7.1 THE SETTING

Zimbabwe is a semi-arid country heavily reliant on regular rains (generally November to April). Mean annual rainfall is low and many rivers in the drier parts of the country are not perennial. Zimbabwe has made extensive investments in large, small, and medium dams, though current utilization is only about 22 percent of mean annual run-off. Zimbabwe's management of its water resources is critical to its economic growth. Droughts and inability to manage its water resources cost Zimbabwe a significant percentage of its GDP. The country has a forward-looking Water Act and undertook significant reforms in the 1990s to create a Zimbabwe National Water Authority (ZINWA) to manage the national water resources. But the water resource sector has been badly hit by the economic downturn and the lack of investment has nullified many of the reform gains. Rivers are now unregulated, inadequate attention has been given to the maintenance of key water resource infrastructure with a high risk to public safety from the breach of dams, catchment plans are not implemented, and significant pollution has occurred in some major water bodies.

In the 1980s, Zimbabwe launched an ambitious program of development of its water supply and sanitation infrastructure; by the later part of the 1990s the levels of service coverage were among the highest in Sub-Saharan Africa. The country was widely seen, within Africa and internationally, as a leader in innovation, policy reform, and service provision in the water sector. However, the fortunes of the sector were reversed in the past decade as a result of very limited new investment in services and inadequate revenues of the institutions responsible for service provision that led to a sustained decline in operations and maintenance of assets. The progressive decline in water and sewerage services culminated in a serious outbreak of cholera in the 2008/09 rainy season. With almost 100,000 cases of cholera and about 4,280 deaths, international attention was drawn to the extent of the decline in the sector. The result was a large scale mobilization of humanitarian assistance by the international community to help the country address the immediate risks posed by the cholera outbreak and to support the rehabilitation of water supply and sanitation services in urban and rural areas. As a result, the number of cases reported in 2009-10 declined substantially. The challenge for the decade ahead is to rebuild the existing dilapidated infrastructure and access to services to the levels that prevailed more than a decade ago.

7.2 CURRENT POLICY AND INSTITUTIONAL FRAMEWORK

7.2.1 Policy Framework for Water and Sanitation

There is no one document that provides a policy framework for the management of the country's water resources, and for the provision of water and sanitation services. The Water Act of 1998 reformed the water sector to ensure a more equitable distribution of water and a stakeholder involvement in the management of water resources. Water was no longer privately owned. The prior system of water rights was replaced by water permits of limited duration which are allocated by Catchment Councils. Water was to be treated as an economic good and the principle of "user pays" was to apply. Pollution of water became an offence under the new Act which adopted the principle of "polluter pays."

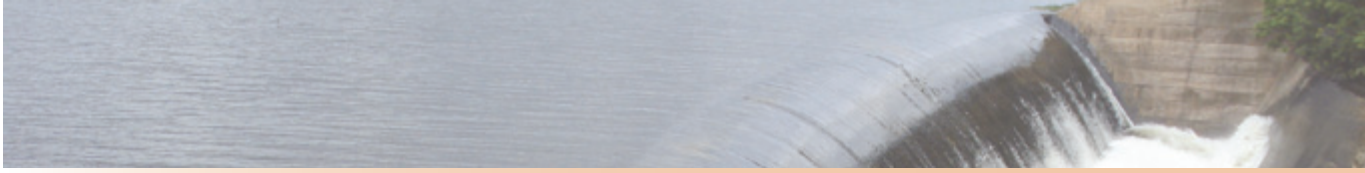
The Zimbabwe National Water Authority Act of 1998 led to the creation of ZINWA, a parastatal agency responsible for water planning and bulk supply. ZINWA was to manage water resources on a catchment basis with involvement of stakeholders in each catchment area. Other responsibilities of ZINWA included the management of the water permit system, the pricing of water, operating and maintaining existing infrastructure, and executing development projects. ZINWA was

to devolve responsibility for managing river systems and enforcing laws and regulations at the local level.

The Land Acquisition Act of 2000 empowered the government to acquire any land for resettlement purposes under the land reform program. The land redistribution program has resulted in an increase in the land under irrigation that is operated by smallholders as a result of commercial irrigated farms being acquired and subdivided into smaller parcels of farm land.

The Environmental Management Act 2002 provides for the establishment of the National Environmental Council, the Environmental Management Agency, Environment Management Board, and the Standards and Enforcement Committee. The Environment Fund, provides for the formulation of environmental quality standards and environmental plans, provides for environmental impact assessments, audit, and monitoring of projects, and for other matters related to management and conservation of the environment.

The Act empowered the Government to command public and private development institutions to undertake an Environmental Impact Assessment (EIA) before undertaking any activity and adhere to mitigating activities to protect the environment as recommended in the EIA. Irrigation development is one of the activities that require an EIA.



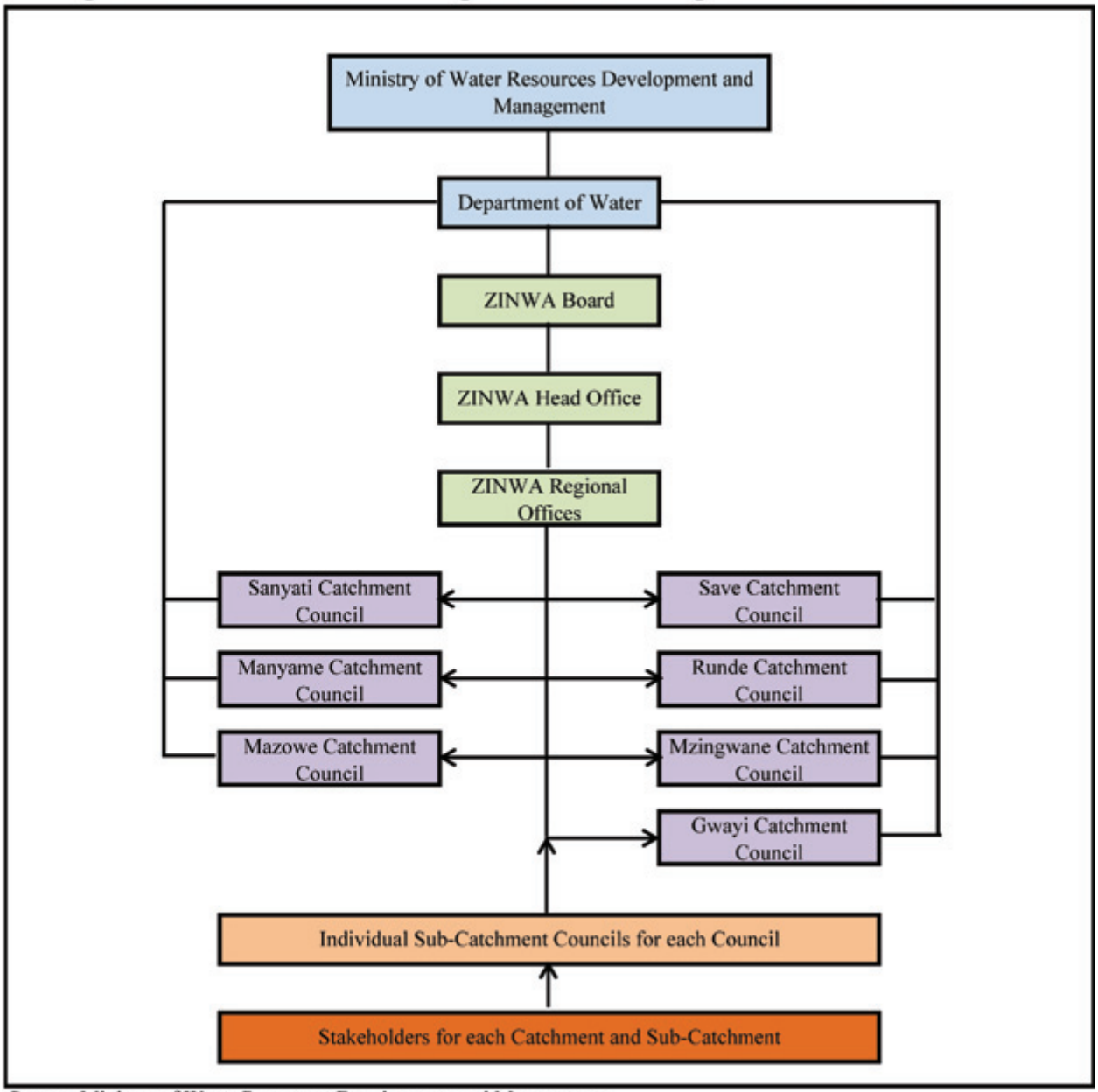
7.2.2 Institutional Arrangements for the Sector

The institutions of the water and sanitation sector are organized by law and policy according to their responsibilities for service provision. There are four distinct areas of service and related institutional arrangements: (i) water resources management; (ii) urban water supply and sanitation; (iii) rural water supply and sanitation; and (iv) irrigation. The detailed arrangements for each of these service areas are set out below.

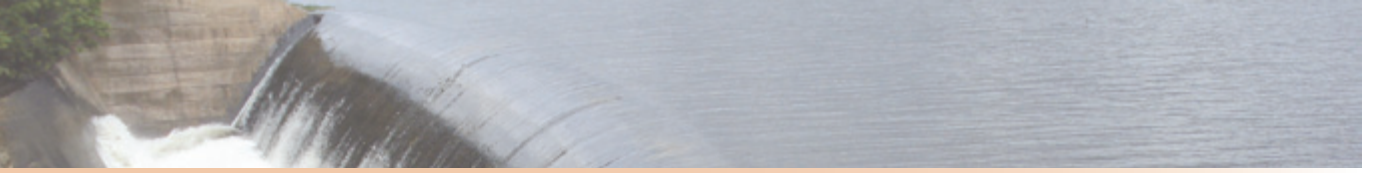
7.2.2.1 Management of Water Resources

Figure 7.1 sets out the organizational arrangements for the principle institutions with responsibilities for the management of water resources in Zimbabwe. These arrangements stem from the Water Act of 1998 and the Zimbabwe National Water Authority (ZINWA) Act of 1998. For the purposes of managing the nation's water resources, Zimbabwe is divided into seven catchments that are based on the six major river basins in the country. Each catchment is administered by

Figure 7.1: Institutional Arrangements for Management of Water Resources

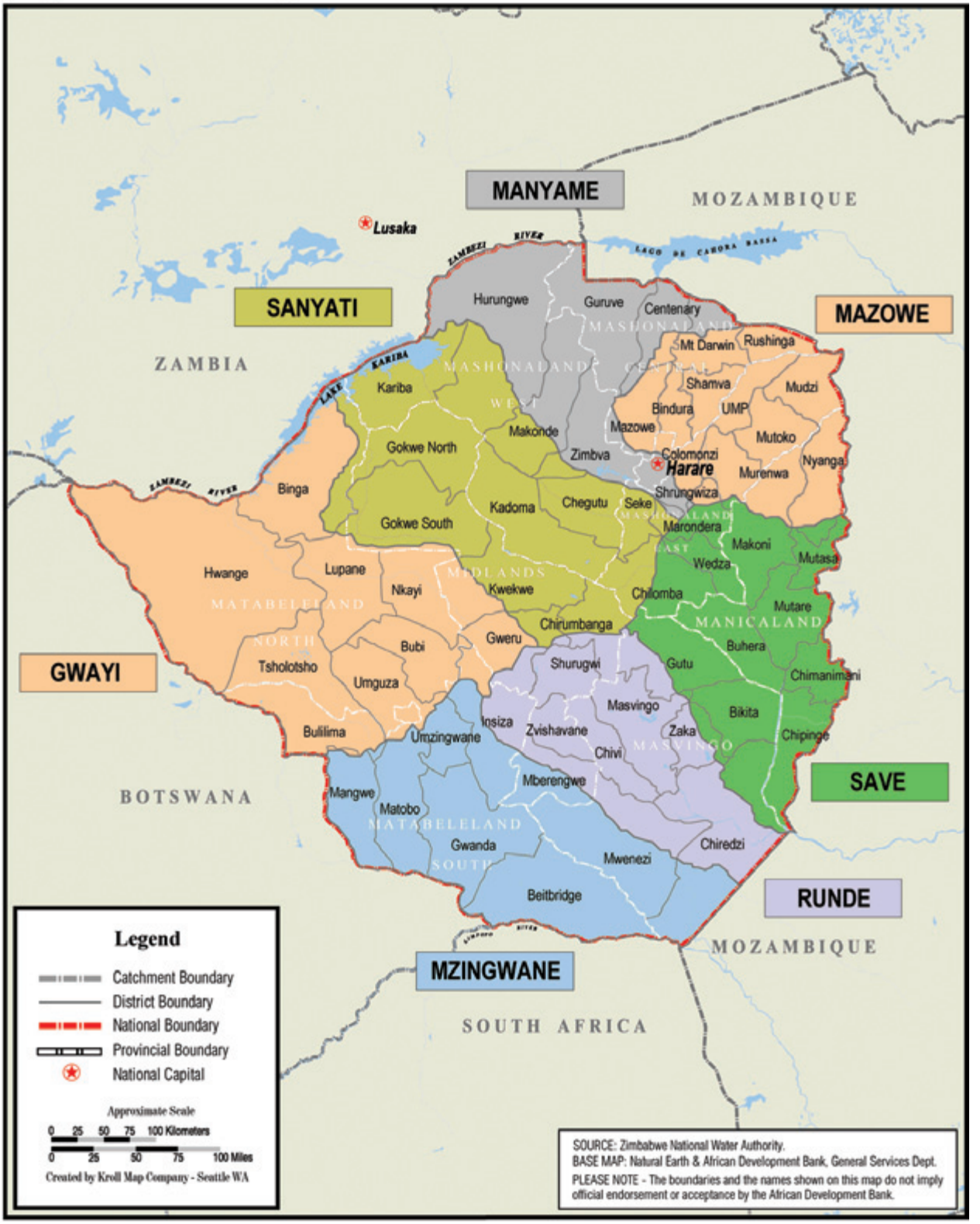


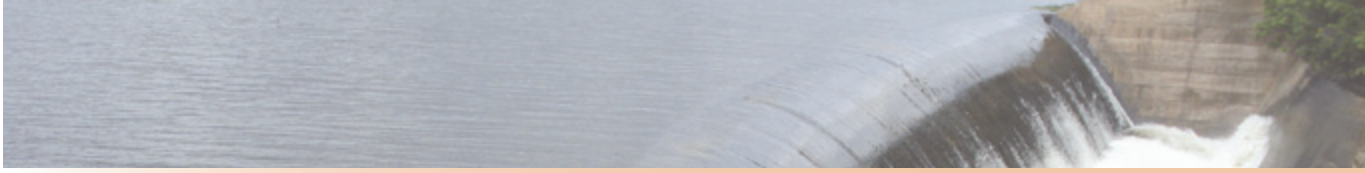
Source: Ministry of Water Resources Development and Management.



an elected catchments council, with technical support from ZINWA. The Minister for Water Resources Development and Management (MWRDM) provides guidance on policy matters through the Department of Water Resources (DWR).

Map 7.1: Seven Designated Catchment Areas of Zimbabwe





The Department of Water Resources assists the Ministry to carry out the following statutory functions:

- Development of water policies, laws and regulations and general directions to guide the orderly and integrated planning of the nation's water resources to ensure their optimum development, utilization and protection;
- Ensuring the availability of water to all citizens for the primary purposes with due regard to environmental requirements;
- Ensuring the equitable and efficient allocation of available water to all users;
- Giving effect to any international water agreements to which Zimbabwe is party;
- Fixing the criteria for water allocation and the issue of permits by Catchment Councils.

