region/country	per capita decline, 1955–90	decline per unit of economic product, 196082
South Africa	62.2[58]	59.7[59]
Africa	59.3	92.8
Western Europe	17.1	90.0

Compiled from Central Statistical Service 1997, United Nations population and environmental programme's 1995 update on water availability, IBRD World Development Report 1997.

What do these figures mean? Section one expressed some scepticism of a scale of water scarcity based on population growth alone. This shows up again in the table: the per capita decline in water availability between 1955 and 1990 was slightly higher than the African average, and this simply means that the rate of growth of the population is slightly higher than the African average (and of course much higher than the average in Western Europe). Nevertheless, there is 62,2 per cent less water per person in South Africa than there in 1955 - indicating a strong reduction in water availability.

Overall, then, there has been an exponential increase in water storage capacity in South Africa in the 20th century, while remaining room for expansion is fairly limited. Also, both in terms of population and economic growth, the same water bulk has to be spread over an increasing number of individuals and economic actors. Taken together, South Africa can be seen to be crossing a threshold from an era of supply orientation to one of critical re-examination of this philosophy. This change is resulting in the emergence of new ideas and practises on water resource management. The country is in the unique position that this emerging scarcity takes place as all laws and public management systems are under review in the attempt to shake off the legacy of apartheid. The process of reformulating water law is fundamentally informed by scarcity, and most of the 28 principles on which the new water law is based relate in some way to the need to address rising scarcity of water in quantity or quality. If properly managed, the country is therefore in a position to take a quantum leap into new forms of water management. The sections below review the progress on water demand management, integrated catchment management and water harvesting.

58 Based on a population estimate for South Africa of 14 million in 1955 and 37 million in 1995; see Central Statistical Service, 1997, 1.1, 1.2.

59 At 1990 prices.

New policies: transforming a legacy in South African water resource management

This background depicts some of the history of South African water resource management, sketching the legacy which the democratically elected government in 1994 faced. It also hints at the constraints that transformation would throw up: water resources were locked into the service of an advantaged minority while a huge proportion of the population remained unserved even for its domestic water needs. At the same time DWAF was an institution focussed on engineering and supply augmentation, whereas demand management was becoming more and more necessary.

The new Department of Water Affairs and Forestry came into existence by Presidential proclamation on 1 July 1994[60]. The scale of the transformation it faced was huge. It integrated the eleven water affairs and forestry related administrative units that were the result of apartheid's separate development policy; its budget was thus trebled while the personnel count rose from 7 000 to some 35 000 people[61].

DWAF departed in a fundamental manner from its previous policies. The first and most radical of its policy shifts was the introduction of policy on third tier water management (responsibility for retail water and sanitation service delivery to households). The systematic lack of access to reliable sources water of an estimated 12 million people[62] was given top priority, and the department was given disposal over a considerably larger budget than it had commanded in the apartheid period, from 1,28 per cent to 2,24 per cent of the national budget[63]. The department had a large staff contingent with expertise in first tier water management but little capacity in the new field of third tier water management. This placed pressure on its capacity to deliver water services on the kind of scale required to address the existing backlog, and forced partnerships with a broad range of organisations to ensure service delivery[64].

The second policy shift was in water resource management. Existing expertise was focussed on the supply orientation, and therefore new competencies had to be created to address demand and catchment management, in which engineering was merely a role player in more holistic management approaches that addressed a broad range of issues including the socio-economic and environmental arenas. To all intents and purposes, these new functions were add-ons to the existing structure and introduced new policy direction in the department without necessarily getting rid of the old directions, for instance through commencing a scaling down of infrastructure supply.

A key cultural element in the department was a commitment to move at speed with the policy and delivery process while not necessarily having all the available data, per-

60 See DWAF, White paper on water supply and sanitation policy, 1994, 2.

61 K Clement and T Schmitz, Input paper on water supply and sanitation (to the national poverty and inequality study, Johannesburg: Land and Agricultural Policy Centre, 1997, 17.

62 This figure was later changed from 12 million to 18 million, indicating the kinds of data uncertainities with which the new government had to cope.

63 See T Schmitz, *Rethinking delivery?: a review of the efforts of the Department of Water Afairs, 1994-9,* CPS policy brief no 16, Johannesburg, 1999.

64 Ibid.

sonnel, or a clear view of the divisions of tasks. Thus amid all the confusion of transformation, policy vacuums and uncertainties on redeployments of staff and changes in functional divisions, there was an overriding commitment to ensure that staff rise above this and create increasing momentum in a new direction. This was referred to as the '80 over 20' policy, that margins of 20 per cent error would be accepted as long as processes could move at speed. This intangible 'vibe' was the key to current perceptions of the success of the department under Kader Asmal between 1994 and 1999.

Three white papers have emanated from the department since 1994. In the first cabinet period considerable emphasis was given to water services delivery, while in the second the profile of catchment management, for instance, was raised to second position: the department developed policy on water resource management after that on water services delivery had been developed, and they now co-exist as the dual pillars of DWAF policy. The three white papers are:

- Water Supply and Sanitation White paper (1994);
- National Sanitation Policy White paper (1996);
- White Paper in a National Water Policy for South Africa (1997).

The third white paper set the policy for water resource management in the new South Africa. It deals with national management of the resource: it is concerned with resource management and conservation, catchment management, water allocations, demand management, and the institutional environment required to implement the new policy. It places strong emphasis both on redressing the imbalances created by apartheid in access to water (an equity focus), and on placing demands on management relating to sustainable resource use (a sustainability focus). An example is the concept of the 'Reserve': this translates into the attempt to quantify an amount of minimum flow in rivers and impoundments that can be reserved for maintaining basic ecological functions (such as habitat for fish and plants) and to ensure that the population is guaranteed a minimum of 25 litres per capita per day for domestic purposes[65].

The 1997 white paper advocates water tenure reform: it replaces riparian law with a system in which the state will issue water use licenses that have restricted validity. A prime motivation for this is scarcity of water and the consequent need to ensure optimal use and allocation of water over the economic sectors at all times. But it also motivated by equity considerations. The white paper mentions three components of equity: in *access to water services* (connection to the tap and sanitation services are basic rights), in *access to water resources* (equitable access to productive uses of water), and in *access to benefits from the use of water resources* (water should be used in a way beneficial to the whole of society). Only the first was operationalised and quantified in law; the meaning given to equity in water provision therefore shrunk somewhat between the writing of the White paper in 1997 and the promulgation of the new Water Act in 1998.[66]

The White paper on a national water policy for South Africa was a crucial stage in the so-called water law review process – a process of public consultation that eventually led to promulgation of the Water Act. In 1995 the department published a document entitled

65 Drawn from a draft dissertation on water management in South Africa by T Schmitz.

66 Ibid.

'you and your water rights', calling for public input into the reform of the 1956 Water Act. A review panel synthesised the resulting comments and ideas into 27 key principles on which the new water law was to be based. These principles were in turn published and distributed for public consultation, resulting finally in a water law review conference in October 1996. This process resulted in 28 principles which were approved by Cabinet, and which formed the pillars on which drafting panels were to write the 1997 White Paper and the subsequent Water Act, finally promulgated in August 1998. Parallel to this, the Water Services Act, that regulated third tier water management, was also drafted and promulgated.

Both the Water Act and the preceding White Paper indicated a new emphasis on water conservation and demand management on the one hand, catchment-based management on the other. As 20 of the 28 underlying principles of the Water Act related in some way to scarcity in quantity or quality or both, these developments can be seen as a policy response to scarcity.

Water demand management, integrated catchment management, and water harvesting are now treated in turn. Only the first two are within the ambit of government; water harvesting is a more civil society-based development and is placed here alongside the other two for purposes of contrast.

Water demand management

Under apartheid, water was already regarded as an increasingly scarce national resource by the then department of water affairs[67]. In policy terms, this had led to increasing centralisation of the control of water, in 'the public interest'. A key policy principle was that of 'best joint utilisation' which sought to achieve optimum benefit and minimum negative impact from any configuration of water demand, supply, and allocation combinations that an evolving economy demanded. This mission was formulated thus:

> to ensure the ongoing, equitable provision of adequate quantities and qualities of water to all competing users at acceptable degrees of risk and cost under changing conditions.[68]

Of course, in typical apartheid era doublespeak the 'all competing users' referred primarily to competing fractions of white capital rather than to the population as whole. Considerable restriction of demand was in fact (perhaps not always consciously) achieved by ignoring the demands of the majority for proper access to the resource.