The main responsibilities of the Zimbabwe National Water Authority (ZINWA) are as follows:

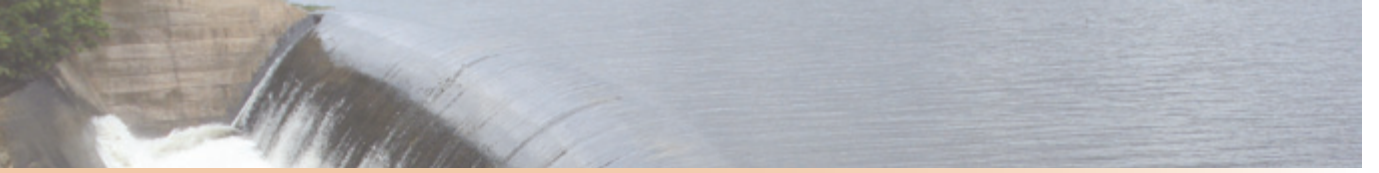
- To advise the Minister on the formulation of national water policies and standards;
- To exploit, manage, and conserve water resources in order to ensure security of supply and to facilitate equitable access to water by all sectors, and its efficient utilization, while minimizing the impacts of drought, floods and other hazards;
- To provide specialist advice and technical assistance to local authorities and catchment councils in matters concerning the development, management and environmental protection of water resources;
- To provide design and construction services for new works and to operate and maintain water supply facilities owned or managed by ZINWA;
- To carry out and publish hydrological and geographical surveys, including water related research, for the purposes of planning, development, and exploitation of water resources;
- To effect the joint management of international water resources, as directed by the Minister.

The head office of ZINWA is located in Harare and it has a branch office in each of the seven catchments headed by a Catchment Manager. The multidisciplinary staff of the latter is responsible for the statutory functions of ZINWA. The staff typically includes expertise in hydrology, hydrogeology, water supply and quality, and administrative support.

Each Catchment Council (CC) is established by a statutory instrument under the Water Act. The councils are composed of representatives of those sub-catchment councils in each catchment. The Catchment Manager's office provides technical and secretarial services to the respective catchment councils. The main responsibilities of each council are: (i) to prepare a Catchment Outline Plan (COP) for its river system; (ii) to determine and grant water use permits under criteria set by the Department of Water Resources (DWR); (iii) to regulate and supervise the exercise of rights to, and use of water in respect of its river system; and (iv) to ensure proper compliance with the Act and to supervise sub-catchment councils.

The sub-catchment councils (SCC) are established by the Minister through a statutory instrument under the Water Act for any part of a declared river system that falls under the catchment council. The SCC is the operational arm of the CC. Its main function is to regulate and supervise the exercise of rights to water within the area for which it was established. It also performs any other functions that may be conferred upon it in terms of the Water Act.

The stakeholders comprise the water users, members of government departments with legal responsibilities in the management of natural resources, and private organizations that represent interests in the basin or otherwise have a direct stake in water management in the catchment. The SCC is elected from representatives of water users.



Zimbabwe is bordered to the north by the Zambezi River and to the south by the Limpopo River, both of which flow through Mozambique to the Indian Ocean. Table 7.1 describes the main river systems in Zimbabwe. These major river systems form the basis for the above-mentioned seven catchments of the country: Save, Runde, Mzingwane, Gwayi, Sanyati, Manyame, and Mazowe. These major rivers feed into either the Zambezi or the Limpopo.

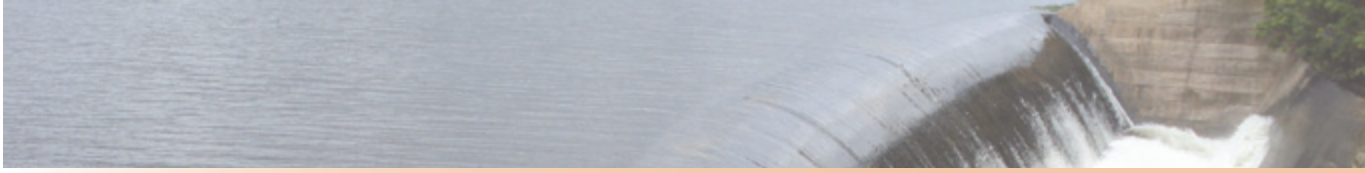
Table 7.1: The Major Rivers that Serve Zimbabwe

River	Description	Countries
Catchment Areas that Feed the Zambezi River		
Zambezi River	Rises in north-western Zambia . Fourth longest river in Africa, with a basin area of 1,390,000 sq. km; 3,540 km long.	Zambia, Angola, Namibia, Botswana, Zimbabwe, and Mozambique
Gwayi River	Gwayi River rises Northwest of Bulawayo and flows northwards 400 km to enter the Zambezi in Devils Gorge upstream of Lake Kariba	Zimbabwe
Mazowe River	Rises north of Harare and flows north and then northeast, where it forms part of the border with Mozambique before entering the Zambezi River	Zimbabwe and Mozambique
Manyame River	Also known as **Panhame** and formerly as **Hunyani** is a tributary of the Zambezi River. It rises mear Waddilove, SE of Chitungwiza and drains first into Chivero reservoir, then Lake Manyame and forms part of the larger Manyame catchment that flows into Carbora Bassa reservoir on the Zambezi. It has been said to be the most important river in Zimbabwe	Zimbabwe and Mozambique
Sanyati River	The river rises in Mashonaland East just north of Chivhu and approximately 100 kilometres south of Harare. It runs approximately north-west and for much of its length it originally formed the southern border of Mashonaland province, and today is largely the southern border of Mashonaland West. The river is joined by the Mupfure River (also known as the Umfuli). Below this point, the river is often referred to as the Sanyati. After a total of 500 km the river flows in to Lake Kariba (the section of the Zambezi between the Kariba Dam and the Batoka Gorge) making it part of the Zambezi Basin.	Zimbabwe
Catchment Areas that Feed the Limpopo River		
Limpopo River	Rises in central southern Africa; 1,750 km long with a drainage basin of 415,000 sq. km.	South Africa, Botswana, Zimbabwe, Mozambique
Mzingwane River	The **Mzingwane River** (alternative spelling Umzingwane River) is a major left-bank tributary of the Limpopo River. It rises near Fort Usher, Matobo District, south of Bulawayo and flows into the Limpopo River near Beitbridge, downstream of the mouth of the Shashe River and upstream of the mouth of the Bubye River.	Zimbabwe
Runde River	The **Runde River** (formerly Lundi River) is a river in south-eastern Zimbabwe. It is a tributary of the Save River and rises 60 km east of Bulawayo and flows 200 km to the Limpopo River	Zimbabwe
Save River	Rises 80 km south of Harare and flows 400 km from the Highveld to its confluence with the Odzi River. It is joined by the Runde River at the Mozambique border.	Zimbabwe and Mozambique
Shashe River	Rises northwest of Francistown, Botswana , and flows into the Shalimpo Tran frontier conservation area. Major left-bank tributary of the Limpopo River	Botswana, Zimbabwe and South Africa

Source: ZINWA.

7.2.2.2 Urban Water and Sanitation Services

The major urban areas are divided up into the following 31 administrative units: (i) six cities, nine municipalities, 13 town councils, and three local boards. Each entity has a statutory requirement to provide water and sanitation services to their communities. ZINWA has supply responsibilities for water and sewerage in some of the smaller towns, but for other towns the ZINWA responsibility is restricted to bulk water supply, with the local council responsible for distribution and billing. In addition, ZINWA has supply responsibilities for 534 "ZINWA Stations" supplying small settlements that may comprise growth centres, health centres, and small units at border crossings, National Parks, and police posts in strategic locations.



7.2.2.3 Rural Water and Sanitation Services

Over the past two decades, there have been changes in responsibilities for various aspects of the supply of rural water and sanitation services. As things now stand, there appear to be overlapping responsibilities and lack of clarity among the various entities now involved with service provision. The key entities active in rural water and sanitation are the National Action Committee (NAC), the Rural District Councils (RDCs), the District Development Fund (DDF), and the Water Environmental Sanitation Working Group (WES).

The *National Action Committee* was set up in 1987 to manage the implementation of the Integrated Rural Water Supply and Sanitation Project (IRWSSP). The NAC was largely funded from bilateral aid. With the withdrawal of donor support in 2000, its activities collapsed. The NAC was re-launched in October 2010 under the Deputy Prime Minster (Infrastructure Cluster). Because eight ministries are involved in the cross-cutting nature of water and sanitation, the MWRDM was made Chair of the NAC and supported by a Secretariat. The NAC's responsibilities include the review and approval of all rural water and sanitation project proposals and plans originating at district level, setting of policies and standards for the rural water and sanitation sector, and formulation of strategies for the delivery of rural water and sanitation projects.

Rural District Councils are responsible for all development activities in their districts. They are required to ensure the right to access to basic water and sanitation services, and formulate development plans that integrate water and sanitation services. RDC Water and Sanitation programs are funded through the Department of Infrastructural Development Services (DID) of the Ministry of Local Government, Urban and Rural Development. They co-ordinate the activities of NGOs in the districts, and liaise with the District Development Fund on development and maintenance needs.

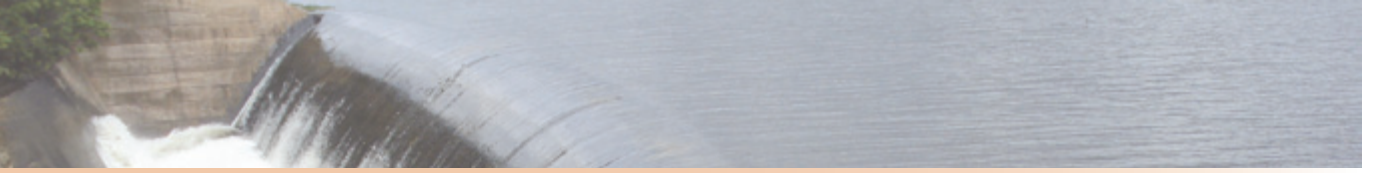
District Development Fund is responsible for the development and maintenance of non-commercial water supplies in communal and resettlement area and research and development of appropriate technologies. Development funds for water and sanitation are channeled to the RDCs through the Rural Capital Development Fund (RCDF) for minor activities. Major capital items are funded through the Public Sector Investment Program (PSIP).

With the re-engagement of the donor community in support for water and sanitation in recent years, there was need for coordination of donor activities. The *Water Environmental Sanitation Working Group* was established in 2008. It is coordinated by UNICEF and includes private sector representatives. It helps to facilitate a coordinated and collaborative humanitarian response, resource mobilization, networking, and sharing of information and lessons learned. The primary focus of WES is rural communities, but its activities include support for urban activities. The main objective of the Working Group is to ensure coordination of all humanitarian-related water and sanitation interventions being implemented by donor-supported NGOs. It ensures that the NAC and UN country team are kept informed about these activities, and it promotes linkages with other relevant sector working groups, especially those responsible for health, HIV/AIDS, food security, agriculture, and nutrition.

7.2.2.4 Irrigation Services

The Ministry of Agriculture, Mechanisation, and Irrigation Development has overall responsibility for development and implementation of irrigation policy and services. Responsibility for various aspects of irrigation services is shared among units within the Ministry, as follows:

- The Department of Research and Extension Services (AREX) provides extension



services to all irrigators and its research section is responsible for soil surveys and testing for irrigation development;

- The Agricultural and Rural Development Authority (ARDA) is a parastatal agency responsible for the operation of government-owned irrigated estates and farms. It works closely with the Department of Irrigation;
- The Grain Marketing Board (GMB) is a parastatal agency in charge of marketing the country's strategic crops. All controlled crops such as maize and wheat from irrigation schemes are sold to the GMB at regulated prices. The GMB also administers the government input credit scheme for irrigators;
- The Department of Irrigation (DOI) is a new department which was initially in the Ministry of the then Rural Resources and Water Development (MRRWD) and was recently moved over to MAMID. The Department is mandated with all the irrigation activities in the country which include planning, identification of schemes, designing, construction, operation and management of existing irrigation schemes.

7.3 WATER RESOURCES AND RELATED INFRASTRUCTURE

7.3.1 Water Resources of Zimbabwe

According to FAO estimates, the total surface water produced annually is 11.26 million km3, while annual ground water production is 6.00 million km3.[1]

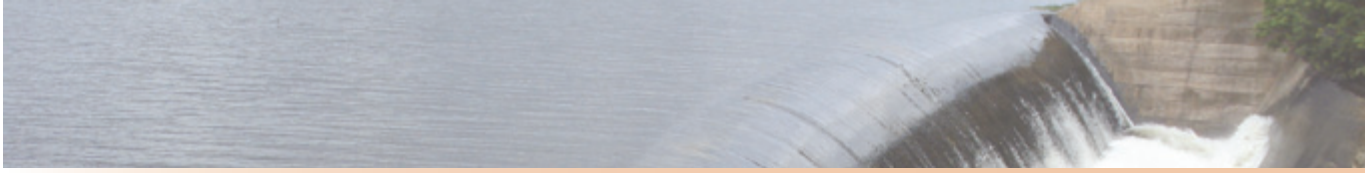
After allowing for an overlap between surface water and groundwater resources estimated at 5.00 million km3, the total renewable water resources produced annually in Zimbabwe is estimated at 12.26 million km3 (Table 7.2). The surface water entering the country each year is estimated to be

Table 7.2: Zimbabwe: Water Sources and Uses , 2002 (In billions of m³)

Water indicator	Volume (mill km³)
Renewable water resources	
Surface water produced internally	11.3
Ground water produced internally	6.0
Less: overlap between surface & groundwater sources	-5.0
Total renewable water resources produced annually	12.3
Plus: surface water entering the country	7.7
Total renewable water resources available	20.0
Withdrawal of water resources	
Irrigation and livestock	3.3
Domestic	0.6
Industry	0.3
Total withdrawal	4.2
Memo items:	
Total renewable resources per capita per year (m³)	1604.8
Total withdrawal of water per capita per year (m³)	337.4

Source: FAO (2005).

1 FAO (2005), Irrigation in Africa in figures —— AQUASTAT Survey 2005. Food and Agriculture Organization, Rome, 2005.



7.74 million km3, to give a total supply of renewal water resources of 20 million km3. On a per capita basis, the total available renewable resource was 1,605 m3 and the total withdrawal was 337 m3. Zimbabwe's available resources are low relative to many other SSA countries; for example, Mozambique which had available resources of 5,208 million km3 in 2002. Zimbabwe's rate of withdrawal of 337 m3 per capita compares with an average of 173 m3 per capita for Sub-Saharan Africa for 2002 (FAO 2003), but this withdrawal rate is very low in comparison with other parts of the world.[2] As with other SSA countries, utilization of renewable water resources in Zimbabwe is low, as reflected by the fact that only 5 percent of Zimbabwe's cropland is irrigated.

The overall groundwater resource of Zimbabwe is small when compared with estimates of surface water resources, mainly because the greater part of Zimbabwe consists of ancient igneous rock formations where groundwater potential is comparatively low. According to the FAO, the estimated available groundwater potential is between 1 and 2 million km3 per year. Four aquifer systems of relatively high groundwater potential are known. These are:

- The Lomagundi dolomite aquifer which occurs northwest of Chinhoyi, about 120 km northwest of Harare.
- The Forest sandstone which occurs in the Save, Limpopo, and Zambezi basins.
- The Kalahari sands which are widespread in the southwestern part of the country and where exploitable groundwater resources are related to the thickness of the sands.
- Alluvial deposits which occur mainly in the Save valley where they form a local aquifer, along the Zambezi, Manyame, and Musengezi rivers.

Given the limited potential of groundwater resources, it is clear that adequate storage in reservoirs is required for the full utilization of the country's water resources. There has been an aggressive program of construction of medium- and large-size dams for irrigation and other purposes, although funding shortfalls in the past decade have resulted in cessation of ongoing construction work. Dams can be owned by commercial companies, local authorities and ZINWA. The owners have a responsibility to ensure that the dam is maintained and fit for purpose. Extraction of water from dams is limited by the permit, and charges are levied by ZINWA.