In the new South Africa, various aspects of water demand management were launched several years before permanent institutional structures were created at national level to ensure the furtherance of the demand orientation. In 1995, at the initiative of then minister Asmal, the National Water Conservation Campaign was launched. It was run by a group of part-time external consultants, none of whom were full-time government employees.[69]

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67 See DWAF, 1986, 10.3.

68 Ibid, xvii.

69 Drawn from an interview with Desighen Naidoo, 14/10/1999, and the DWAF Working for Water home page.

A major thrust of the conservation campaign was the Working for Water programme, which focuses on the national consumption of water by non-indigenous plant species which have 'invaded' South Africa's natural habitat. In fact, this 'invasion' was induced by human action and many of these species are being exploited commercially.

Invasive plants now occupy some 10m ha of land in South Africa, an area equivalent to that of KwaZulu-Natal (some 8 per cent of the nation's land area). It is estimated that this vegetation consumes some 7 per cent of the country's water resources, and the programme aims to clear this vegetation to free a significant amount of the national water bulk and enhance water security. What is not mentioned is that, if left to itself, this added water would sustain *indigenous* vegetation (although indigenous vegetation is often water efficient), and need not necessarily be released for human production. How much water will be reserved for local ecosystem maintenance is still under discussion.[70]

Designed as a public works programme, Working for Water has been very successful in achieving efficiency, equity and sustainability. Unemployed adults are trained to recognise and remove alien vegetation, providing jobs, while water resources can be used more efficiently than in feeding alien plants, and the natural environment is protected from competition with other species. The programme is quite rightly heralded as one of the best launched by the government in the RDP era.

But it is not without its faults. Tony Turton [71]mentions the impossibility of actually eradicating alien invaders, whose seeds lead to a continuous resurgence of the prevalence of the plants. The Working for Water Campaign is therefore not a once-off event but a continuing battle against alien plants. It can be asked how long government funding will be available for this campaign.

The National Water Conservation Campaign created an argument for a competency in DWAF that could begin to tackle the demand side of the water supply problem. In August 1998 the Directorate of Water Conservation was established, consisting of 5 core and four support staff members; it has a budget of R 14 million. Compared to the some R 250m of the infrastructure development chief directorate, water conservation obviously has an inferior status within the department, although its work is linked to and supported by the catchment management and water quality directorates. There is no doubt, however, that the chief directorate of water utilisation under which demand management falls is enjoying rising prominence in the department, and water scarcity has now achieved status of priority 2 in the department, after community water services[72].

The directorate embraces the five pillars of demand management described above as tools to reduce consumption. Its policies cannot be judged on their implementation because the national strategy framework on water conservation and demand management was only released in May 1999. However, that the measures proposed by the strategy to effectuate demand management (chapter 6) *emphasise efficiency measures rather than equity*, the enormous concentration of demand in the hands of a small group of producers and domestic consumers (poor people use less water) does not feature as prominently as

70 Working for Water Annual Report, 1998/9.

71 Personal correspondence, 1999.

72 Conversation with Haroon Karodia, director of catchment management in the DWAF.

it perhaps could have. The block tariff system seems to be the only measure available to flatten out the relationship between income and demand.

Integrated catchment management

No mention is made in South African catchment management documents of the call for integrated catchment management made at the UNCED conference in Rio in 1992. But a DWAF official asserts that South Africa did attend UNCED and that the changes in water quality management from point source control to receiving water quality objectives, as well as the groundswell towards catchment management, are strongly related to the UNCED process. [73]

In South Africa, the catchment management process started in earnest in 1996 with the commissioning of preparatory studies on catchment management through traditional beneficiaries of research funding such as the CSIR and Ninham Shand. The studies show a chronological evolution from the abstract and general to the specific and practical. Two documents, *The philosophy and practise of integrated catchment management. Implications for integrated water resource management in South Africa (1996)* and *Research into alternative institutional models for integrated water resource management in South Africa (1997),* acted as key background documents to the drafting of the new Water Act, promulgated in August 1998. These were later followed up by more concrete, practical, documents such as *Guidelines for catchment management to achieve integrated water resources management in South Africa (1997),* and *A strategic plan for the department of water affairs and forestry for the implementation of catchment management in South Africa (1998).*

The directorate of catchment management was established in mid-1998; this development ran parallel to the refinement and promulgation of the Water Act. The director of catchment management started the job alone, but was soon joined by four core and one support staff. The directorate, like that of water demand management, falls under the chief director of water utilisation. There are no similar structures in the regional offices of DWAF, so catchment related work consists of involving other functions in catchment management. In the future it can be expected that catchment management agencies will be staffed with experts, but indications are that this team will not consist of more than ten people per agency. Given the complexities of catchment management, it can be asked how policy developed at head office is to be effectively implemented by such a small team. History has taught that water quality management, for instance, was crisis driven and that it was difficult for water quality managers to monitor the activities of the many stakeholders that catchments can contain. In the present situation it is difficult to see how this will be improved upon unless civil society itself becomes actively involved in mutual social control to prevent excessive pollution or illegal water abstraction.

As with water demand management, integrated water resource management is a new field in South Africa and analysing any discrepancies between policy and its implementation can only be done in terms of emerging *trends* rather than analysing *outcomes.* These

[73] Conversation with Eustacia Boufilatos, deputy director of catchment management, 7/1/2000.

trends are considered to be important in assessing the direction of catchment management in South Africa:

1). F*rom ICM to IWRM:* The concept of catchment management involves the integrated management of all natural resources in the natural area of a catchment. It attempts to capture all activities and foreseen impacts of human activity and natural events within a management plan. But this would transcend existing boundaries between line departments such as Land and Agriculture, Environmental Affairs and Tourism, and DWAF. Catchment based natural resource management thus requires either its complete integration under one ministry, or efficient co-operative governance between line departments involved in managing one or more prominent natural resource. The DWAF diluted its early mentions of catchment management to integrated water resource management, remaining within its competency and opting for an incremental route whereby the assistance of other departments will be requested as catchment management gets off the ground and inevitably expands into land use planning, mining regulations, and the like. Unfortunately, current trends in South Africa show a fragmentation of environmental governance along departmental lines; each department has set up its own institutions for integrated environmental management and is inviting others to participate in its structures[74]. Of course, this falls short of integration. The institutional structures for integrated natural resource management should indeed be structured around catchments but they should involve a panel constituted by members of the various natural resource-centred line departments. Furthermore, catchment-based natural resource management should recognise its transcendence of provincial and local government boundaries and involve all relevant authorities in a manner that recruits rather than challenges their competencies.

2). *Community involvement:* The issuing of licenses for water use is to be handed to catchment management agencies (CMAs) which answer to participatory catchment management forums (CMFs). Water resource management is thus to become community-based, with direct involvement of stakeholders in the deliberations over catchment management and water allocation. If we move from the premise that apartheid was about resource capture, then all initiatives that open avenues to democratic debate on access to resources fundamentally deepen democracy . There is a powerful opportunity through catchment management to deepen democracy, especially in rural areas where oppression still manifests itself strongly.

But South African water delivery infrastructure is locked into the service of previously *advantaged* communities, and the new law has not guaranteed or quantified water rights for the productive needs of the poor. Unless the individual catchment management strategies (that each CMA must submit to the minister for approval) are specifically required to contain a chapter on development needs and strategies, there is a danger that the poor will be left to fend for themselves in stakeholder forums in which businesses can be expected to play a dominant and well-informed role. Development chapters in catchment management strategies should be made obligatory, and resources should be devoted to *informing* the poor about their water rights (extension work through community liaison officers) and *involving* them in stakeholder forums (non-technical, personal, communica-

74 See Schmitz, Current boundaries among line departments need to be transcended.

tion strategies and institutional support) while a critical eye is kept on the institutional, financial and bureaucratic barriers to their participation. The employment of locally recognised, specialised, community based organisations that are neutral third parties between government and communities is an effective way to achieve this.[75]

3). *Data poverty:* Research on water management has a long history in South Africa, and the plethora of local publications on water-related topics could fill entire libraries. These publications are generated through institutions such as the CSIR, Water Research Commission, DWAF itself and university research centres. An interesting sub-group within these publications are those produced by consultants who were traditionally used by the government to study particular issues and thus built up an impressive stock of knowledge - the very usefulness of their knowledge and the reliability of their information services is hampering the stimulation of emerging consultants because DWAF often relies on the reliable rather than venturing into the arena of new consultants.

In general, information gathered on water resource management in the apartheid era was very technical. But as DWAF moves from an era of technology push to one of user pull, information needs are changing, and there is a dearth of data on water related socio-economic issues required for catchment management. The water availability and needs of the majority were ignored for many years and planning would at least require catchment studies of communities, their water use and needs. For instance, if requests are to be submitted to CMAs for water allocations for development, some indication is needed of the consumption and quality requirements of various kinds of activity.

Water harvesting in South Africa

In contrast to India, rainwater harvesting (RWH) does not have a long history in Southern Africa. There is therefore no cultural stock to draw on other than traditional knowledge on natural resource conservation. But the technique has considerable potential because of its low cost and the fact that it lends itself to a large degree of community control and independence from donors or the state. There is considerable momentum in the expansion of RWH on the subcontinent, supported primarily by NGOs although in Zambia, for example, it is also supported by the state. This expansion is taking place from a small base and there are 'pockets' of RWH development in each country. The tradition seems to be particularly strong in Zimbabwe, where it primarily has agricultural applications. It seems that very positive gains in access to water can be reaped through RWH projects but, predictably, in the absence of the centralised water quality control that comes with bulk supply projects, water quality must be managed at the local and even household level, which requires training and appropriate technology. Scanning the Southern African experiences with RWH projects, project planning seems to need to tackle two central issues to be effective: the costs of developing a RWH scheme, and designing appropriate institutions to handle it.

In respect of the first issue, factors to be considered include:

- training communities and individuals;

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75 See Schmitz, 1998.

- recruiting labour for the scheme;
- obtaining the necessary materials; and
- overcoming financial hurdles such as the construction of an underground tank;

In respect of the second issue, factors to be considered include:

- achieving community participation in the project;
- drawing on local as well as external knowledge;
- solving questions of system ownership and control;
- linking costs incurred by the community to their carrying capacity: the project must be feasible economically from their perspective

In South Africa, RWH's support is found predominantly among NGOs rather than government. It has its roots in the environmental movement, having been experimented with in various forms, for instance, on permaculture farms. RWH projects, for augmenting domestic water supply, providing access to irrigation water or both,[76] are currently initiated through environmentally and rurally oriented NGOs. Despite its enormous potential, RWH in South Africa is restricted to a relatively isolated group of projects. It is certainly an area that deserves some policy attention from DWAF.

CONCLUSIONS

An attempt has been made to place South African water resource management in a global context, drawing out areas in which there may be emerging gaps between policy formulation and implementation.

Broadly speaking, South Africa has mirrored water resource management developments globally: both globally and in South Africa, the supply orientation enjoyed ascendancy until very recently (in the last twenty or so years). In both, new management disciplines emerged in response to the evolving crisis but water harvesting did not achieve the kind of state recognition that either water demand management or integrated catchment management have enjoyed. There are, therefore, strong similarities between South African and global developments.

But there are also several characteristics of the South African case that do not match other countries' experiences. Firstly, the supply orientation was driven by the state rather than international donors, and in this sense South Africa stands out from the rest of the continent. Water resource development in South Africa is in this sense (but as the second point will illustrate not in another sense) closer to developments in industrialised countries than events in the rest of Africa. Secondly, in South Africa, most of the population was intentionally locked out of access to water as a productive resource. Rather than water being used for development as it has across the Third World (whatever opinion one might have of these interventions), it has been used predominantly for the needs of the elite. Overcoming the legacy of consciously created inequality is a key element of water resource management.

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76 See Mosoang, 1998.

It was noted that it took some years for policy to be developed and that therefore any analysis of implementation would have to be based on emerging trends rather that set outcomes. Looking at these trends, the following themes stand out:

1. The Working for Water arm of water conservation and demand management policy appears to have been highly successful at integrating efficiency, equity and sustainability. But the proposed policy measures of the new national strategy framework for water conservation and demand management emphasise efficiency and sustainability rather than equity. Water scarcity as a consequence of maldistribution in society is not dealt with, except in the case of potable water.
2. The ideal of integrated catchment management quickly ran up against institutional boundaries, diluting it to integrated water resources management. Each natural resource management - oriented department is working on its own version of integration. Will, then, these institutions can be merged or linked to jointly manage natural resources and, if so, how?
3. The issuing of permits for water use is to be devolved to the catchment level. Since supply infrastructure is now geared to previously advantaged groups, how will the needs of the previously disadvantaged be addressed? Indications are that the poor will not be taken on board automatically - concerted effort is needed to ensure equity. Established stakeholders are active and vocal in the establishment of catchment management forums and agencies. This requires interventions not yet catered for in policy. Providing rights to water or access to stakeholder meetings also does not guarantee water: policy on delivery infrastructure does not yet exist.
4. Compared to the infrastructure division in DWAF, water conservation, demand and catchment management have very limited human resources. While the policy frameworks for both directorates are in place and merely need detailed operationalisation, it can be asked how implementation is to be effected at existing staffing levels. Given the relative lack of staff, will the state be able to take the lead in developments or will it have to swap regulation and intervention for facilitation and laissez-faire?
5. A change in policy direction from a strong supply orientation to catchment based management, water conservation and demand management is taking place against a background of data gathering at the department which has a highly technical and supply oriented nature. This means that policy could be better informed in certain areas. Examples of data needs are catchment-level overviews of bulk users, their water needs, their effects on water quantity and quality, their existing uses as contrasted with other potential demands in the system, and their future intentions and desires; studies of the poor and the kinds of water usages that they have and the needs that they experience for stock watering , irrigation, etc.; or the existence, capacity and extent of non-permitted farm dams as well as non-permitted water abstractions.

Part 2

DOMESTIC WATER AND SANITATION SUPPLY

Caroline Kihato

INTRODUCTION

Part 2 of this paper deals with debates and issues in the water and sanitation sector. It reviews national and international literature, showing how policy developments in South Africa have been influenced in part by shifts in global thinking. In particular, an attempt is made to assess the discrepancies between South Africa's current policy on water and sanitation and its implementation. This involves an analysis of the available literature on the government's (and its partners') progress thus far in the provision of water and sanitation to rural and urban communities, and whether this matches policy intentions.

The provision of water and sanitation is highly susceptible to prevailing international developmental, environmental, political and economic paradigms. The history of the sector can therefore be traced through an analysis of these paradigms. Although not exclusively, these paradigm shifts have helped inform South Africa's own policies on water and sanitation provision. South Africa's apartheid history has also had a large impact on the direction of policy - in the past and currently. Yet despite the progress in providing a solid policy foundation for the pursuance of the 'some for all forever' objective, the literature shows that more still needs to be done to ensure that the strides in policy development translate into tangible results for the millions of South Africans who still have inadequate water and sanitation supplies. Further, while water and sanitation are ordinarily lumped in the same category, the rate of implementation and perceptions towards them differ.

MAKING SENSE OF HISTORY

An ambitious look at international events shaping the water and sanitation sector

The year 1977 ushered in a new epoch in the sector which marked the beginning of international co-operation on water and sanitation issues, and of a succession of shifts in the rationale underpinning provision world-wide and, particularly, in developing countries.

At the 1977 World Water Conference in Mar del Plata, Argentina, the 191980s were declared the 'International Drinking Water Supply and Sanitation Decade'. At the time, billions of people in developing countries had inadequate - or no - water and sanitation supplies despite international and national efforts to provide the service universally. The conference also came as both international and national policy makers were beginning to question post-colonial conventional wisdom which had resulted in the inappropriate transfer of technology from developed to developing countries, a huge backlog in the supply of water and sanitation facilities, and the development of socially, economically and environmentally unsustainable systems. It was the beginning of an international consensus that more than aid and economic growth were needed to solve the problems ex-

perienced in the developing world[1] - that total transformation of previously unchallenged truths was needed if developing countries were to meet current demands. To understand developments in the sector, it is necessary to trace the predominant development paradigms which influenced the last four decades.

Development from above or below?[2]

The period following colonialism had a particular understanding of the notion of development which informed not only the internal production and industrial policies of former colonies, but their external relationships with 'mother country' economies. Development was couched in the modern paradigm and its essence was shaped by post war reconstruction, decolonisation; the 'discovery' of Keynesian economics in the 1930s; and the invention of National Income Accounts by Colin Clark and Simon Kuznets[3] which made 'development' a *quantifiable* concept. It was seen as a function of economic growth and, by extension, of the market value of production within a given economy[4]. Development was thus a single dimensional, linear, process - the more the sustained rise in the value of production per capita, the greater the degree of development.