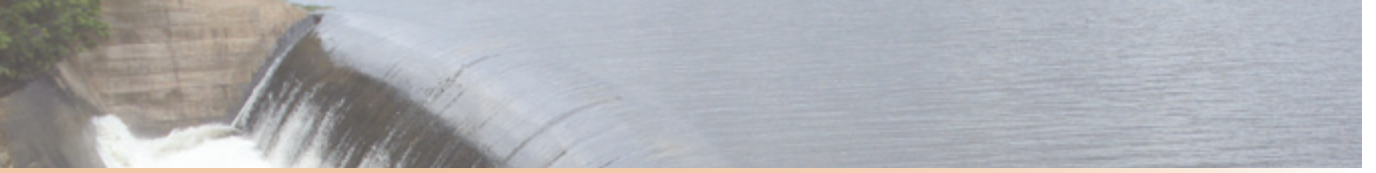
Table 7.3: Dams Classified by Size and Ownership

Type of dam	Ownership		
	Government	Private	Total
Large	250	10	260
Medium/small	600	1340	1940
Total	850	1350	2200

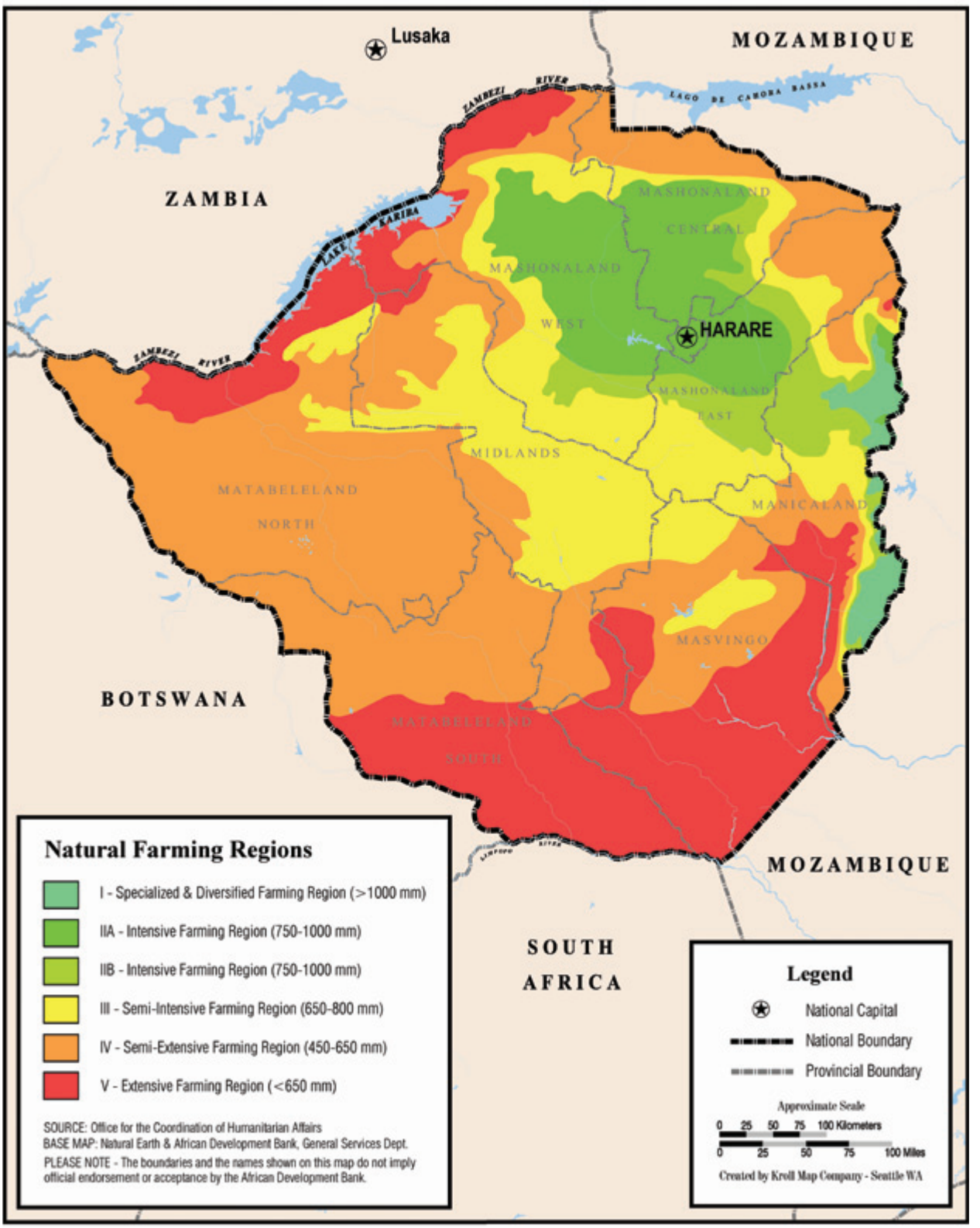
Source: ZINWA.

As Table 7.3 indicates, there are about 2,200 dams in Zimbabwe, 850 of which have been constructed by the Government. Most of the 1,350 privately owned dams are small. The International Commission on Large Dams (ICOLD) reports a total of 253 large dams in Zimbabwe; 100 of these are owned by the Government of Zimbabwe or government parastatals (including the Zambezi River Authority which owns the Kariba dam); seven are owned by city governments; and 146 are privately owned. As noted earlier, the total capacity of dams in Zimbabwe is estimated at 103 million km3, including Lake Kariba which accounts for 90.30 million km3. . Not including Lake Kariba, the large dams listed by ICOLD account for 9.08 million km3 of this capacity. The large dams owned by the Government of Zimbabwe and city governments account for 7.61 million km3 and 0.22 million km3 of capacity respectively (Figure 7.2). The key point about these ownership arrangements is that national

2 For example, the available renewable resource per capita for Asia in 2002 was 4,079 m3 and the per capita withdrawal rate was 631 m3. For North America, the comparable per capita rates for 2002 were 19,993 m3 and 1,663 m3. See FAO (2003), FAO Statistical Database.http://www.fao.org/corp/statistics/en.

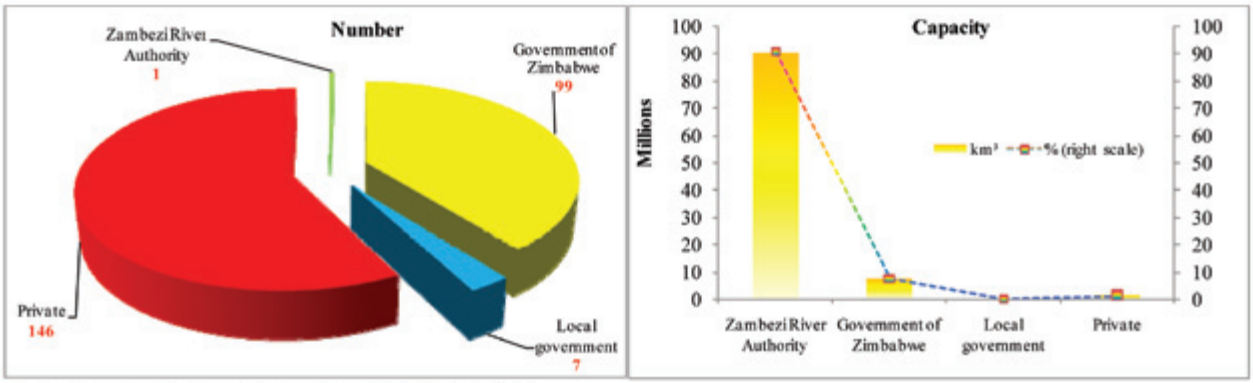


MAP 7.2: AGRO-ECOLOGICAL ZONES OF ZIMBABWE



and local government own almost 90 percent of the existing dam capacity of the country, other than that of Lake Kariba which is owned jointly by the Governments of Zambia and Zimbabwe. These publicly owned dams account for most of the stored water supply in the country. Their condition and that of pipelines and canals that carry water from these dams are central to Zimbabwe's water resource management and supply capacities.

Figure 7.2: Ownership of Large Dams in Zimbabwe



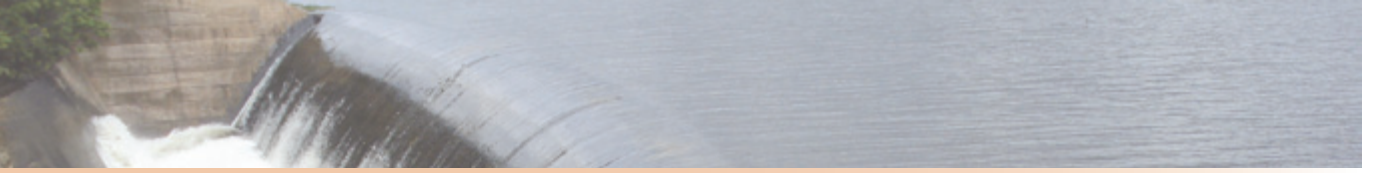
Source: International Commission on Large Dams, ICOLD database, 2001.

As with other types of infrastructure assets, there has been a lack of maintenance of dams over the past decade. Zimbabwe now faces a situation where there may be a serious public safety risk from breach of some of these dams. The lack of maintenance has also resulted in loss of large volumes of water that in turn have affected services to populations dependent on the supply of water from these dams. Moreover, a high proportion of the medium- and small-sized dams face operational difficulties because of high levels of siltation that, in turn, stem from inadequate attention to sustainable management of watersheds.

7.3.2 Hydrological and Climatic Variability

Climatic conditions in Zimbabwe are largely subtropical with one rainy season, from mid-November to March, a cool winter season from April to August and the hottest and driest period from September to mid-November. Average annual rainfall is 657 mm, but ranges from over 1,000 mm in the Eastern Highlands to around 300-450 mm in the lowveldt in the south. Rainfall reliability in the country decreases from north to south and also from east to west. Evaporation varies over the country to a much smaller extent than rainfall. Values of net annual pan evaporation range from about 1,400 mm in the Eastern Highlands up to 2,200 mm in the lowveldt. Only 37 percent of the country receives adequate rainfall for agriculture. For the rest of the country the rainfall pattern is insufficient, erratic and unreliable, making supplementary or full-time irrigation indispensable for successful agriculture. In the drier parts of the country, most rivers are not perennial. Only the major rivers such as Munyati, Manyame, Mazowe, Save, and Runde are perennial. However, even in dry years these large rivers may dry up in the months of August to November.

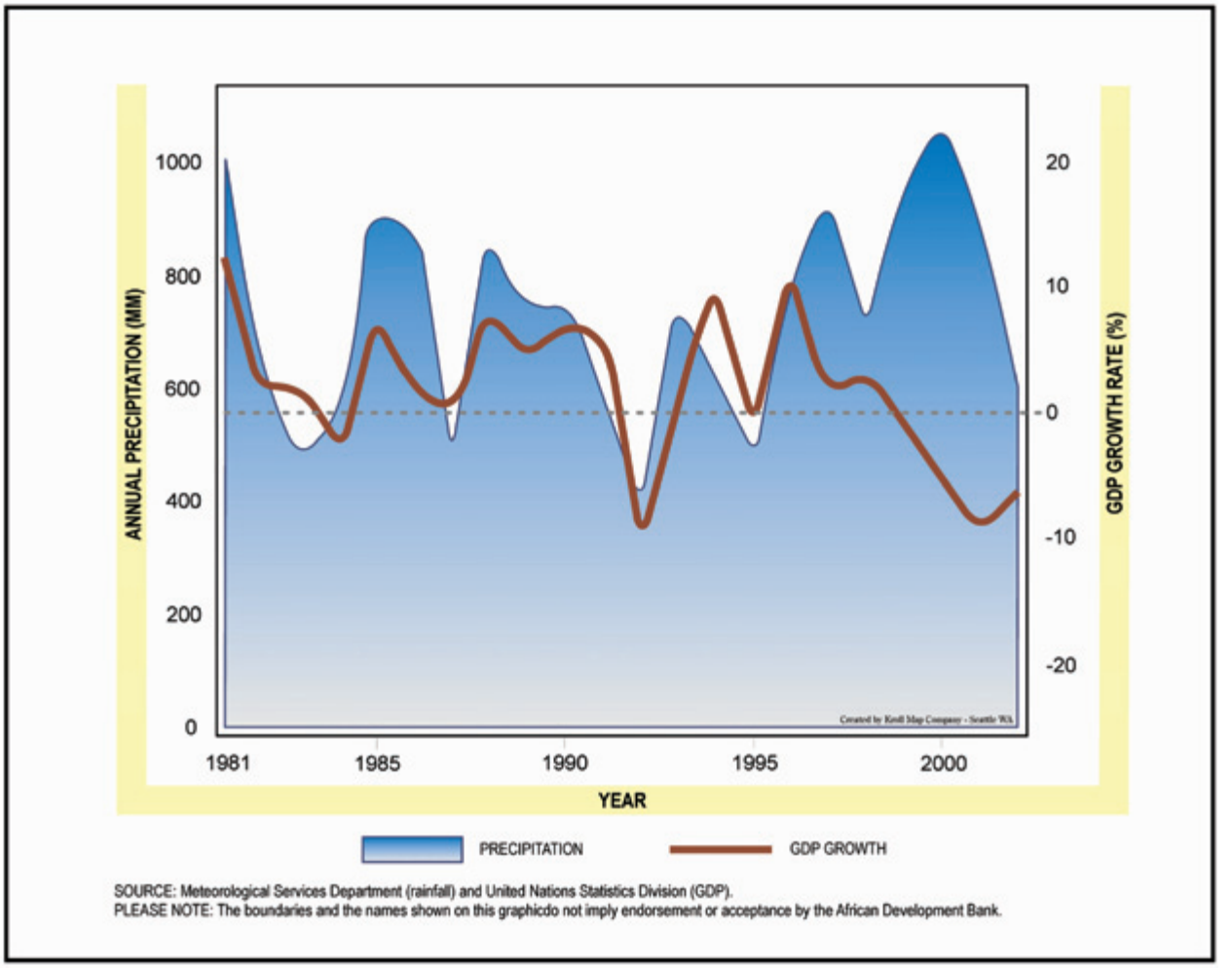
A high climatic variability is one of the major challenges facing Zimbabwe in its management of water resources. As noted earlier, Zimbabwe depends heavily on surface water to meet its various requirements. However, rainfall is variable and unpredictable. This hydrological variability is important for Zimbabwe, given the very small share of cropland that is irrigated. As discussed elsewhere in this Chapter, the arable and permanent cropland of Zimbabwe is about 3,327 thousand hectares, of which only 11 percent (366,000 hectares) currently has a potential for irrigation. Current information is not available for the amount of land that is currently being irrigated, but



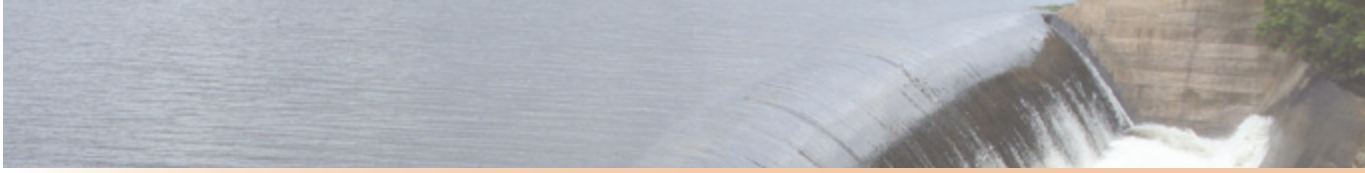
estimates for 2002 indicate that 173,500 hectares were equipped for irrigation, but only 124,000 hectares were actually being irrigated. In other words, only 5 percent of the cropland is irrigated. Given the substantial declines in agricultural output in the past decade, and lack of funding for maintenance of infrastructure, it is very likely that the area of cropland that is currently under irrigation has declined from the 2002 level.

As Figure 7.3 indicates, Zimbabwe faces year-to-year variations in rainfall that exceed 30 percent of the mean. High seasonal variability compounds these effects, causing floods and droughts. The hydrological variability experienced by Zimbabwe causes significant economic shocks. As Figure 7.3 indicates, the fluctuations in GDP growth during the 1981-98 period were closely linked to rainfall variability. As discussed in Chapter 1, the continual decline in GDP for most of the past decade stemmed from the economic policies of the country rather than hydrological variability. Nonetheless, it is clear that improved water resources management is critical to the stability and security required for sustained strong economic growth. A number of studies have been published on the effects of climate change on agriculture in Zimbabwe, the most recent by the World Bank.[3] The findings indicate that climatic variables (temperature and precipitation) have significant effects on net farm incomes in Zimbabwe (Table 7.4).