Seeing development as a measurable value with a common denominator implied that the contextually varied economies of developing and developed countries could be compared. Reducing economic growth to a single factor - production - also meant that the 'magic bullet' to combat underdevelopment could be found in increasing the value of outputs in developing regions. It is therefore no surprise that post-colonial development was hinged on industrialising former colonies through *import substitution* strategies. Replicating goods previously imported in a 'periphery' which had neither the economic structure nor the technology to produce industrial products implied that the *transfer* of western technology and skills was necessary, as was aid to purchase it. Yet the transfer of technology was not confined to inputs to aid industrialisation. The understanding of 'development' at this time required former colonies to emulate the paths of 'developed' countries.

From the late 1940s to the 1960s development had certain salient features:

- It was considered a linear process which all economies duly followed;
- development planning was top down, centralised, and comprehensive;
- It was rooted in positivism - development theorists believed that development laws could be derived scientifically and that the 'perfect' development model could be formulated and applied to underdeveloped regions;

1 M Black, Learning what works: a 20-year retrospective view on international water and sanitation co-operation, UNDP/World Bank, 1998.

2 Title taken from W B Stohr and DRF Taylor (eds), Development from above or below? Chichester: John Wiley and Sons, 1981.

3 J Friedmann and C Weaver, Territory and function: the evolution of regional planning, London: Arnold, 1979.

4 Ibid.

- It was dualistic; for development to occur there needed to be a 'core and a periphery' - a developed and undeveloped region. The theory presumed that the core had to develop first, then the benefits of development would 'trickle down' to the periphery[5].

A firm ally of the modern development thesis is the centre down paradigm inspired by the seminal writings of Hirschman, Friedmann, and Myrdal[6]. Although their writings varied, the premise of their notion of development and underdevelopment was similar. Hirschman's idea of 'polarisation' and 'trickle down' and Myrdal's 'backwash' and 'spread', describe development as a dialectic - initial polarisation between growth poles and the hinterland gives way to a more equitable and balanced growth as wealth 'trickles down' or 'spreads' from wealthy to impoverished regions[7].

These authors presuppose that development follows a fixed pathway which begins with the growth of a centre at the expense of the hinterland creating tensions between them which are eventually reconciled by diverting public funds to underdeveloped regions. In Friedmann's core and periphery theory, these tensions dissipate when social, political and economic autonomy reduce the dependency of the periphery on the core. Development is thus considered a linear process, which consists of a series of stages in which all societies follow. Rostow's theory of the process of economic growth developed in the 1960s best describes the development path. He believed that each society went through five stages of development: the traditional society; the preconditions for take off stage; the take off stage; industrial economy; and the post-industrial society[8]. This implies that all economies gradually substitute the traditional (primitive) economy for a more modern one. The modern paradigm was predicated on the assumption that the transfer of aid, skills and Western technology to developing countries would create the impetus that they needed to ensure that they moved quickly along the development pathway into fully developed economies.

Impact of paradigms on water and sanitation supply

The optimism of the modern development paradigm began to give way to widespread disillusion in the 1970s. The high economic growth rates of developing economies in the 1960s and early 70s were replaced by sharp declines in growth, increasing poverty and inequality and inadequate access to services. Moreover, the predicted trickling down of wealth to developing economies failed to occur. Instead, they became progressively more marginalised and dependent on developed economies for aid. For the water and sanitation sector, the modern paradigm had failed to provide what it had promised; levels of access and quality standards comparable to the West.

Modernist development paradigms had various consequences. Development from above implied increased dependency on western technology, expertise and skill. This not

5 Friedmann and Weaver, Territory and function.

6 Ibid.

7 See A Hirschman, *The strategy of economic development;* G Myrdal, *Rich lands and poor;* M Niles, Development from above: the centre-down development paradigm, in Stohr and Taylor (eds), *Development from above or below?*1.

8 W W Rostow, *The process of economic growth* (second edition), London: Oxford Press, 1960.

only had financial consequences, it also resulted in the transfer of *inappropriate* technology. Modernist paradigms implied western solutions to developing country problems and so instigated a new set of problems.

Although technological and skills transfers from developed economies quickly increased coverage of water and sewerage systems in developing countries and, in particular, in the fast growing urban centres, it soon became apparent that the systems were less than optimal. Conventional systems were too expensive to provide to all. Water and sanitation was therefore available only to the elite who lived mainly in urban areas. As city populations expanded, and unemployment increased, coverage became exclusive to high and middle-income residential areas, business districts and city centres.[9] This was exacerbated by the fact that no technological alternatives were explored or considered for residents in poor neighbourhoods or rural areas. International aid came with standard Western model systems placing water and sanitation out of reach for many [10]. Further, the importation of technology in many instances required trained technical personnel to install, repair and maintain; this added to the cost of provision as external technical assistance had to be sought - usually from developed countries where the technology had originated.

Secondly, the transfer of technology had little regard for local knowledge or context. Industrial inputs were usually capital-intensive in economies that had excess labour. Water and sanitation systems were replicas of comprehensive blueprints in the developed world, informed by principles governing public health policies in the West. They ignored existing financial and natural resources, local knowledge and technological systems, and environmental conditions. Water borne sewerage systems, for instance, would be installed in very dry countries, resulting in accelerated depletion of the scarce resource, environmental imbalances and unreliable provision. The 'what is best for the rich must be best for the poor' mentality raised local expectations, creating a mismatch with affordability as the importation of technology forced developing economies to live far beyond their means. It also caused disillusionment. European model hand pumps designed to provide single homesteads with water broke down under the pressure of providing whole villages with the service. Often it took weeks to repair damaged pumps because spare parts and skilled technicians were not easily available[11].

Thirdly, the modern development paradigm's obsession with sophisticated technology and elaborate systems meant that social, political and environmental issues took a back seat to technical deliberations. Engineers and city planners became *the* experts on waste disposal and water provision - a function which traditionally belonged to households. This changed social organisation of service provision and created a dependency on technocrats. The role of engineers and planners:

9 Black, Learning what works.

10 Ibid.

11 Ibid.

> ... was elevated to a position of central authority over networks of ducts, pipes, drains and sewers, and to remove issues relating to water and waste disposal out of the province of household action into the realm of public administration[12].

Trickle-down theories were thus accompanied by top-down service delivery methods. Water and sanitation systems were designed and delivered by engineering experts and 'imposed' on users, who had little to do with delivery - the only expectation was that they pay for services (in many cases payments were heavily subsidised by the state). But this delivery style began to give way as its shortcomings were exposed. Top-down methods became unsustainable, costly and inappropriate because of the lack of beneficiary involvement in delivery. The break down of 'development from above' was followed by 'bottom up' paradigms which continue to dominate development theory.

Lastly, the focus on 'hardware' at the expense of 'software' issues, raised questions about the sustainability and effectiveness of imported technology. It soon became clear that institutional management systems, the structure of social groups, local knowledge, beneficiary involvement and environmental management issues that had been ignored were as important - some argue more important [13] - than digging trenches and laying pipes. In many instances water pumps installed in villages to provide easy access to water to help 'ease women's afflictions' were vandalised or left to rot because fetching water was one of the few activities in which women could socialise and be away from their families. Attempts to mould social, political, economic, and environmental contexts around technology rather than the reverse resulted in weak water supply and sanitation policies which failed to achieve the universal access that was sought.

Water and sanitation for all: searching for appropriate hardware solutions

By the 1970s, questions challenging the notion of development began to emerge. The ILO world employment programme in 1970 questioned capital intensive strategies, arguing for labour intensive production. E F Schumacher's *Small is Beautiful* advocated intermediate technology with a 'human face' which was affordable to developing economies[14]. He challenged the popular understanding of development as synonymous with economic growth, and began raising questions that would become pertinent decades later with the popularisation of community participation.

> If we talk of promoting development, what have we in mind—goods or people? It is people - which particular people? Who are they? Where are they? Why do they need help? If they cannot get on without help, what, precisely, is the help they need? How do we communicate

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12 Black, Learning what works, 12.

13 See E F Schumacher, *Small is beautiful: a study of economics as if people mattered,* London: Blond & Briggs, 1973; J Friedmann, *Empowerment: the politics of alternative development*, Cambridge: Blackwell, 1992.

14 Schumacher, *Small is beautiful*.

> with them? Concern about people raises countless questions like these. Goods ... do not raise so many questions.[15]

Writings on the impact of economic growth on the environment also began to emerge in the early 1970s. In 1972, the Club of Rome's *Limits to Growth* warned that if levels of population growth, pollution, industrialisation, food production and resource depletion continued unabated, the planet would reach its carrying capacity in three generations[16]. In 1975 the United Nations' Cocoyoc conference made a strong plea for a shift in development, arguing that it should be centred around people and their well-being rather than the obscure focus on economic growth, capital inputs and production. It is at this stage that the concept of basic needs begins to take off internationally.