Figure 7.3: Rainfall Variability and Economic Growth in Zimbabwe



3 See Mano, Reneth and Charles Nchemachena (2007), Assessment of the Economic Impacts of Climate on Agriculture in Zimbabwe. The World Bank, Washington DC, Policy Research Working Paper 4292, July 2007.



The results showed that farms with irrigation are more resistant to changes in climate, indicating that irrigation is an important option for reducing the impact of further changes in climate. Studies for a number of other Southern Africa region countries have similar results.[4]

With only 20 percent of renewable water available each year being used, it is clear that there is substantial scope for increased investment in infrastructure to store and transport water. The storage capacity of the country remains underdeveloped. As noted earlier, the total storage capacity of Zimbabwe's dams, excluding Lake Kariba is about 9 km3, which is equivalent to 719 m3 of storage capacity per capita. This is roughly the same as in South Africa (Figure 7.4). Zimbabwe's share of Lake Kariba accounts for more than 90 percent of the country's storage capacity, and if that is included, the storage capacity per capita increases to 7,500 m3, which is comparable to the level of storage in North America.

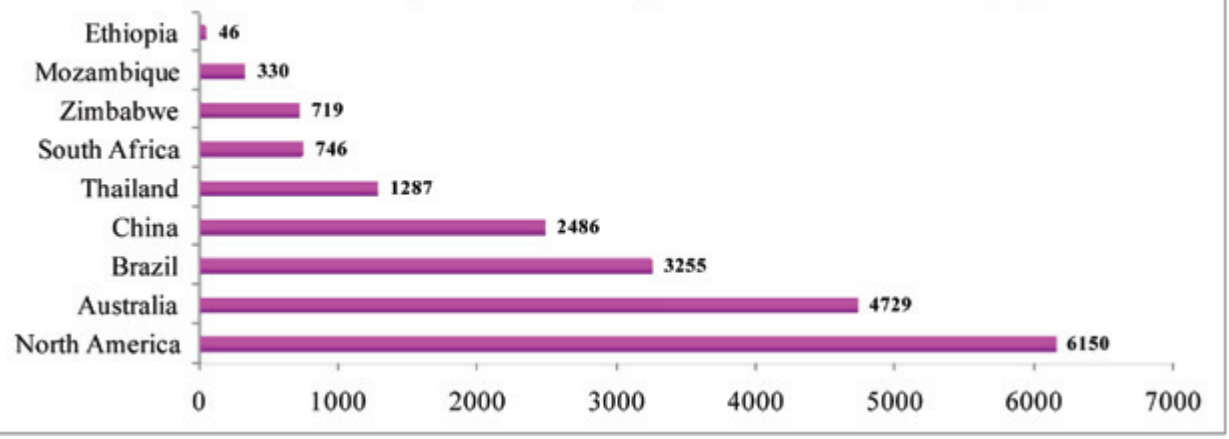
Table 7.4: Zimbabwe:Forecast Impact on Net Farm Revenue of Climate Change (Percentage change in net farm revenue per hectare)

Climate change scenario	All farms	Dry land	Irrigated
Increase in temperature of 2.5%	-31	-17	3
Increase in temparature of 5.0%	-36	-21	-1
Reduction in rainfall of 7%	-27	-16	-2
Reduction in rainfall of 14%	-28	-22	-2

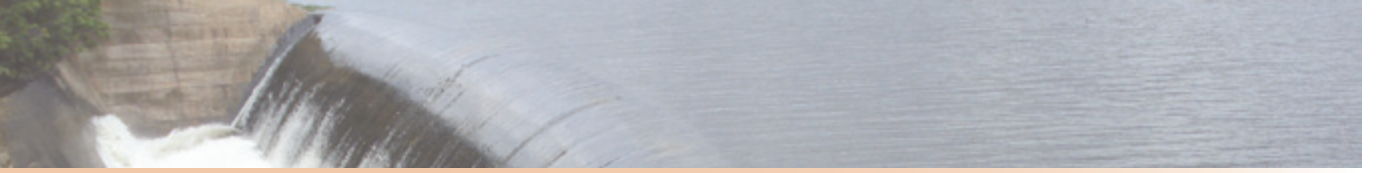
Source: Mano and Nhemachena (2007).

The subsequent consideration in this Chapter about investment priorities for the decade ahead includes a review of the Government's proposed investment program for new water storage and transport capacity. To the extent possible, future water storage infrastructure should be developed as multi-purpose facilities in a basin- or catchment-wide context. In this way, the needs for flood control, salinity repulsion, development of irrigation, and environmental requirements can be addressed.

Figure 7.4: Per Capita Water Storage for Selected Countries (m3)



4 Mozambique's GDP growth is reduced by more than 1 percentage point annually because of water shocks (World Bank 2007). In Zambia, a study of hydrological variability found that rainfall variability will cost the country $4.3 billion in lost GDP over 10 years, and it lowers the country's agricultural growth by 1 percentage point each year (World Bank 2008).



7.3.3 Regional Cooperation on Water Use

The other major challenge for the management of the country's water resources relates to arrangements for sharing the resources of the major basins that serve countries in the southern Africa region. As Table 7.1 indicates, since Zimbabwe is a land-locked country, all its major rivers are shared with neighboring countries. Zimbabwe cooperates actively with other members of the Southern Africa Development Community (SADC) on the shared management of the region's river systems. The country is a signatory to the Shared Water Course Systems Protocol, which provides the basis for the management of international rivers in SADC. It is also an active member of the Limpopo and Zambezi basin commissions which oversee joint management of these international rivers.

Given the current very low levels of storage capacity per capita in Sub-Saharan Africa, the expectation is that many SSA countries will want to reduce their vulnerability to hydrological variability through increased investment in infrastructure for storage and transport of water. The challenge will be to strengthen these existing arrangements for managing the international river basins to ensure that increased investment in storage does not cause increased tensions and possible conflict among riparian states.

7.3.4 Pricing Policies for Water Supply

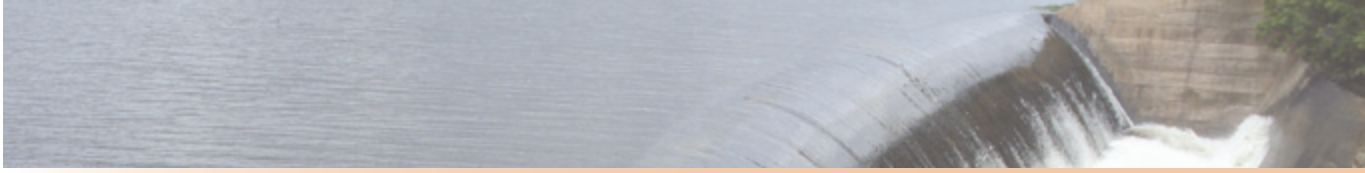
A major concern in the past decade was the increasingly large gap between the price of water charged by ZINWA and the domestic inflation rate. However, the past 18 months has seen an improvement in the financial position of ZINWA. As Table 7.5 indicates, revenues from the sale of water were $47 million in 2009. With operating expenses of $37 million, net operating income was $10.4 million. As a result, ZINWA had an operating profit margin of 23 percent – one of the better performances in 2009 among the nine parastatals involved with infrastructure-related service provision. Water prices in 2009 were sufficient to cover operating costs, but a provision of $11 million for bad debts resulted in negative net income of about $600,000.

Table 7.5:Income Statement for ZINWA (US$ '000)

Item	2009
Revenue	
Water sales	
Clear water	32138
Raw water	12719
Other income	2795
Total revenues	47652
Operating expenses	
Supplies and services	12563
Personnel	17092
Repairs and maintenance	3833
Other expenses	3547
Depreciation	203
Total operating expenses	37237
Operating income	10416
Extraordinary expenses	11019
Net income	-604

Annex Tables 3.3

Going forward, ZINWA must address three particular financial concerns. The first is that it had some $27 million of accounts receivable, including a substantial amount due from public sector agencies. The average collection period for these accounts was 220 days. A reduction in the average collection period to 30 days would generate about $20 million of additional receipts, sufficient to reduce accounts payable to more manageable levels. The second issue is that the level of maintenance spending by ZINWA is low. In 2009, ZINWA reported outlays of only $540,000 on maintenance of the publicly owned dams for which it is responsible. Among the 250 major dams in the country, those owned by the Government account for more than 80 percent of the total storage



capacity of all dams (excluding Lake Kariba). As Annex Table 3.15 indicates, the capital value of the dams managed by ZINWA is estimated to be about $700 million at the present time. With routine maintenance and repair estimated at 4 percent of their capital value, the current level of maintenance spending by ZINWA should be in the range of $30 million a year. A substantial increase in maintenance outlays on existing and proposed new dams will be required in the decade ahead. A detailed assessment of these future maintenance requirements is set out in Annex 3.F.

The third concern stems from the above-mentioned inadequate levels of maintenance spending by ZINWA. It would appear that the tariffs for raw water supply are low in comparison with other countries that also price water on a volumetric basis for agriculture. In a recent study of irrigation potential in Sub-Saharan Africa, the working assumption for an evaluation of the feasibility of large scale investment in irrigation was that the cost of water delivery and conveyance was $0.25 per m3 (World Bank 2010). Another study cited a price of $0.065 per m3 for irrigation water in a Tunisian irrigation project.[5] These compare with the raw water price for commercial agricultural estates reported in Table 7.6 of $0.01268 per m3 (equal to $12.68 per million liters) — a level that is one fifth of the Tunisian example. A further complication is that the raw water supply of ZINWA is not metered.[6] The low prices for raw water reduce the revenues of ZINWA. While ZINWA recorded a net operating income of $10.4 million in 2009, the surplus came at the expense of an allocation of only $540,000 for maintenance and repair of dams that, in turn, stemmed from the very low raw water charges for various user categories.

Table 7.6: ZINWA Raw Water Charges (US$ per million liters)

Consumer category	Price
Industry	13.17
Commercial agriculture	
Commercial estates	12.68
A2 farmers	12.19
A1 farmers	7.80
Local authorities	11.71
Local communities	
Pumped water	5.00
Gravity fed water	5.00

Source: ZINWA.

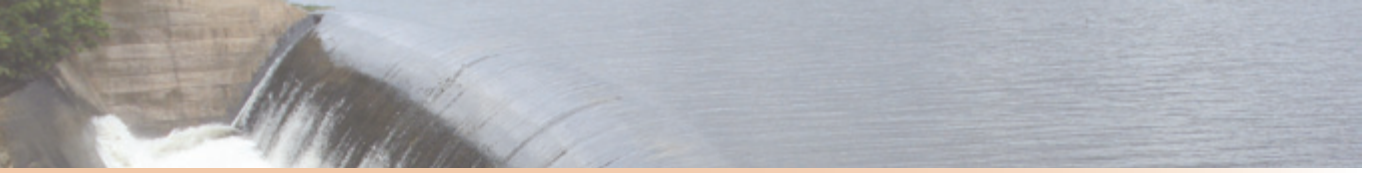
The implication is that ZINWA will need to increase the price charged for raw water if it is to cover operating costs that include realistic levels of maintenance spending on water resources infrastructure while at the same time continuing to generate a financial surplus that would be available to cover some of the capital costs of the program.

7.3.5 Proposed Action Plan for Management of Water Resources

With a 30 percent increase in urbanization in the decade ahead and sustained economic growth, demand for water will continue to grow steadily. As noted elsewhere in this Report, demand has exceeded supply capacity throughout the past decade. The challenge for the decade ahead is to close this gap with rehabilitation of existing WSS facilities, increased investment in new infrastructure for water storage and transport, and improved conservation of existing resources. These measures will need to be complemented by improved institutional arrangements for management of water resources and service delivery and improved cost recovery in

5 Easter, K. William, and Yang Liu (2005), Cost Recovery and Water Pricing for Irrigation and Drainage Projects. Agriculture and Rural Development Discussion Paper 26, World Bank, Washington DC, 2005.

6 The price is calculated from the maximum capacity of pumps working for a specified period of time. In the event that a pump is not working or a raw water source is not available, the charges continue to apply.



the sector. Without substantial additional investments in water resource infrastructure, including storage and transport capacities, it is very likely that water demand will continue to exceed supply and, as a result, the current unregulated use of water resources will persist.

Future demand for water. Reliable estimates of the current use of water resources for agriculture, mining and industry, and domestic purposes are not available. The annual drawn-down of renewable resources of 4.2 million km3 reported by FAO for 2002 is the most recent information available. There are no up-to-date estimates of water use for irrigation, industry, and households. Nor are there any projections of likely future use. For the purposes of this Report, a very rough estimate of current water use has been made, along with a projection of the growth in use for the decade ahead. Annex 3.C contains a detailed outline of the assumptions that underpin these projections.

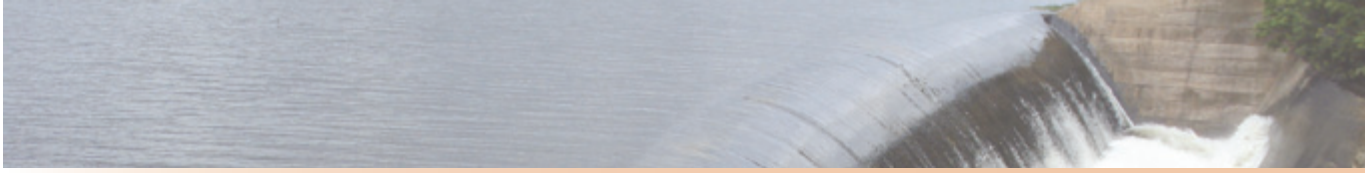
Given the very substantial declines in agricultural and industrial production in the past decade as discussed in Chapter 1 of the Report, and the 16 percent decline in household access to safe water during 2002-09, the current annual drawdown of water resources has declined since 2002, although the full extent of the decline is not known with any degree of accuracy. Table 7.7 suggests that the current level of water use is about 50 percent of the 2002 level, largely because of a sharp decline in the use of irrigation. A decade ago some 50,000 tons of wheat was cultivated under irrigation, with annual production in the range of 300,000 tons. Current levels of wheat production are in the range of 10,000 tons a year, implying a very large decline in the use of irrigation. The second most important crop under irrigation at the start of the decade was sugar cane, with about 35,000 hectares under cultivation. Current levels are about half that of 2000.

Overview of proposed Action Plan. The Report sets out a proposed Action Plan for water resource management in Zimbabwe in the decade ahead. The emphasis at this stage is on strengthening capacities within the sector and the further development of the country's water resources. Once the basic stock of water infrastructure has been developed, the emphasis would shift to management of these resources. The key elements of the proposed program are:

Table 7.7: Zimbabwe: Estimate of Growth in Water Use and Storage Capacity (million km³)

Indicator	2002	2010	2011	2012	2013	2014	2015	2020
Water use								
Irrigation	3.32	1.66	1.99	2.32	2.66	2.99	3.32	5.35
Industry	0.30	0.22	0.25	0.28	0.30	0.32	0.35	0.51
Households	0.59	0.29	0.37	0.46	0.56	0.61	0.66	0.88
Total	4.21	2.17	2.61	3.06	3.51	3.92	4.33	6.74
Dam capacity								
Existing	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08
Required new	…	…	…	…	…	…	0.50	5.75
Total	9.08	9.08	9.08	9.08	9.08	9.08	9.58	14.83
Memo items:								
Use as % of capacity	46.31	23.93	28.77	33.69	38.70	43.16	45.18	45.45
Irrigation (% of total use)	78.91	76.34	76.22	75.96	75.56	76.24	76.70	79.33

Source: Annex Table 3.9.