> Our first concern is to redefine the whole purpose of development. This should not be to develop things but to develop man. Human beings have basic needs: food shelter, clothing health and education. Any process of growth that does not lead to their fulfilment or even worse disrupts them is a travesty of the idea of development''.

It is against this backdrop that the 191980s were declared the International Drinking Water Supply and Sanitation Decade. The modernist paradigm had failed to make headway in providing universal access to services. It is therefore not surprising that the slogan for the decade was 'water and sanitation for all'. The conference made a commitment to ensure that

> ... all peoples, whatever their stage of development and their social and economic conditions , have the right to have access to drinking water in quantities and of a quality equal to their basic needs[17].

Inherent in this statement is the notion of access to water as a basic human *right* – that all people *deserve* access to the resource. Governments and international development organisations have a moral obligation to provide a package of basic human needs of which water and sanitation are a part. This is a shift from the ambiguous post-colonial commitments to developing underdeveloped regions whose fetish with factors of production eclipsed discussion of people and their well-being. This shift is clearly evident in South Africa's own water policy. The water and sanitation white paper lists as one of its principals that basic services are a human right. In addition, the RDP stipulates a minimum per capita consumption figure of 20-30 litres per person per day within 200 metres.

But to achieve universal service provision, there needed to be a shift in the *modus operandi* - there had to be alternative technologies on offer which were appropriate to the environment in which they were installed. Also, donors, policy makers, city planners, and engineers had to be more flexible in their approach – this required a rethink of assump-

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15 Schumacher, *Small is beautiful*, 160.

16 D H Meadows et al, *The limits to growth: a report for the club of Rome's project on the predicament of mankind*, London: Pan Books, 1972.

17 UNCED, *Earth summit 1992,* London: The Regency Press, 1992, 165.

tions that western technology was both superior and appropriate in all contexts. The 1980s were therefore a decade in which international donors such as the World Bank and the United Nations as well as national governments were exploring alternative technologies for providing water and sanitation.

The quest for appropriate - or in Schumacher's words, intermediate – technology was therefore the greatest concern during the decade. It was assumed that, if the right technology was found, marginalised areas would receive coverage. To do this, water and sanitation technology had to be low cost, designed to meet demanding conditions of use and manufactured to ensure that trained locals could repair and maintain it. The decade made great progress in finding hardware solutions to service delivery constraints. In Bangladesh, the Tara pump was designed for use in areas where the water table was below the suction level. The Village Level Operation and Maintenance hand pump installed in parts of Kenya was designed to ensure that trained locals could take care of its repair and maintenance to reduce delay between breakdown and repair. In India, Mark II was designed to withstand the pressure of demanding conditions of use[18]. In the early 1980s, the Orangi Pilot Project designed an affordable 'traditional' sewer system in a Karachi squatter settlement with very little external funding and high community involvement in its installation and management[19].

In the search for hardware solutions, practitioners unwittingly stumbled on the need to acknowledge the role that 'software' issues played in the delivery of services in marginalised areas. It soon became clear that no matter how well suited the technology, its long term impact depended on the organisational and management systems set in place to ensure its longevity. In the 60s and 70s, management of water and sanitation systems was extremely centralised. This often contributed to low access particularly in remote areas where poor communication and long distances meant that it took technicians months to respond. To combat this, technology had to be designed to ensure local operation and maintenance. But this was not possible without organised local management systems. By default, practitioners found themselves setting up management systems and organising beneficiaries around the repair and maintenance of their water and sanitation systems. And, if communities were to be involved in operations and maintenance, surely they needed to be involved in the project from its inception? Unexpectedly, the decade's focus on hardware solutions gave way to software concerns which would dominate service provision in the 191990s.

Structural adjustment programmes

Something else happened in the 191980s. Developing economies were confronted with an economic crisis which impeded their development. In Africa, economic decline had reached its highest point ever, raising concern among international funders which stood to lose large loans that African countries could no longer afford to repay. The problems

18 Black, Learning what works.

19 J Briscoe, *The population environment: water and sanitation nexus in developing countries,* paper presented at the Revelle Memorial Symposium, Harvard University, 1992.

facing the developing world were recognised as 'structural' - they were inherent in the structure of the economy and its unequal relationship with 'First World' countries. A UN report describes the situation:

> Internally, African economies were experiencing severely depressed economic growth rates, stagnant agricultural production, deteriorating social services, and declines in living standards. Externally, it was marked by a rising debt burden, inadequate resource flows, and a sharp fall in commodity prices for Africa's key exports.[20]

Internal structural handicaps continued to include use of inappropriate production technologies which failed to reflect realities such as the abundance of labour. And, despite aid, developing economies were plagued by production stagnation, poverty, inequality, malnutrition, poor access to health care, education, water and sanitation facilities. For the World Bank and IMF, it was clear that fundamental economic and social restructuring were essential if trends were to be reversed. Thus Structural Adjustment Programmes (SAPs) were born out of the need to induce growth in developing countries as well as to ensure that they would pay back their long-standing debts. They contained three national programmes which described short medium and long term approaches:

- Short-term stabilisation programmes involved instituting tight monetary and fiscal policies and the devaluation of exchange rates.
- Medium term growth-inducing policies involved price deregulation, wage restraint, the removal of taxes and subsidies, institutional reform and debt rescheduling. Theoretically, the deregulation of prices would act as an incentive for production and stimulate growth while the removal of taxes, government subsidies and the privatisation of state institutions would inevitably reduce inefficiency and stimulate growth.
- The long-term transformational approach had its concerns with poverty and inequality in developing countries. To ensure the reduction of poverty and greater equity, a complete overhaul of the structure of developing economies was essential.

These programmes mirrored closely Thatcherite and Reaganite economics which professed renewed optimism in Adam Smith's 'invisible hand of the market'. They advocated the *withdrawal* of the state from active provision of social services and relegated state activities to providing an 'enabling environment' for investment and the provision of services. These views would change the nature of service provision internationally and in South Africa. Although South Africa has not had World Bank, or IMF-imposed structural adjustment programmes. many commentators argue that its macro-economic policy GEAR is a self-imposed structural adjustment programme. South Africa's water and sanitation policy thus has neo-liberal strains, which have undoubtedly been influenced by international thinking.

Concerns about how aid was disbursed, its effectiveness, impact and how it was used also gained ground in the 1980s. More stringent lending policies were developed and financial sustainability became the central focus of lending policies among aid institutions

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20 UNPAAERD, 1991.

By the end of the 1980s, the environmental movement, too, had begun to gather momentum. The notion of 'sustainability' which has become common currency in development in the 1990s was first elucidated in the World Conservation Strategy in 1980. Sustainability was 'effectively linked to human welfare, now and in the future, to sustainable management of the planet's natural patrimony'. But it is the more recent World Commission on Environment and Development (WCED) report *Our Common Future* that has popularised sustainable development and given it a strong conceptual foundation. As defined by the Brundtland report, it is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. The criteria for development should therefore be broadened to include environmental variables: the report emphasises the need for a new era of 'growth that is forceful and at the same time socially and environmentally sustainable'. Its fundamental features are to ensure that basic necessities are available to the poor, promoting equity, and the use of production technology that is 'environmentally friendly'. Underlying this conception of development is the recognition that poverty is intertwined with the environment: sustainable development requires poverty eradication.

Some for all rather than more for some

Practitioners and academics in the water and sanitation sector quickly adopted the term 'sustainability'. The 1990 Global Consultation on Safe Water and Sanitation in New Delhi formalised the need to provide water and sanitation to all on a sustainable basis[21]. For the sector, sustainability took on a double meaning. Firstly, it implied that service provision should take into account the scarcity of water - the environmental impact of drawing on the resource - as well as the impact of sewerage disposal on the environment. Secondly, as a result of the economic crisis of the 1980s, sustainability also became synonymous with 'cost recovery' which became a necessary project criterion for foreign funders. This implied that service beneficiaries, even the poor, had to raise funds to cover - at a bare minimum - the operation and maintenance of water and sewer systems.

In tune with the new conventional wisdom, the New Delhi statement for the 1990s was 'some for all rather than more for some'. South Africa's own motto 'some for all forever' was inspired no doubt by the statement. In addition to environmental and financial sustainability, concern about setting up sustainable institutional and 'integrated' management systems has become part of the focus of service delivery in the 1990s. Community participation, private sector and civil society groups have also become popular alternatives to conventional methods of service delivery. With the state withdrawing from direct service provision to providing an 'enabling environment' there is more space for other actors in previously 'traditional' state activities. Thus institutional and 'integrated' management systems are as much a focus of the 1990s as financial and environmental sustainability.

The guiding principles for the statement reflect this. To make 'some for all rather than more for some' a reality, delegates at the consultation realised that environmental protec-

21 UNCED, *Earth Summit 1992.*

tion, institutional reforms, community management of services and sound financial practice were imperative. A key theme is the shift in focus from hardware - technological issues - in the 1980s to software - institutional and management issues - in the 191990s. The guiding principles agreed upon in New Delhi make no mention of technological reforms or designs. Software considerations had finally eclipsed the technological issues which dominated the 1980s.

The Dublin International Conference on Water and the Environment in 1992 recognised water scarcity as a threat to human development and survival instigated largely, it was argued, by poor or non-existent resource management practices. Four guiding principles resulted from the conference:

- Fresh water is a finite and vulnerable 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 and should be recognised as an economic good[22].

Again, the dominance of the 'soft' issues of delivery –management, stakeholder involvement, the participation of women – is evident. A landmark decision was the recognition of water as an economic good –a resource that was not free, but had economic value. This, it is assumed, will prompt better management of the resource, ensuring its sustainability.

In three decades, the water and sanitation sector had moved from what is now known as the 'old' to the 'new' agenda. The old agenda, which focussed on supply driven service provision, was placed in the context of Keynesian economics, regulatory national government policies and highly centralised decision making. The 'new agenda' is demand driven and directs its attention to the frugal and sustainable use of water as a natural resource. It has emerged in the wake of neo-liberal economics, more decentralised modes of governance, an acceptance of the importance of citizen participation in decision-making, particularly on matters that directly affect their well being, and a global concern for environmentally sustainable development. Is it effective in providing services to present generations in a way that guarantees that the needs of future ones are met? Has it been effective in ironing out the problems of the old agenda? What are the current problems facing water and sanitation supply? Where do the gaps between policy intention and implementation exist? We will address these questions by looking into South Africa's water and sanitation policy environment.

22 United Nations Administrative Committee on Coordination intersecretariat group for water resources, International conference on water and the environment: development issues for the 21st century, The Dublin statement and report of the conference, 1992.

DEPARTMENT OF WATER AFFAIRS AND FORESTRY: WATER SUPPLY AND SANITATION POLICY

In 1994 DWAF initiated an intensive water supply and sanitation programme aimed at providing water to disadvantaged communities. The first phase, also known as RDP 1, began under the auspices of the Presidential Lead Projects of the Reconstruction and Development Programme. Subsequent programmes, RDP 2, 3, and 4 have been initiated by the department and their cycles correspond with the government's budget cycle. In August 1994, the Community Water Supply and Sanitation (CWSS) division was established to provide water and sanitation directly to users. By May 1995 given the importance of CWSS's function, its status was elevated and it became a fully-fledged branch in the department. Its mission was 'to ensure access for all South Africans to basic water supply and sanitation services'[23]. Until the establishment of the CWSS in 1995, South Africa did not have a national agency which provided basic water and sanitation services directly to users. But the implementation of RDP 1 in 1994 meant that DWAF had an interim framework within which it could deliver services while waiting for the organisational structures to be put in place.

The primary aim of the Reconstruction and Development Water Programme is to provide basic water supply in accordance with the standards set by the RDP, using an 'integrated', 'sustainable' and 'people-driven' approach[24]. Secondary goals include job creation among beneficiaries, developing community skills and capacity to carry out operations and basic maintenance, and to shift the focus of DWAF and its agencies towards supply to disadvantaged communities[25].

Eight policy principles locate the policy context in which DWAFs objectives are to be met:

- water and sanitation provision should be demand driven and community based;
- basic services are a right, implying that all citizens are entitled to a basic level of services;
- 'some for all' rather than 'all for some' which prioritises coverage to those without access;
- equitable regional allocation of development resources;
- that water has economic value and its provision should ensure its sustainability;
- in order to ensure financial and management effectiveness, users must pay for services;
- the provision of water and sanitation should be integrated with that of other social services;
- environmental sustainability should be emphasised when extending coverage.

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23 DWAF, Annual report, 1994/5.

24 DWAF, Reconstruction and Development Water Programme Presidential Projects National Business Plan 1994, http://www-dwaf.pwv.gov.za.

25 Ibid.

Unpacking the key concepts

Perhaps the important shift in DWAF policy is the movement from the 'supply driven' to the 'demand driven' principle which currently underpins the supply of water and sanitation. The white paper states that 'the primary principle is that development should be demand driven[26]' - 'demand driven' should be 'understood as the motivation for development originating from within the community, not from some outside agency (including the State) on behalf of the community'.[27] This interpretation of demand driven supply has these implications on the method of delivery:

- it advocates decentralised methods of delivery; and
- it places emphasis on greater beneficiary control over delivery.
- This, together with the user pays principle and the principle that recognises water as a commodity with economic value, encapsulates the international 'new agenda' which has dominated social service provision in the last decade.

Another important shift is marked by DWAF's motto; 'some for all forever'. This emphasises equity in service provision, an important principle given the huge disparities in levels and access of service in South Africa. The motto also brings the issue of sustainability to the forefront of DWAF policy by implying that water is made available to present and future generations.

Development jargon or inalienable truths?

The objectives of the RDP programmes and the principles underpinning service delivery, point to a marked shift in methods. Much emphasis has been placed on participatory, people-driven, delivery methods, community empowerment, sustainable and integrated development. These shifts mirror international thinking. But what do these terms mean? They have become so common in development policy that their meaning is open to various interpretations.

Empowerment

DWAF's understanding of empowerment evident in its policy documents, seems to be based on creating management structures which allow the participation of beneficiaries through elected representatives. Community empowerment is achieved as a result of 'strong representation' on the Steering Committee - a decision making body representative of stakeholders such as DWAF, local government, provincial RDP co-ordinators, civic organisations and community representatives:

> Due to their strong representation on the Steering Committee the community and their involvement in decision making the community are *fully* empowered.'[28] (emphasis added)

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26 DWAF, White paper on water supply and sanitation policy, 1994, 9.

27 Ibid, 9.

28 DWAF, White paper on water supply and sanitation policy, p 5.

This interpretation assumes that empowerment is synonymous with participation in decision making structures. Defining empowerment as a project management function has its appeal - it operationalises it and makes it relatively easy to measure the extent of community 'empowerment' in a project by looking at the representative structures. But it simplifies a relatively complex concept and perhaps ignores a crucial element intended in development discourse. The difficulty in the term perhaps stems from its literal meaning which implies the transfer of power or authority in order to enable the recipient to do something. This assumes an unequal relationship between the 'giver' who has the power or authority and the 'receiver' who does not and is therefore emasculated. But the interpretation in development discourse is far more complex. (Arguably, if the 'empowerment' of 'communities' were that simple, many of the problems encountered in development would have palpable solutions). Within the development context, power cannot - as is implied by the term empowerment - be transferred or given away. It emanates from *within* an individual or community. External agents can therefore only *facilitate* its emergence through creating an 'enabling environment'. Thus the establishment of a project steering committee in itself does not overcome any developmental hurdles or unlock energies frustrated by village-level power structures. The assumptions thus made by DWAF's policy are exposed in the implementation process which in some cases results in unintended outcomes.

Sustainability

Sustainability in DWAF's policy documents is linked to the increased space afforded the community in the decision-making process. It is assumed that this will develop a 'sense of ownership[29]', increasing the longevity - sustainability - of the project.

> An important aspect of achieving sustainable and integrated development is for the community to accept responsibility for the scheme, which can only be achieved through being involved in the decision-making process.[30]

Increased responsibility for projects among beneficiaries is therefore seen as the key to sustainability. Other sections of the document describe the specific nature of this responsibility: beneficiaries are to assume responsibility for the operations and maintenance of projects as well as making and collecting service payments. Sustainability in this context refers not so much to the environmental sustainability - although this is among the eight policy principles stated in the white paper[31] - but to the *financial* and *management* sustainability of projects.

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29 The concept of ownership is problematic. Conceptual discourse assumes that 'ownership' automatically translates into 'care', and an acceptance of 'responsibility' for the service. The words 'ownership', 'care' and 'responsibility' are often used synonymously, but this need not be the case. Ownership also carries cost implications for beneficiaries. If these are too high, then ownership does not necessarily translate into care for the service.