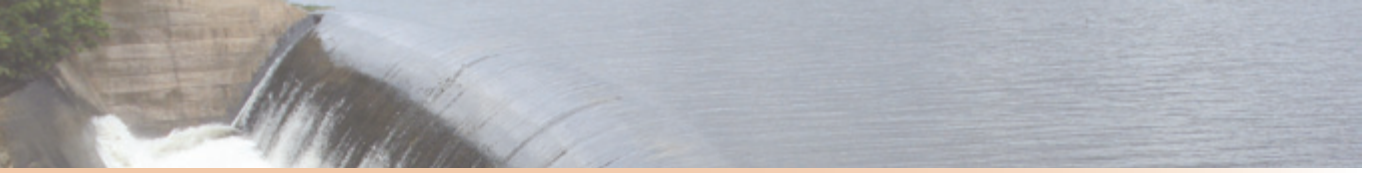
- A program of analytical studies, technical support and capacity building for institutions with responsibilities for water resource management.
- An inspection program for all of the major dams in the country to assess risks to public safety, extent of water losses, and extent of siltation.
- A rehabilitation program to remedy deficiencies in existing water infrastructure. This component of the program would include rehabilitation of existing dams, water transport facilities such as canals and pipelines, and water treatment plants.
- Drilling and hydrological investigations and expansion of hydrological stations to provide basic information for improved management of the national water resources.
- Expand availability of raw water with construction of additional water supply infrastructure, including completion of dams whose construction was discontinued in the past decade because of funding shortages, new dams and water transport facilities, and treatment plants.

Capacity building and technical support. A clear strategy is also required to address the vulnerability of the Zimbabwe economy to water shocks and the constraints to growth and poverty reduction imposed by an inadequate stock of water infrastructure. A multi-pronged approach to technical support and capacity building is proposed. The Report proposes the preparation of a water resources strategy for the country. The main thrust of the assessment would be as follows:

- Analysis of future water demands by sector, including specific demands of major new investment projects;
- Analysis of water infrastructure investment needs consistent with the foregoing demand analysis;
- Identification of priority investment requirements and opportunities;
- Financing options for the proposed program;
- Development of a consensus among stakeholders on the way forward.

The second element of the strategy would focus on a range of interventions designed to strengthen the policy framework for water resources management, including in particular: (i) development of an appropriate regulatory framework for water resources management that includes processes for permits and standards in construction of dams and other hydraulic infrastructure, dam safety, and water licensing; and (ii) a clear institutional framework for integrated management of the nation's water resources that includes definition of institutional roles and responsibilities, and processes for prioritizing major investments that support improvements in integrated water resource management. In the past decade, there has been substantial unregulated development of the main river basins of the country, including for example, extensive artisanal mining activities along rivers. These unregulated activities have led to deterioration in water quality and may pose increasingly important threats to ecosystems and human health. Given the magnitude of investments in water resources, consideration should also be given to promotion of possible private investment in major dams and pipelines that would contract with ZINWA for the supply of water. The proposed Action Plan includes $27.5 million of funding for an assessment of the requirements for such investment and a transaction advisory team for the design and negotiation of specific proposals. (As the discussion in Chapter 4 indicates, the cost of these services is typically about 2 percent of the capital cost of the proposed investments.)

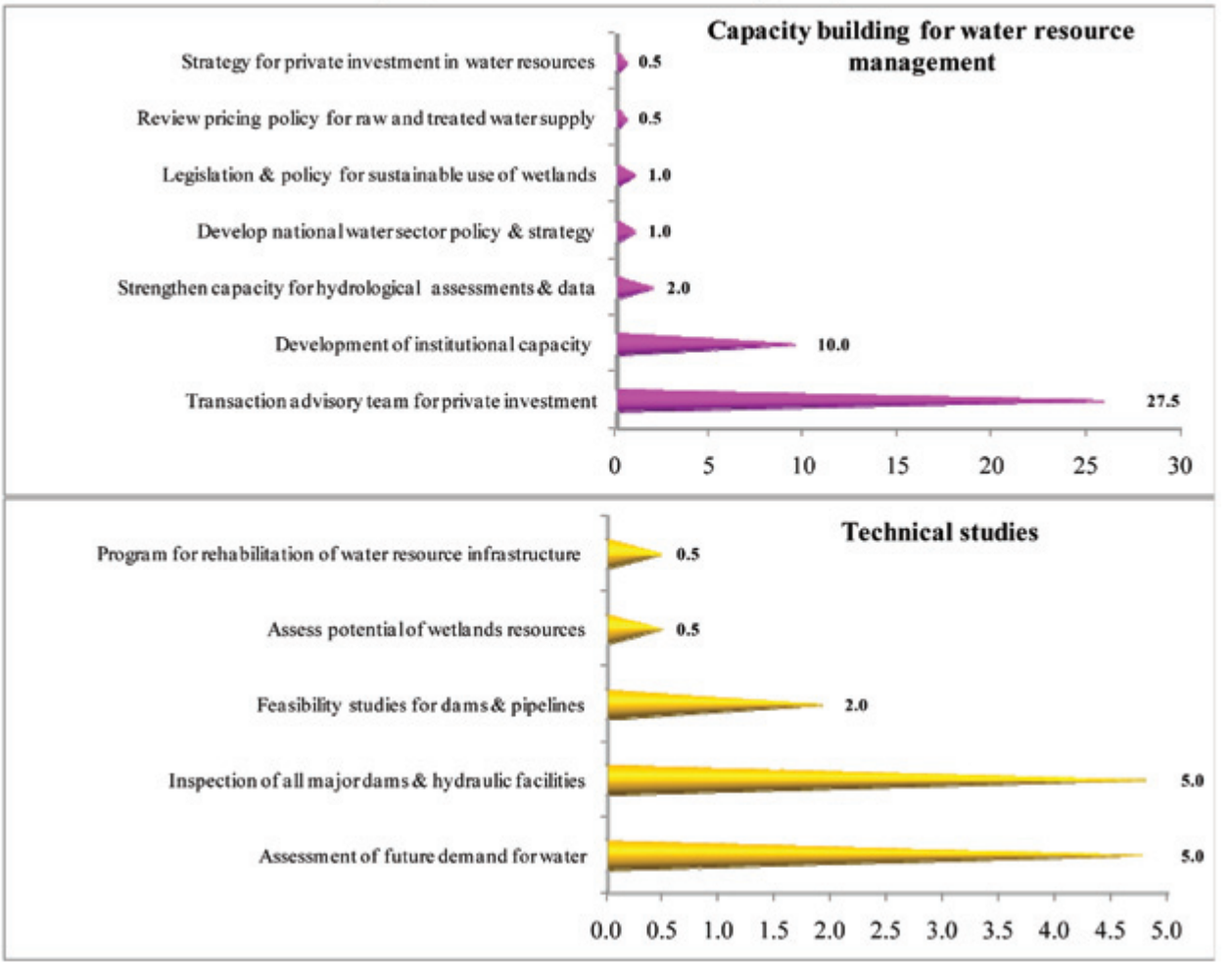
These policy and institutional initiatives will require support for capacity building. Currently, many water-related policies and programs are poorly integrated and not well coordinated. Capacities for planning, monitoring, and oversight of the water resources sector are weak. The objective of this part of the program



would be to strengthen capacities for water resource development and management, including coordination among agencies within the sector and cross-sectoral coordination, pricing policies for water supply, as well as capacities to monitor water resource use and compliance consistent with the provisions of the Water Act and related legislation.

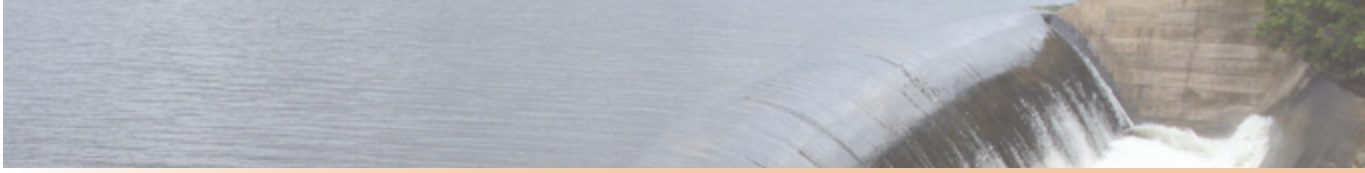
The Report proposes a total of $55.5 million for these studies, technical support, and capacity building initiatives for the decade ahead. As Chapter 3 indicates, particular attention would be given to strengthening institutional capacities for regulation and oversight of the management and use of the country's water resources.

Figure 7.5: Zimbabwe: Capacity Building for Water Resource Management (US$ millions at 2009 constant prices)



Source: Estimates by authors.

Inspection program for major dams. A high priority is attached to an inspection program for all of the major dams in the country to assess risks to public safety, extent of water losses, and extent of siltation. The objective is to avoid the risk of loss of lives, property damage, and overall public peril from breach of dams. Priority would be given to inspection of the 250 large public dams with holding capacities of 1 to 6 million m3. Under the MDTF-A, the World Bank is providing technical assistance to ZINWA for safety inspections of 25 large dams in Zimbabwe that are known to have problems and a potential for damage in the event of failure. The budget for these services is $400,000. These activities will provide early information of rehabilitation requirements for these 25 dams. However, the other 225 large public dams need to be assessed as well. The



inspection of these dams would be undertaken by highly qualified and experienced dam engineers, if need be recruited internationally. ZINWA would be expected to undertake a phased inspection program of all medium and small dams using its own technical staff. The resulting safety reports would provide the basis for decisions about rehabilitation requirements and priorities among the dams that require rehabilitation. A total of $5 million is proposed for this program.

Rehabilitation of water supply infrastructure. The development of reliable estimates of the possible cost of rehabilitation of the 250 large public dams must await the findings of the proposed inspection program. Once that becomes available it will be possible to set out a proposed rehabilitation program for implementation in the decade ahead. However, the Government has put forward a number of proposals, including rehabilitation of the 538 supply stations operated by ZINWA, repair and rehabilitation of pipelines, canals for provision of raw water, and related treatment plants. The estimated cost of these projects is $9.13 million (See Annex Tables 3.5 and 3.6 for details on these proposals).

Hydrological investigations and data collection. A major effort is required to rebuild Zimbabwe's once comprehensive water resource data gathering and monitoring network. Detailed and up-to-date information on hydrological and hydro-geological conditions is essential for effective planning, development, and exploitation of water resources, as well as effective management of water allocations among competing users and monitoring of water quality. A total of $2 million is proposed for this program.

Expansion of water storage and supply capacity. As Table 7.7 indicates, the level of water use is expected to recover in the near-term with increased emphasis on rehabilitation of the water resource infrastructure. By 2015, water use is projected to be back to the levels that prevailed a decade ago. By 2020, total water use is projected to be about 6.74 million km3 — a 60 percent increase over the level of 2002. For the near- and medium-term, the strategy is to rehabilitate existing storage and transport infrastructure and get the utilization of existing storage capacity back to about 45 percent. Among other things, the rehabilitation program would give close attention to reducing the current extensive water losses that stem from leakage at dam sites and from pipelines and canals.

The large increase in water use in the latter part of the decade ahead will require addition water storage and transport capacity. As Table 7.7 indicates, new storage would be required from about 2015 onwards and by 2020 an additional 5.75 million km3 of capacity would be required to meet these demand projections. The Government has proposed a list of some 13 dams for completion in the decade ahead.[7] These would add about 5.965 million km3 of new capacity at an estimated cost of $614 million (at 2009 constant prices) — sufficient to meet the projected demand in Table 7.7. Contracts had been awarded for the construction of 11 of these dams in the past decade, and construction had begun on a number of them. As a result of the Government's past financial difficulties, work on these 11 dams was discontinued. As Table 7.8 indicates, about $350 million of the program is reserved for single purpose dams that supply irrigation water. These dams would increase storage capacity for irrigation by 4.05 km3 which would add substantially to the current annual use of 3.32 km3 of water for irrigation. Only three of the projects listed in Annex Table 3.5 are classified as multipurpose dams. The construction cost of these dams is put at $46 million.

7 Government of Zimbabwe (2010), "Project Summaries Under the Government's Investment Proposals for the Water Sector in Zimbabwe", Harare, July 2010

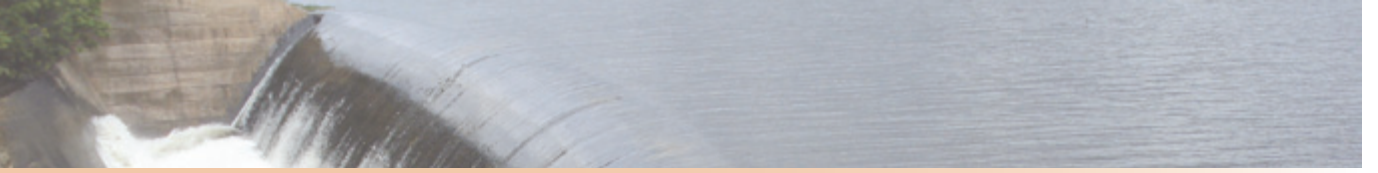


Table 7.8: Proposed Investment in Water (US$ millions)

Project category	Capacity mill km³	Cost (US$ mill)
Dams		
Multipurpose	0.15	46.00
Irrigation	4.05	353.00
Not specified	1.76	215.00
Sub-total	5.97	614.00
Water transport & treatment	...	1441.13
ZINWA supply stations	...	33.00
Total	...	2088.10

Source: Annex Tables 3.10 and 3.11.

Annex Table 3.11 includes a number of projects put forward by the Government to rehabilitate and expand the water transport infrastructure of the country. The current deficiencies in the water transport infrastructure are well known. Without a substantial increase in these capacities, the economic benefits of new storage capacity will be reduced. The Government's proposed expansion of the country's water infrastructure includes $1.4 billion (at 2009 constant prices) for water transport infrastructure. As Annex Table 3.11 indicates, four new pipelines are proposed, the most important of which is the 400 km Zambezi River-Bulawayo pipeline. The draft national budget for 2011 calls for the construction of the $1.2 billion Zambezi-Bulawayo pipeline to commence in 2013. Other high priority projects are the Mtshabezi pipeline to Bulawayo, and the Kunzvi and TokweMkosi dams. The budget proposes that construction of these projects begins in 2010-11.

7.4 IRRIGATION AND INDUSTRIAL USE OF WATER

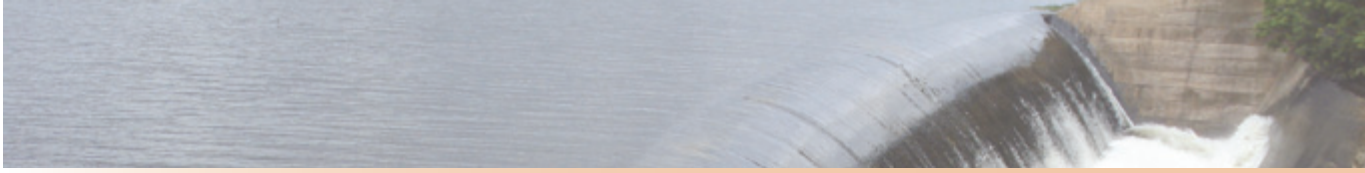
7.4.1 Exploiting the Potential for Irrigation

More than 60 percent of the population lives in rural areas and depends primarily on agriculture for their livelihood. Zimbabwean soils are derived predominantly from granite and are often sandy, light textured, and of fair agricultural potential. However, soils with significant clay content and of excellent agricultural potential are also found in all regions of the country, including Natural Farming Regions III, IV and V that receive relatively small amounts of rainfall in most years (see Map 7.2).

Irrigation is of particular importance for successful crop production these three regions. Even in Regions I and II, which typically receive larger amounts of rainfall, supplementary irrigation is important because mid-season droughts are common. The major irrigated crops in the country are wheat, cotton, sugar cane, tobacco, soybeans, fruit, vegetables, and maize. Supplementary irrigation is also used to extend the growing season of certain crops, such as tobacco and cotton. Crops grown under irrigation constitute almost half the total value of marketed production. Crop yields under irrigation are also higher than those grown under rain-fed conditions.

Investment in irrigation facilities has a long history in Zimbabwe. Before independence in 1980 the then government invested heavily in dam construction and irrigation infrastructure, although this mainly benefited large-scale commercial farmers. From 1980 onwards, the government recognized the importance of extending the benefits of irrigation to the small-scale farming sector. Intensified efforts were made in the first two decades after independence to expand these services. A variety of arrangements have been used for the program. Up-to-date estimates of the extent of irrigation were not available at the time this Report was prepared. According to the FAO (2005), at the end of the 1990s, the industry was organized along the following lines: (i) farmer-managed schemes accounted for 50 percent of the number of irrigation schemes in the country; (ii) government-managed schemes accounted for 32 percent; and (iii), jointly managed schemes accounted for the remaining 18 percent.