30 DWAF, White paper on water supply and sanitation policy, 6.

31 See DWAF, White paper on water supply and sanitation policy.

> The eventual goal of the projects is that the communities themselves will operate and maintain the projects, and also be responsible for collecting payment.[32]

Integrated development

Interpreting the use of the term 'integrated' development in DWAF documents – a term, which, like 'people-driven' development or 'empowerment', has become *de rigueur* in development circles – is difficult. According to the white paper, it is a method of delivery in which planning, design, and implementation in a given sector are synthesised with the activities of other sectors in order to create greater harmony between departments on development policy. Increasingly, service provision is seen as an integrated whole. This has been spurred on by the realisation that, for any sector to reap maximum benefits from increasing service provision, there must be subsequent increases in the levels of provision in other sectors. Efficiency and effectiveness of service delivery is therefore dependent on an integrated approach. Because, no matter how efficient an education system is, it will fail if pupils are too malnourished or unhealthy to take advantage of lessons. And basic inoculative health care will not reduce mortality rates as significantly as it could if safe water and sanitation are unavailable.

> Water and sanitation development are not possible in isolation from development in other sectors. Co-ordination is necessary with all tiers of government and other involved parties and maximum direct and indirect benefit must be derived from development in , for instance, education and training, job creation and the promotion of local democracy.[33]

Greater integration therefore implies better co-ordination within government.

Progress thus far

Given DWAF's relatively short experience at delivering services to domestic users, extending services to over 4,5 million people since 1994 is a great feat. Yet the efforts are eclipsed when the extent of need is considered: 18 million citizens are estimated to be without water, 27 million without sanitation[34].

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32 Ibid, p 5.

33 Ibid.

34 DWAF, *RDP Business Plan,* http://www-dwaf.pwv.gov.za.

Table I: Progress report ending June 1999

Programme	No of projects	Budget (Rm)	Population to be served (m)	Population served to date	Projects completed
RDP I (1994/5)	12	282.3	1.148	888 000	10
RDP II (1995/6)	311	576.28	1.666	2 065 151	94
RDP III (19967)	345	966.45	1.078	705 442	68
RDP IV (1997/8)	357	793.34	1.058	862 046	19
Total	1025	4.95	4.95	4 520 639	191

Source: DWAF, *Progress report ending July 1999,* http://www .dwaf.pwv.gov.za

By the end of 1997, DWAF had serviced 1 million people with water or sanitation facilities. Although this was acknowledged as a great achievement, it was recognised that it would take 30 years or longer to meet existing service backlogs at the current rate of delivery. A rapid delivery infrastructure development programme (RDP 4) was instituted its main aim: to accelerate the delivery of water and sanitation facilities in disadvantaged areas[35].

Although the basic objectives of RDP 4 remain the same as those of the previous RDP water programmes, its emphasis, no doubt informed by experience, seems to shift towards improving co-ordination between DWAF, local government and other departments such as the Department of Constitutional Development. Initial RDP water programmes, particularly RDP 1 and 2, were set up in the absence of legitimate or capable local government - this process was known as 'top-down on the way to bottom-up'. Even with democratically local councils, delivery in many rural and urban areas was hampered by councils which had little or no capacity. DWAF's role has evolved and its objectives have shifted to take into consideration the role of local government in provision of social services. This is made clear in the primary objective of RDP 4:

> The primary objective of the department is to ensure that communities are serviced with basic water supply and sanitation infrastructure which is provided in a manner which fully involves the Local Government and community such that the community both owns the schemes and is able to operate and maintain them. It is imperative that the services are sustainable administratively, financially and technically. This can only be achieved thorough building adequate capacity within local government which is an important part of the department's developmental programme'.[36]

35 DWAF, RDP Business Plan.

36 Ibid, 1.

But the entrance of a democratic third sphere whose constitutional mandate it is to provide services has implied a shift in DWAF functions, from providing services directly to end users, to placing its focus on support to local government. The training and capacity building of particularly rural municipalities to provide services is identified as a crucial function:

> A further important objective of the programme is that of support to local government. It is in the interests of the Department of Water Affairs and Forestry to ensure that the capacity of Local Government to fulfil its service delivery functions is developed as quickly as possible. The Department has no desire to continue to function as the service provider.[37]

This is a crucial development in DWAF policy because it fundamentally represents a shift in policy, separating one delivery period from another. Promulgation of the Water Services Act in 1997 places local government at the centre of provision to consumers. Chapter 3 states that municipalities will be Water Services Authorities, responsible for providing services to consumers.

> It is important to stress again that water services authorities are local government. Although local government may contract an outside body to do the actual work of providing water services, it remains responsible to consumers for the service. Local government can delegate the function but it cannot delegate the responsibility.[38]

This change presents DWAF with a new challenge; ensuring that services continue to be delivered without infringing on local government's territory[39].

The involvement of other service providers

The increased sensitivity to the role played by other social actors in the RDP 4 programme is not surprising. The enormous backlogs coupled with lack of human resource capacity has meant that other actors are essential to augment DWAF capacity: the Department acknowledges that providing 18 million people with water and 27 million with sanitation is 'beyond its capacity'.[40] But the involvement of NGOs such as Mvula Trust, Water Boards, the Department of Constitutional Development (DCD) and local government in local service delivery has created uncertainty about the responsibilities of these institutions. DCD's Municipal Infrastructure Programme created to provide municipalities with funding for infrastructure package options which reflected their needs began to infringe on DWAF territory[41], likewise clear demarcation of functions was required in areas where DWAF and local authorities operated. The RDP 4 Business Plan attempts to alleviate the institutional overlaps and focuses CWSS operations to rural areas particularly where municipali-

37 DWAF, RDP Business Plan, 1.

38 DWAF, The Water Services Act: a guideline for local government, 1997, 8.

39 See T Schmitz, *Rethinking delivery?*

40 Ibid, 4.

41 Ibid.

ties lack capacity and resources. According to the business plan DCD's Municipal Infrastructure Programme will be concentrated in areas with established municipalities.

Too many cooks?

While the involvement of other social actors augments DWAF capacity, co-ordinating their activities and ensuring that all agents adhere to national guidelines is difficult. It is questionable whether DWAF has the capacity to ensure that all delivery agents comply to the methods of service delivery stated in its policy. There are also varying interpretations of the policy, meaning that methods and delivery guidelines could be as many as the number of delivery institutions. Ironically, some of the tensions experienced in the field have been between other delivery agents and DWAF. A project initiated in an impoverished area had a system that was unaffordable to the beneficiaries. Attempts by NGOs and the community to alert DWAF to this and suggest alternative systems, resulted in the response that the project would lose its funding if money was not spent on the proposed scheme[42]. Mvula's projects often require beneficiaries to put up a certain amount of money up front to engender a 'sense of ownership' of the project. DWAF's policy however, does not require a 'deposit' from beneficiaries. This weakens Mvula's efforts to instigate greater responsibility for the project among beneficiaries. In one case, a community realised that DWAF's project did not require a fee up front, and 'dumped' Mvula, opting for DWAF's scheme. The lack of cohesion and co-ordination in the field reduces delivery impact and creates competition among service providers whose efforts should be mutually reinforcing. It also undermines the foundation on which the long-term survival of the project depends - user commitment and responsibility.

The pitfalls of fast-track development

DWAF's focus on accelerated delivery in RDP 4, increased rapidly the coverage of water and to a lesser extent sanitation to disadvantaged communities[43]. Although the speed with which it delivered infrastructure and extended services to disadvantaged communities was impressive, it created delivery pitfalls associated with a lack of focus on 'software' issues. The infrastructure installed has began to creak at the joints, revealing faults with the fast delivery approach. With taps running dry, vandalism of projects, non-payment, poor planning and management, questions about sustainability have come to the fore which query DWAF's focus on 'fast delivery'. Officials and practitioners claim that around 50 per cent of government water schemes have failed[44]. The reasons posited include:

- the unwillingness of communities to pay a minimum fee for water;
- the vandalism of projects, crippling water supply;

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42 E D Breslin, *Lessons from the field: rethinking community management for sustainability,* paper presented at a conference on rural and peri-urban water supply and sanitation in South Africa, Mvula Trust, 1999.

43 The provision of sanitation lags behind that of water; the justification for this is that beneficiaries almost always prioritise water before sanitation. The danger of this is discussed below.

44 Newspaper article, Water schemes run dry.

- illegal connections causing financial unsustainability;
- the use of inappropriate technology;
- poor maintenance of projects;
- poor monitoring and evaluation systems.

Resonating through a recent evaluation of DWAF and Mvula Trust projects is the lack of long-term sustainability in many[45].