The irrigation potential of the country is substantial. Zimbabwe has a total of 3,327 thousand hectares of arable and permanent cropland, which is about 9



percent of the total land area of the country. According to the FAO, the overall area of soils in Zimbabwe classified as irrigable is estimated at 600,000 hectares, of which the currently estimated irrigation potential is estimated at 365,624 hectares – equivalent to about 11 percent of the total cropland of the country. Opportunities also exist in the country for the cultivation of wetlands or dambos. These cover a national area of 1.28 million hectares according to the FAO (2005), of which about 260,000 hectares are in communal areas, with the remainder in commercial farming areas. About 20,000 hectares are cultivated in communal areas. There is no national legislation and policy to promote the sustainable use of these areas.

In 1999, the total equipped area under irrigation was estimated at 173,513 hectares, equivalent to about 5.2 percent of the total cropland.[8] At the time of the FAO estimate, about 49,650 hectares was equipped for irrigation but was not functional because of damages to the equipment. That left about 123,870 hectares as the operational area under irrigation in the country — equivalent to about one third of the area identified as suitable for irrigation.

Most formal irrigation schemes in the country depend on water stored in small- and medium-sized dams. Other important water sources are boreholes and deep wells, direct diversion of river water, shallow wells and springs, and sand abstraction systems.[9]

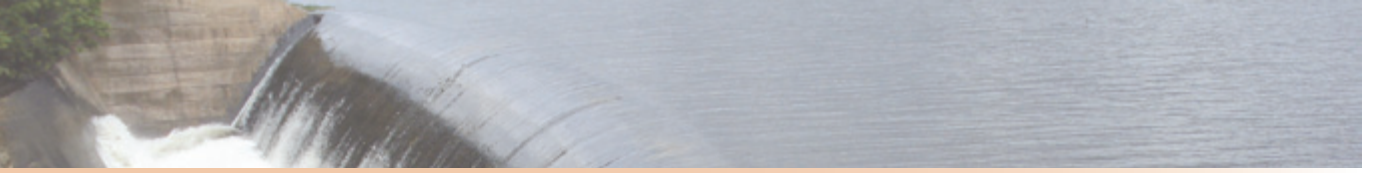
7.4.2 Proposed Action Plan for Irrigation

The MTP emphasizes the importance of irrigation. The implication is that wherever possible, agriculture in the country will be irrigation-based. As Table 7.8 indicates, the Government has proposed $350 million of new investment in sole purpose dams for irrigation in the decade ahead. If these projects were to go ahead, they would add about 4 million km3 to the existing irrigation water storage capacity of the country. The proposed Action Plan includes $2 million for detailed feasibility studies for each of the seven single purpose irrigation dams listed in Annex Table 3.10. These assessments would need to determine the economic and technical feasibility of the projects and whether any of the dams can be designed to operate as multi-purpose dams.

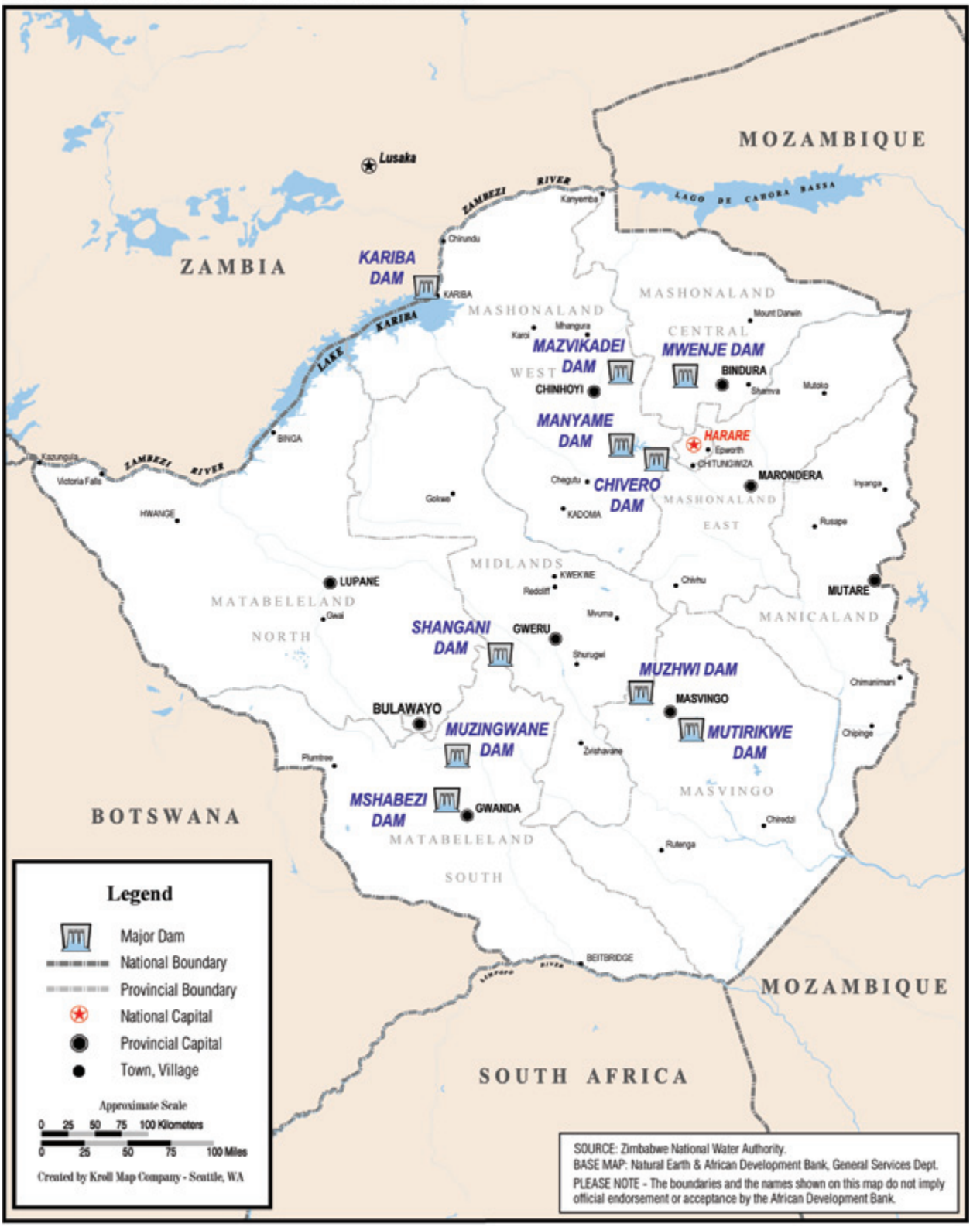
A number of technical studies of various aspects of water resources management are proposed as part of the Action Plan, all of which have important implications for the design and implementation of the proposed program for irrigation. These are listed in Figure 7.5 above.

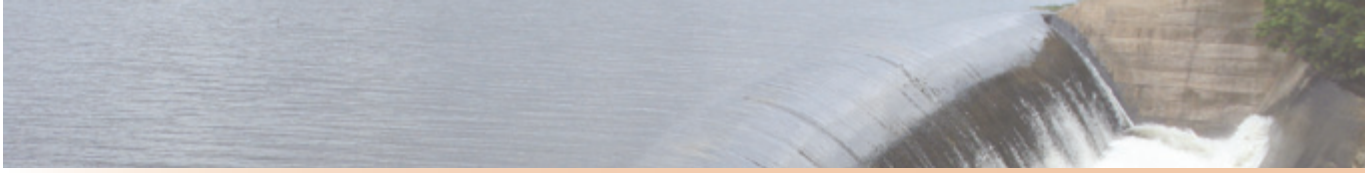
8 The area subject to dambo irrigation is not included in these official estimates. Informal estimates put the area involved in the range of 20,000 to 50,000 hectares.

9 Sand abstraction systems extract water from sand layers in river beds through a network of perforated pipes buried in the river bed that collects water into a sump from which it is then pumped.



MAP 7.3 : MAJOR DAMS IN ZIMBABWE





7.5 WATER SUPPLY FOR URBAN AND RURAL AREAS

7.5.1 Increased Access to Improved Water

At independence in 1980, about 10 percent of the population, predominantly in major urban centers, had access to improved water supplies. In other words, among the total population of 7.282 million people, about 730,000 had access to safe water. In 1982, Zimbabwe adopted the declaration of the International Decade for Drinking Water and Sanitation. Under this program the Government set out to provide every household with protected water, with the source located at a maximum of 500 meters. The commitment led to the adoption of the National Master Plan for Rural Water Supply and Sanitation (NMPWS&S) in 1985 and the Integrated Rural Water Supply and Sanitation Program (IRWSSP). During the period 1980-2000, Zimbabwe registered one of the highest rates of growth in water supply and sanitation services among all developing countries. With 100 percent coverage for urban areas by 2000, Zimbabwe was a world leader in provision of urban water supply services among developing countries. In these two decades, the urban population increased from 1.6 million to 4.2 million. The authorities in Zimbabwe planned for urban resettlement and most areas were provided with water supply (and sanitation) facilities. In contrast to many Sub-Saharan countries, there were only a few isolated cases of "urban squatter settlements" in Zimbabwe at that time. The dramatic improvements in access to water were not confined to urban areas. By 2000, 77 percent of the rural population had access to improved water supplies, compared with an average of 41 percent for Sub-Saharan Africa.

As Table 7.9 indicates, within the Southern Africa region only Botswana and Namibia had 100 percent access to improved water in urban areas by 2000. And in the case of rural access to improved water, only Botswana, Lesotho and South Africa had higher levels of access in 2000. These dramatic improvements stemmed from strong government leadership in the sector with support from the international donor community, NGOs, and local stakeholders. During this period, rural water (and sanitation) programs were funded by bilateral aid programs and NGOs under the coordination and direction of the National Action committee (NAC) that had been created by the Government. Urban programs were supported by the international donor community led by the World Bank, and were co-funded through the Public Sector Investment Program (PSIP) of the Government.

Table 7.9: Water Supply Access Indicators for Selected Southern Africa Countries (As percent of total population)

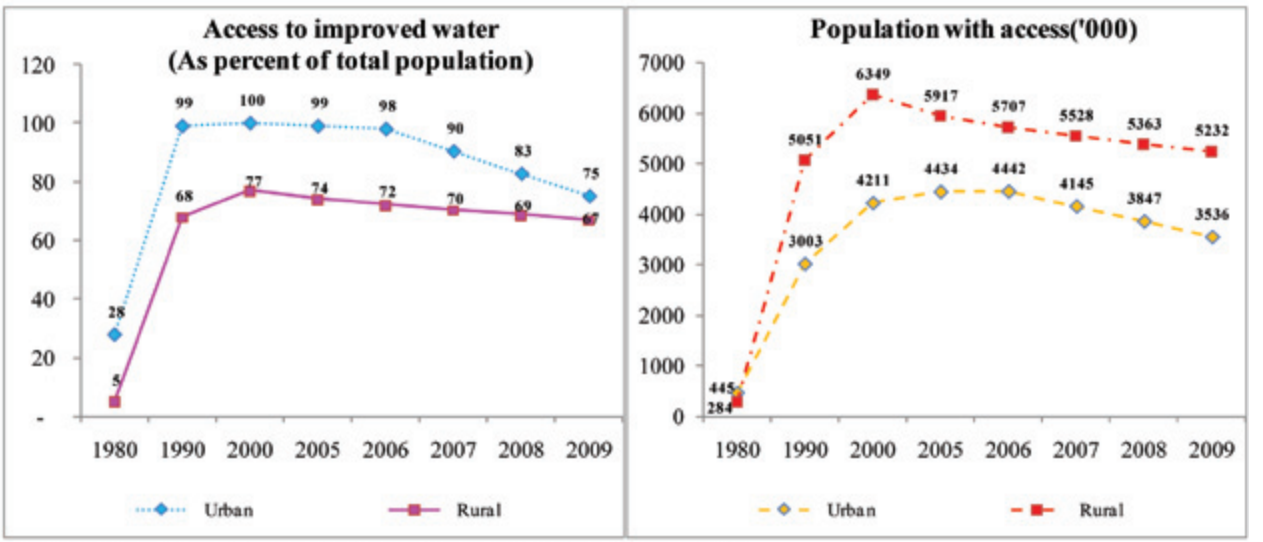
Country	Urban population			Rural population			Total population		
	1990	2000	2006	1990	2000	2006	1990	2000	2006
Angola	..	34	62	..	40	39	..	38	51
Botswana	100	100	100	91	..	90	95	..	96
Lesotho	..	98	93	..	88	74	..	91	78
Madagascar	85	85	76	31	31	36	44	47	47
Malawi	90	95	96	43	44	72	49	57	76
Mozambique	..	86	71	..	43	26	..	60	42
Namibia	98	100	99	63	67	90	72	77	93
South Africa	..	92	100	..	80	82	..	86	93
Zambia	88	88	90	28	48	41	52	64	58
Zimbabwe	99	100	98	68	77	72	77	85	81
Sub-Saharan Africa	81	82	81	37	41	46	49	55	58

Source: World Bank (2009), *Africa Development Indicators 2008/09* and World Bank (2001), 2001 World Development Indicators.

7.5.2 Collapse of Water Services and a Cholera Epidemic

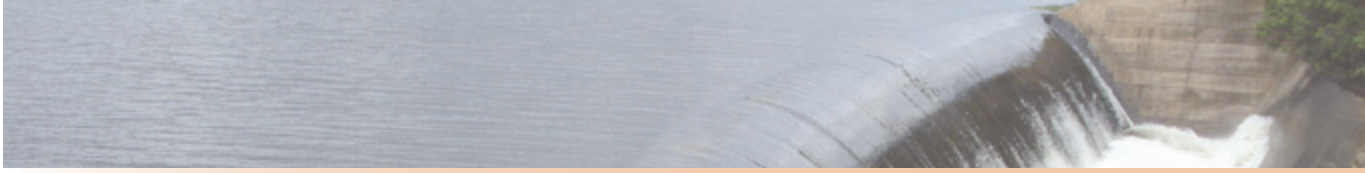
The year 2000 was a turning point in the provision of water services to urban and rural communities in Zimbabwe. Zimbabwe fell into arrears in its debt service obligations to the donor community and this led to closure of most international assistance programs, including donor support for water supply (and sanitation) services. In the ensuing decade, there was a rapid decline in the quality of water services that were provided, along with a reduction in the number of people with access to improved water. There was virtually no new investment in service delivery for most of the past decade. Moreover, with only minimal levels of spending on maintenance and repairs, the condition of the existing infrastructure deteriorated steadily. As Figure 7.6 indicates, access to safe water in urban areas levelled off in the 1990s and then began to decline in the past decade. In rural areas, the contraction in access began several years earlier than in urban areas. The extent of the decline in service coverage is not known with any degree of accuracy. These various estimates do not give the complete picture about the decline. There has also been a significant decline in the quality of urban and rural services (poorer water quality, intermittent supplies, and longer walking distances). The full extent of the deterioration became clear in August 2008 with the onset of the nationwide cholera epidemic that resulted in more than 100,000 cases of cholera and about 4,300 deaths. The national outbreak spread to most districts in the country and to neighboring states.

Figure 7.6: Access to Improved Water Supply in Urban and Rural Areas in Zimbabwe



Source: World Bank, World Development Indicators, various issues, and estimates by authors.

Estimates of the current levels of access to water vary according to the source and timing of the surveys undertaken. Table 7.10 reports on recent estimates made by the Joint Monitoring Program (JMP), the National Action Committee (NAC), and the Vulnerability Assessment Committee (VAC). The WHO/UNICEF Joint Monitoring Program (JMP) presents a relatively optimistic assessment, whereas the estimates of government agencies are more pessimistic. A second, considerably more pessimistic, scenario uses coverage data derived from local surveys and inventories of infrastructure. Derived from MOHCW data on sanitation coverage, the NAC inventory and urban council estimates that in 2008 only 46 percent of Zimbabweans had access to improved drinking water. A third, less gloomy assessment, was completed in May 2010 by the VAC. According to this assessment, the national average for access to safe water is 67 percent and for rural areas the average is in the range of 63 to 77 percent. Although



no estimate was provided for urban areas, the urban population data used in this Report gives an implied estimate for urban areas in the range of 51 to 74 percent. For the purposes of this Report, it was assumed that in 2009, 75 percent of the urban population and 67 percent of the rural population had access to safe water. The implied national average for 2009 was therefore 70 percent. These assumptions are broadly consistent with the VAC estimates in Table 7.10.

Table 7.10: Zimbabwe: Access to Improved Water

Category	Source of estimate		
	JMP 2008	NAC 2008	VAC 2010
National	82	46	67
Urban	99	…	51-74
Rural	72	…	63-77

Sources: JMP (2008), NAC (2008) and VAC (2010).

Rapid assessments of urban services undertaken in 2009 by the donor community give a clear picture of failure of waste water treatment plants, with effluent and raw sewerage entering the rivers and dams. Lack of water flow led to frequent blockage of the sewerage systems. Water treatment plants were found to be dysfunctional and many distribution systems were found to be in need of repair. As service levels deteriorated so too did revenue collections, with unaccounted-for water at 40 to 50 percent of supply. In rural areas, lack of maintenance and government provision of spare parts meant that an increasingly large number of rural boreholes and wells —the cornerstone of the rural water supply network — stopped functioning.

What is clear at this stage is that without restoration and a strong recovery in the WSS sector, Zimbabweans will continue to face the risk of further cholera outbreaks with more deaths and illnesses, and negative impacts on livelihoods, industry, tourism, food production and agriculture, pollution of rivers and water courses.

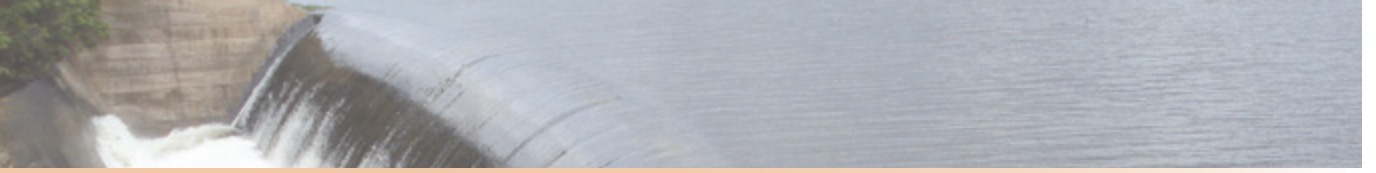
7.5.3 Rebuilding Water Services: The Challenges Ahead

7.5.3.1 Rehabilitation of the Existing Water Distribution Network

The cholera epidemic resulted in a substantial international response with the provision of humanitarian assistance. Since the outbreak of cholera in 2008, the primary focus of the donor and NGO communities has been on emergency support to contain the disease and its possible recurrence. A Water, Sanitation and Hygiene (WASH) cluster of donors was created in 2008 to coordinate the international response. UNICEF has played a leading role in coordinating these activities. An Emergency Rehabilitation Program was drawn up in 2008, the focus of which was supplying chemicals to local authorities in urban centers, drilling boreholes, and cholera educational programs. Rapid assessments were undertaken in urban centers and these laid the basis for a planned program of support for 15 urban settlements. With strong support from donors, the NGO community is reported to have provided an estimated $85 million of emergency assistance in 2009 for these programs.

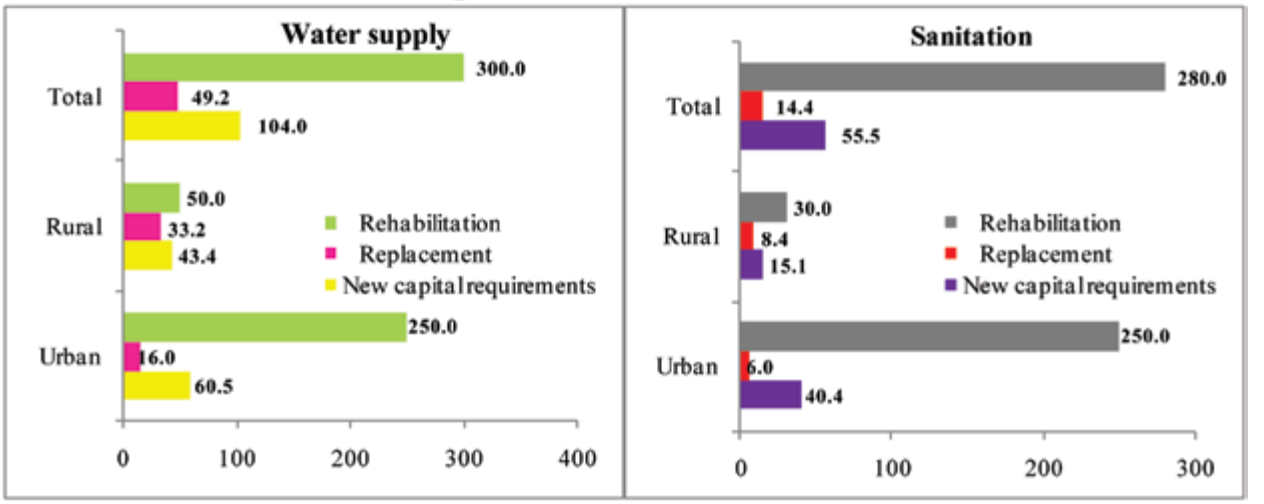
With the worst of the epidemic under control by the latter part of 2009, the challenge now is to rebuild the urban and rural water supply and sanitation infrastructure and strengthen local government capacities for service delivery. There has been a series of assessments by members of the WASH cluster. In the latter part of 2010, the World Bank proposed a program of some $216 million for high priority interventions in the urban water and sanitation sector and a companion program of about $190 million of support for the rural WSS program.[10] In early 2010, the WASH cluster issued a report on the current status efforts to rebuild WSS infrastructure and services in Zimbabwe.[11] The CSO report included an

10 World Bank (2009), "Joint Aide-Memoire of the Multi-Sectorial World Bank Missions, October 5-November 12, 2009." *Zimbabwe: Priority Investments and Policies in Infrastructure.* World Bank, Washington DC, 2009. See also Annex E to this report: "Zimbabwe: Water and Sanitation Sector Budget Review."



estimate of the expenditures that would be required to meet the MDG goals, either by 2015 or at a later date. The estimates are reported as annual expenditure requirements needed to meet the goal. These are reproduced in Figure 7.7, which indicates that the required annual capital outlays for the water sector are about $450 million a year, the largest component of which is an annual outlay of $300 million for rehabilitation of existing assets. The report does not provide separate estimates for the total funding required for new connections and facilities, or for the related total cost of replacement and rehabilitation expenditures.

Figure 7.7: Zimbabwe: Donor Estimate of Annual Capital Development Requirements for WSS Sector



Source: UNICEF et al(2010).

In the absence of detailed assessments of rehabilitation requirements for all major urban and rural areas, there is a degree of uncertainty as to the required amount of work that is required and its cost. For the purposes of this Report, rough estimates have been made for the current value of the urban and rural water supply infrastructure. The estimates put the total value of these assets at about $800 million on a replacement cost basis with the urban component put at about $530 million. The working assumption in this Report is that a substantial part of the urban and rural water supply and distribution networks require rehabilitation and/or replacement. The Report therefore puts the rehabilitation and replacement requirements for urban areas at $250 million, which is broadly in line with the CSO estimate in Figure 7.7. A portion of these needs is already being met by the donor community. In response to the results of the rapid assessments of about 20 towns and cities made in 2009, donors committed a total of about $45 million for high priority rehabilitation and replacement in these communities. In the case of the rural water supply network, the replacement cost of the present network is estimated at about $130 million. For the purposes of this Report it is assumed that $100 million is required for rehabilitation and replacement of the existing network.

7.5.3.2 Choice of Technologies in Urban and Rural Areas

There have been important changes in the relative importance of various sources of water over the past two decades, in part in response to the deterioration in service delivery capacities (Table 7.11). The recent report by WHO/UNICEF provides a detailed analysis of these trends.[12]

11 UNICEF et al (2010), *Country Status Overview: Zimbabwe.* Nairobi, Kenya, Draft 1, 30 March 2010.

12 WHO/UNICEF (2010), "Estimates for the Use of Improved Drinking-Water Sources." *Joint Monitoring Programme for Water Supply and Sanitation.* WHO/UNICEF, Zimbabwe, March 2010.

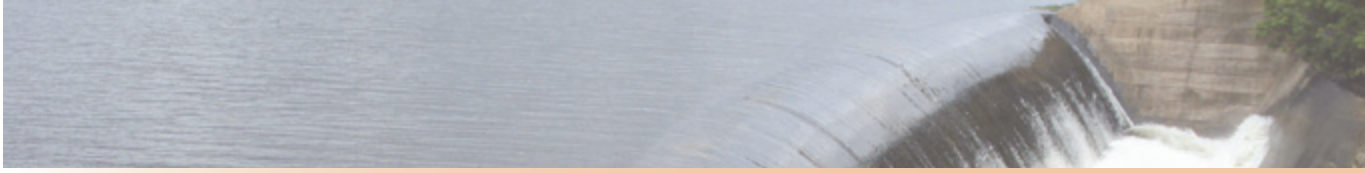


Table 7.11: Changes in the Sources of Water in Zimbabwe

Source	1988		1994		1999		2005		2008	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Piped supply	95.3	9.2	92.6	4.3	90.9	6.1	92.7	6.1	90.1	6.0
Standposts	0.9	9.2	4.8	13.3	7.5	11.3	4.5	5.7	4.4	3.0
Wells and boreholes	3.5	67.3	2.4	69.1	1.5	72.6	2.6	76.8	5.2	79.4
Surface water	0.3	13.6	0.1	13.0	...	9.7	...	11.0	...	11.2
Other, incl. non-improved	...	0.7	0.1	0.3	0.1	0.3	0.2	0.4	0.3	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: WHO/UNICEF (2010).

In the case of urban areas, more than 90 percent of the population using improved water has had access to piped water in the past two decades, although there has been a small reduction in the relative importance of this source and an increase in the use of stand posts, wells, and boreholes in urban areas. Increased use of the latter facilities in urban areas reflects the erosion in capacities of utilities to provide piped water services and declining capacities of local governments to plan for growth in urban populations. In the past decade, the urban population of the country increased by about 540,000 persons. In rural areas, wells and boreholes accounted for two-thirds of the sources of water used in the 1980s, but this dependence increased steadily to more than 80 percent by 2008. At the same time, there has been a steady decline in the use surface water and other sources of unimproved water. These are encouraging trends.

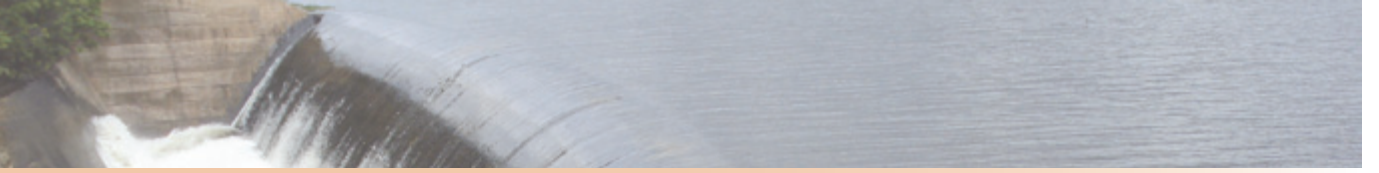
These types of access to water services in Zimbabwe are in stark contrast to the situation in many other African countries. According to the World Bank (2010), for 2001-05, 39 percent of urban dwellers in SSA had access to piped water, with almost 50 percent using stand posts or wells and boreholes. In rural areas about 50 percent of the population used stand posts, wells or boreholes, and 42 percent used surface water.

The increased use of wells and boreholes in both rural and urban areas raises a number of policy issues for the future development of these resources. There appears to be extensive unregulated access to these groundwater resources that may raise issues concerning the most effective choices for use of this water. Large numbers of private wells or boreholes may prevent municipalities from achieving economies of scale in groundwater exploitation and for ensuring that groundwater can provide back-up supplies in times of drought. The potential problems associated with the effective management of these aquifers are illustrated by the manner in which the Harare Aquifer is being used. As Table 7.12 indicates, permits issued for use of water from the aquifer were about 14 million m3 in 2007, but the estimated actual level of withdrawals was put at about 57 million m3, or 96 percent of the recharge volume. There is an urgent need for a careful assessment of the extent of groundwater withdrawal in the country and the vulnerability of these aquifers to pollution from the land surface, especially in urban areas.

Table 7.12: Use of Harare Aquifer in 2007

Indicator	Quantity (km^3)
Recharge volume	59136
Withdrawals	
As per permits issued	13960
Estimated actual	56800

Source: Zimbabwe Water Authority



7.5.3.3 Institutional Capacities and Performance of Service Providers

As noted earlier, urban councils and ZINWA are responsible for service provision in urban areas. ZINWA provides bulk water supply to many cities and towns, and in those towns where the local authorities either cannot, or do not wish to, assume responsibility for service provision, ZINWA operates the water supply systems. Councils manage services from municipal water and sewerage departments and derive revenue from water sales. There are no independent or autonomous water utilities in Zimbabwe, although larger municipalities can access capital from financial markets. The provision of urban water services has been characterised by a considerable degree of independence. Local authorities are responsible for ensuring provision of adequate water supply within their jurisdictions. Generally, municipal departments are responsible for delivering services, operating and maintaining facilities, collecting revenues and managing expenditures.

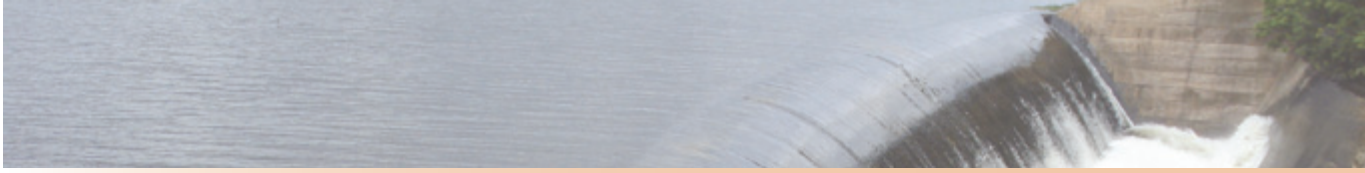
There appears to be a need for careful assessment of three aspects of these institutional arrangements as a part of the ongoing effort to forge a strategy for institutional development for the decade ahead. First, the requirement that ZINWA is a service provider for small towns and other communities should be reviewed. The experience of recent years suggests that the urgency of service provision in these communities has diverted ZINWA attention and resources from its primary mandate which is the development and management of the country's water resources. Consideration should be given to alternative arrangements for the provision of services to the towns and communities that are currently the responsibility of ZINWA. Second, there is scope for promoting greater private sector involvement in the provision of services in the major urban areas of the county. Consideration should be given to creation of autonomous water utilities in these major centers that are privately owned or operated under management contracts by private entities. As the subsequent discussion indicates, full implementation of the proposed program would mean that the number of people with access to water services in urban areas will increase from 3.6 million in 2010 to 6.2 million by 2020. This very large increase will impose substantial strains on the capacities of urban councils for service delivery at acceptable standards.

The same concerns arise in the case of service provision in rural areas. With full implementation of the proposed program, the number of connections in rural areas increases from 5.3 million in 2010 to 8.0 million by 2020. The existing arrangements for service provision in rural areas involve overlapping responsibilities that are shared among the MTCID, MLGRUD, MOHCW, ZINWA and DDF. Effective monitoring and evaluation of the performance of the rural program faces challenges similar to those in urban areas.

7.5.3.4 Price Policy and Cost Recovery

A comprehensive set of financial accounts for the provision of water (and sanitation) services for urban and rural communities was not available at the time of writing this Report. An assessment of the operating revenues and expenses of the various service providers were therefore not possible. The World Bank (2010) reports that average water tariffs in Sub-Saharan Africa are about $0.67 per cubic meter, two-thirds of the cost recovery threshold of just over $1.00 per cubic meter. The same report indicates that tariffs of about $0.40 per cubic meter are generally considered more than adequate to cover operating costs in most developing country contexts. The high operating costs within sub-Saharan Africa reflect inappropriate choices of technologies, low population densities, and high costs of inputs.