> ... despite the well-publicised successes of the water and environmental sanitation sector, unease among practitioners about the sustainability of recently completed projects grows... As more communities come on-line, others it appears, are unable to maintain their existing facilities.[46]

The report attributes the low level of sustainability in projects to:

- overdesigned systems which are unaffordable to beneficiaries;
- weak operation and maintenance systems caused in part by poor, misdirected, training;
- low cost recovery caused by poor management systems which concentrate on expensive technical designs which are unaffordable;
- poor water quality which impacts negatively on health caused partly by poor technical designs and health training at a local level; and
- a lack of communication between beneficiaries and project co-ordinators on issues such as technical design, cost implications of service, health and hygiene, operation and maintenance and financial management[47].

The challenges cited above reveals a gap between policy and implementation: key intentions such as equity and sustainability are not realised. Although the water and sanitation policy stresses the participation of communities, problems experienced in the field reflect inadequate or inappropriate participatory methods. Central to the thesis of community participation in service delivery is the supposition that the greater beneficiary involvement in the delivery process, the more the 'sense of ownership' created will translate into increasing beneficiary interest in protecting and caring for the newly acquired resource by paying for the service and taking responsibility for the maintenance and operation of the project. But the vandalism, unwillingness to pay or illegal connections experienced in some DWAF projects raises two pertinent questions about the thesis of participatory delivery and the methods employed by DWAF. Are the theoretical assumptions of participatory delivery methods valid? Evidence from the field suggests that beneficiary participation in projects is more difficult to implement in practice. Practitioners often encounter conflicts within beneficiary groups, gate keepers, varying agendas, power struggles, illegitimate leaders posing as community representatives and the like. These experiences create delays in implementation and increase project costs, raising questions about the practicality and efficacy of people driven development.

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45 Breslin, *Lessons from the field*.

46 Ibid, 1.

47 Ibid.

The process versus the product: hardware dominance in delivery

If beneficiary participation does increase responsibility for projects, are the participatory methods used by DWAF effective? Is the process well thought through or do pressures to deliver overshadow the need for greater sustainability? Some local commentators[48] see the problem of sustainability as a consequence of the incessant dilemma between the process and product in development projects. The political pressure to deliver in South Africa spurred - in part - by the large service inequalities between racial groups has often compromised the quality of the process of delivery. The product is often considered more important, by both policy makers and beneficiaries, than the delivery process. This is further reinforced by the nature of the end-product: it is much more visible, tangible and measurable than process-related outcomes such as empowerment. But the focus on 'visible' products at the expense of 'invisible' ones often means that project sustainability is compromised. Attention on the delivery *process* - on encouraging beneficiary participation in decision making—wanes resulting in poor process-related outcomes. Available literature points to the lack of participation in some projects. The Mvula report, for instance, notes that 'community involvement in designing the scheme or choosing the technology has been non-existent in the vast majority of cases[49]'. Another manifestation is the poor communication between external agents and beneficiaries or beneficiary representatives and the community.

Great expectations

Poor cost recovery is often attributed to the unwillingness of beneficiaries to pay for services. But affordability and technological choice also play a part. The poor cost recovery experienced by some of DWAF projects has been ascribed to the choice of technology. It is argued that in some areas, unaffordable levels of service have been provided, making it difficult for beneficiaries to cover the costs of provision because they are genuinely unable to afford the service. 'The department has opted for projects that are too expensive for poor rural communities'.[50] The inappropriate choice of technology could be as a result of the lack of skills or technical know-how in the department but it could also be because beneficiaries have high expectations and demand a full level of service without knowledge of the financial consequences. As mentioned earlier, some case studies attribute poor choice of technology to the lack of adequate community involvement in this choice.

But cost recovery issues move beyond the choice of technology and touch on management related questions such as the capacity of the institutions charged with collecting, billing and penalising payment defaulters. Is government expecting too much from beneficiaries? Is enough time being spent on creating capacity among beneficiaries and local government to carry out managerial functions? The Mvula report suggests that more ca-

48 See Breslin, Lessons from the field; C Kihato, *Building in power: problems of community empowerment in a Gauteng development project,* Johannesburg: Centre for Policy Studies, 1998.

49 Breslin, Lessons from the field, 7.

50 Water schemes run dry.

pacity building and training programmes are needed. A report on 12 successful cost recovery case studies by DWAF admits that it was difficult to find a successful rural case study[51]. One reason could be the lack of resources and human capacity among Transitional Rural Councils and rural beneficiaries. Another reason given is increased dependency on government subsidies. The Mvula report suggests that projects that have little or no subsidies have a much higher incidence of cost recovery than those that do. The successful cases seems to suggest that beneficiary involvement in setting tariffs, good enforcement, appropriate and affordable technical systems and the involvement of women are pertinent to successful cost recovery.[52] The second phase of research should seek to clarify these issues.

National sanitation policy

The central theme revolving around sanitation policy is that sanitation provision it is more than just the construction of infrastructure, that it encompasses issues of health and hygiene.

> Sanitation is far more than the construction of toilets, it is a process of improvements which must be accompanied by promotional activities as well as health and hygiene education. The aim is to encourage and assist people to improve their health and quality of life.[53]

Sanitation policy is thus considered part of a larger process of ensuring health and quality of life to citizens. As a result, the white paper proposes an intensive health education programme in all sanitation projects, and a programme to monitor the health impacts of projects. As sanitation, particularly the disposal of waste, is intricately linked to the environment, the white paper suggests that 'sanitation improvement programmes are done in an environmentally sustainable manner'[54]. Recognising sanitation as a part of an integrated system is consistent with DWAF's integrated approach, the challenge is to ensure close co-ordination and consistency in and between institutions. The principles of the sanitation policy remain the same as those in the water and sanitation white paper (mentioned in section 3) with two additions: that 'sanitation is about health' and 'sanitation is a community responsibility'[55]. Meeting the technical challenges of providing affordable, acceptable, well designed facilities without compromising on effectiveness therefore still stops short of adequate sanitation, and evaluations of sanitation programmes need to incorporate the more slippery realm of changing community attitudes to health and hygiene.

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51 DWAF, 12 successful cost-recovery case studies for water services in South Africa, 1998.

52 DWAF, 12 successful cost-recovery case studies for water services in South Africa.

53 DWAF, White paper on national sanitation policy, 1996.

54 Ibid, 12.

55 Ibid, 5.

The poor relative?

Despite the great need (27 million South Africans lack sanitation facilities as opposed to the 18 million who lack water) and its importance to the health and wellbeing of beneficiaries, sanitation lags far behind water provision. Evidence from initial RDP programmes shows that the budget allocated for sanitation was much smaller than that for water. The justification has been that beneficiaries prioritise water over sanitation: research in South Africa shows that sanitation does not feature among the top ten list of priorities for the poor while water does[56]. The RDP 4 business plan, however, tries to increase the level of funding for sanitation projects. International evidence shows that South Africa is not the only country in which water has been given priority over sanitation by beneficiaries and policy makers. Research by WHO and UNICEF[57] shows that in 1994 3 268 million people were supplied with water while a mere 1 510m enjoyed access to sanitation in developing countries. Other studies show that since 1990, 800m people have gained access to water while the number without adequate sanitation rose by 300m[58]. This discrepancy between the numbers of people who have received safe water supplies and the number who have received adequate sanitation facilities is evident in Ghana, Mozambique, and Namibia[59].

Yet sanitation plays an integral part in development. Poor sanitation facilities could negate progress in the health sector. Similarly, the progress made in extending water coverage has little impact on health if sanitation is not addressed concurrently. Notwithstanding this, water seems to have greater political clout: most economic assistance goes to increasing water coverage. UNICEF estimates that it would cost $68bn to provide adequate sanitation systems world-wide[60]. The challenge for South Africa is to ensure that the provision of sanitation is on a par with that of water. Whether the national sanitation policy has had an impact on delivery to poor communities remains to be seen. And the health impact of the policy also needs to be investigated, to ensure that the policies promulgated reinforce progress in health and water.

Research question

This report has raised many issues about DWAF policy and the way in which it is implemented. The central research question will address issues of equity in the provision of water and sanitation. DWAF's motto 'Some for all for ever' implies equitable coverage to all for present and future generations. Is this realisable within its policy framework and given the challenges on the ground?

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56 SALDRU, *Key indicators of poverty in South Africa,* Cape Town: University of Cape Town, 1995.

57 WHO, *Evaluation of the implementation of the global strategy for health for all by 2000 ,* 1998.

58 K Brown, Not a pretty picture, *Discover,* 18 (1), 1998.

59 Country report presented at the interregional conference on service delivery in Tenerife, Spain, 1999.

60 Brown, Not a pretty picture.