The cost of treated water is an important determinant of the overall cost of service provision, especially for those communities that have access to piped water. As Table



7.11 indicates, about 90 percent of the urban population that has access to improved water use piped water. Table 7.13 reports on the cost of treated water provided by ZINWA to various categories of consumers. Consideration is being given to increases in these rates. This would include increases in the fixed monthly fee plus introduction of a price range for the variable part of the formula; for example, in the case of high density domestic consumption, the fixed price would increase to $7 per liter and the variable price would range from $0.4 to $1.29 per liter.

Table 7.13: ZINWA Charges for Treated Water (US$)

Consumer category	Monthly fee (US$)	
	Fixed (per month)	Variable (Price per liter)
Domestic		
High density	5.0	0.8
Low density	5.0	0.8
Commercial		
High density	25.0	0.8
Low density	25.0	0.8
Industrial	25.0	0.8
Intermediate consumers	1000.0	0.8

Source: ZINWA.

Anecdotal evidence suggests that the municipalities responsible for service provision in Zimbabwe may be pricing water services below the cost of service provision, although the full extent of the under-pricing is not clear at this stage. In the case of the City of Bulawayo, the fixed monthly fee paid by consumers is substantially lower than the ZINWA fixed fee for supply of treated water (Table 7.14). There is a compelling case for reassessment of water prices charged by the municipal service providers and arrangements for cost recovery. Continued large operating losses will perpetuate the current problem of insufficient funding for maintenance and operation of the facilities and service, thereby setting up conditions that will require another large round of rehabilitation expenditures several years from now.

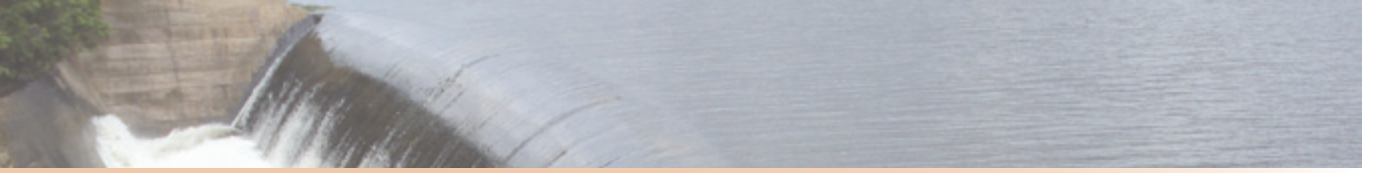
The Ministry of Water Resources Development and Management (MWRDM), has recognized the need to review and update procedures for adjusting tariffs for water and sanitation services to take into account changes in the economic situation in which service providers now operate and advances in thinking on tariff and subsidy issues since Zimbabwe's water tariff structures were designed. The Ministry has requested assistance from the World Bank to support a tariff study due to start in early 2011.

Table 7.14:Bulawayo City Water Charges (US$)

Consumer category	Monthly fee (US$)	
	Fixed (per month)	Variable (Price per liter)
Domestic		
High density	0.22 to 2.72	0.06 to 0.42
Low density	0.22 to 2.72	0.06 to 0.54
Commercial		
High density	11.90	0.54
Low density	7.74	0.54
Industrial	7.74	0.54

Source: Bulawayo City Council.

The objective is to assist the Ministry of Water Resources in developing guidelines for tariff setting that will allow for full cost recovery, taking into consideration affordability and social constraints. Among the principles which should guide tariff setting are the following: (i) provision for full cost recovery to ensure financial viability of service providers and to enable them to fund ongoing maintenance of facilities and renewal and replacement of assets from revenues and attract funding for expansion and upgrading of service over time; (ii) financial and managerial autonomy of service providers with full accountability to stakeholders; (iii) incentives for efficiency and quality performance by service providers; (iv) incentives for efficient use of water resources by customers; (v) affordability, (vi) equitable cost sharing across categories of customer;



(vii) transparency in provision of subsidies; (viii) ease of understanding bills; and (ix) transparency and stakeholder participation in the tariff setting process.

7.5.3.5 Clarification of Responsibilities for Rural Services

Zimbabwe was a forerunner in establishing a system of government/community collaboration for the management and maintenance of the rural WSS infrastructure in the 1980s and 1990s. These arrangements involved community water point committees, pump-minders, and DDF maintenance units. In the past decade, these maintenance arrangements broke down. The 2004 WASH inventory estimated that 75 percent of the 47,000 hand pumps in the country were not functioning. There is broad agreement that the condition of rural assets has eroded further, except in those areas where NGOs stepped in with programs to maintain and or rehabilitate systems. Pilferage has affected many of the rural water systems. The challenge now is to re-establish an effective policy and system for provision of maintenance and spare parts. This involves clarification of ownership of rural assets. The position taken in this Report is that ownership of rural assets should devolve to local authorities along with responsibility for the maintenance and operation of these assets.

The other area of concern relates to arrangements for financing of rural services. In the past, there have been efforts to use the Rural Capital Development Fund (RCDF) as the main instrument for rural water (and sanitation) financing. The RCDF holds transfers from the Treasury and allocates these funds to agreed projects, based on national criteria. Funds can be disbursed to contractors who win tenders, or transferred to those Rural District Councils (RDCs) that are deemed to have the requisite capacity for these activities. The District Development Fund (DDF) has also received capital and recurrent budgets for drilling operations and O&M expenditures. With the deteriorating economic conditions of the past decade, these transfers declined sharply, and according to the recent WHO/UNICEF Country Status Overview, Government-led financing processes had become dormant. Subsequently, a number of channels have been used and in the 2010 budget process, requests for funding for the rural WSS program were put forward by MOHCW, MTCID, DDF and MLGRUD. At the same time, off-budget financing by donors and NGOs increased substantially after the cholera outbreak in 2008. In its 2009 review, the World Bank proposed that the role of the RCDF be revived to allow pooling of funds into a single facility for rural areas. The position taken in this Report is consistent with the World Bank proposal.

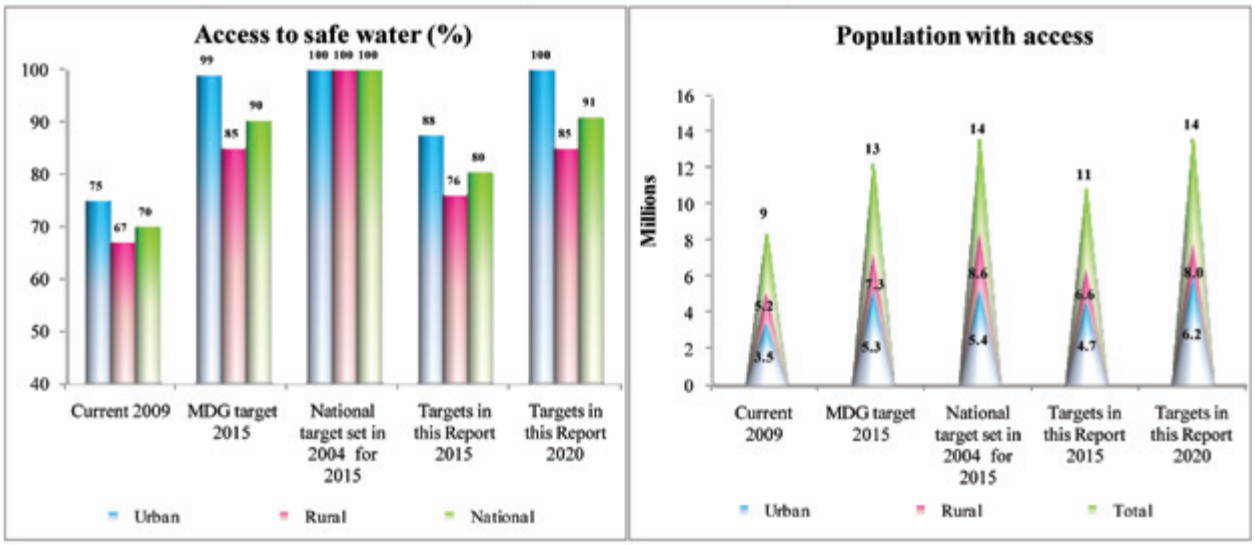
7.5.3.6 Choice of Targets for Access to Improved Water

The MDGs were inaugurated by a resolution of the 55th session of the United Nations General Assembly in September 2000. The targets were to be achieved over a 25-year period from 1990 to 2015. Zimbabwe embraced the targets and incorporated them into the policy framework for the water and sanitation sector. This included halving the proportion of people without access to safe drinking water and sanitation by 2015. The November 2004 Macroeconomic Policy Framework of Zimbabwe subsequently adopted revised targets for 2015, the objective of which was to have 100 percent access in both urban and rural areas at that time.

Because of capital and implementation constraints, there is considerable uncertainty about the prospects for meeting these goals by 2015. Meeting the 2015 MDG targets for access to improved water would require capital outlays of about $380 million during 2011-14 (at 2009 constant prices). Meeting the 2004 mandated national targets would require an additional $80 million over the four-year period. Achievement of these targets will, in all likelihood, require

financial support from donors. In the event that Zimbabwe launched an arrears clearance process with the international donor community in 2011, a substantial amount of donor support for improved water services in urban and rural areas would very likely be forthcoming, but until there is clarity on the arrears clearance process, the prospects for substantial amounts for donor support for rehabilitation and expansion of the water distribution network are uncertain. Given these uncertainties, the position taken in this Report is that the MDG goals would be met by 2020 (Figure 7.8).

Figure 7.8: Zimbabwe: Targets for Access to Improved Water Services



Source: Official targets for 2015 established by the Government of Zimbabwe. Estimates for 2009 and targets used in this Report for 2015 and 2020 are authors estimates.

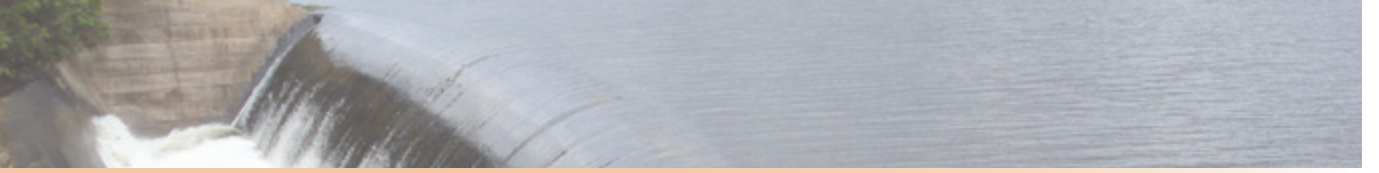
7.5.4 An Action Plan for Improved Water Services

The proposed Action Plan for the water services sector has three key objectives: (i) to complete the rehabilitation of the urban and rural networks within the next four year; (ii) to expand access to improved water sources in urban and rural areas and meet the MDG targets by 2020, or sooner if the required funding is available; and (iii) to implement a range of institutional and commercial measures that strengthen implementation capacities within the sector and improve the financial performance of the entities responsible for delivery of water services.

7.5.4.1 Building Urban and Rural Infrastructure for Water Supply

A two-pronged approach to rebuilding and expanding the urban and rural water supply network is proposed. A high priority is placed on expanding the on-going program of support for rehabilitation of the existing urban and rural network. An amount of $325 million is proposed for this part of the program which would be implemented as a matter of priority and would be completed by 2014, or sooner, depending on the availability of funding. This program would replace or rehabilitate existing water infrastructure, including for example, water treatment plants, distribution lines, and boreholes and standpipes in urban and rural areas.

At the same time, a program to expand connections to improved water sources would be implemented. The objective would be to have 100 percent of urban dwellers with access to safe water by 2020, and 85 percent of rural inhabitants with access to safe water. The latter would make use of boreholes and wells to meet these objectives. The program would aim to reduce the dependence on unprotected sources of ground- and surface-water in rural areas



that are currently used by 33 percent of the population.[13] The cost of the new connection program is put at about $530 million (at 2009 constant prices), some $390 million of which would be for urban areas. Successful implementation of this program would ensure that all but 1.5 million of the 15.5 million people projected to live in Zimbabwe in 2020 would have access to improved sources of water.

The total cost of the proposed program for 2011-20 is estimated at a little more than $850 million at 2009 constant prices (Table 7.15). Funding arrangements for the program are discussed below. The value of capital assets of the water distribution infrastructure of the country is projected to increase from about $800 million at end 2010 to about $1.33 billion at end 2020 (on a replacement cost basis at 2009 constant prices).

7.5.4.2 Strengthening Capacities for Service Delivery

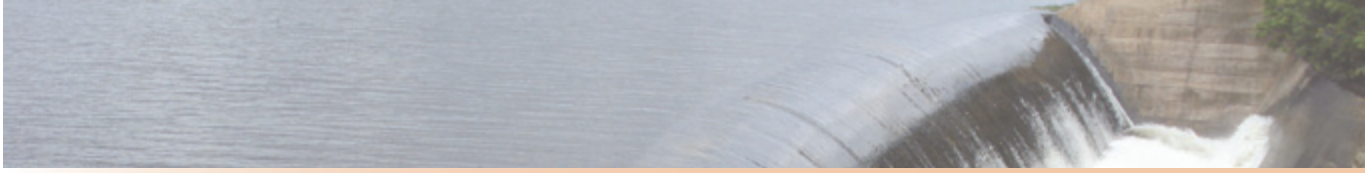
The proposed program for water supply in urban and rural areas includes a range of measures aimed at strengthening the policy environment and building institutional capacities for service delivery. There is an increasingly important need to strengthen regulatory arrangements for the sector. As Chapter 3 indicates, there is a strong case for creation of an independent regulator for oversight of water resource management and provision of water and sanitation services. The activities associated with an enhanced regulatory capacity are outlined in Chapter 3, but would include, for example, assessment of current pricing and cost recovery arrangements in urban and rural areas and establishment of tariff guidelines and performance benchmarks for service

Table 7.15: Zimbabwe: Capital Cost of the Water Distribution Program (In US$ '000 at 2009 constant prices)

Indicator	2010	2011	2012	2013	2014	2015	2020	Total 2011-20
Population with access to improved water ('000)								
Urban	3563.1	3741.7	3954.7	4195.9	4454.4	4722.2	6171.8	6171.8
Rural	5288.5	5508.1	5749.4	6009.3	6281.5	6560.5	7989.4	7989.4
Total	8851.5	9249.8	9704.1	10205.1	10735.8	11282.7	14161.1	14161.1
Share of population with access to improved water (%)								
Urban	75.0	77.5	80.0	82.5	85.0	87.5	100.0	100.0
Rural	67.0	68.8	70.6	72.4	74.2	76.0	85.0	85.0
Total	70.0	72.1	74.2	76.2	78.3	80.4	90.9	90.9
Capital expenditure programs (US$ millions)								
New connections								
Urban	4.1	26.8	32.0	36.2	38.8	40.2	46.9	391.3
Rural	2.9	11.4	12.5	13.5	14.2	14.5	15.4	140.4
Total	7.1	38.2	44.5	49.7	52.9	54.7	62.3	531.7
Rehabilitation								
Urban	20.0	40.0	80.0	80.0	30.0	…	…	230.0
Rural	5.0	10.0	30.0	40.0	15.0	…	…	95.0
Total	25.0	50.0	110.0	120.0	45.0	0.0	0.0	325.0
Total capital expenditures								
Urban	24.1	66.8	112.0	116.2	68.8	40.2	46.9	621.3
Rural	7.9	21.4	42.5	53.5	29.2	14.5	15.4	235.4
Total	32.1	88.2	154.5	169.7	97.9	54.7	62.3	856.7
Memo item								
Capital stock (US$ mill)	799.0	837.2	881.7	931.4	984.3	1039.0	1330.7	1330.7

Source: Annex Tables 3.12, 3.14 and 3.15.

13 See ZimVAC (2010), Rural Livelihood Assessments, Harare, May 2010.



providers. The latter would include the following: (i) service coverage and quality, including such things as quantities of water delivered on a per capita basis and responses to customer complaints; (ii) financial performance which would include preparation of audited accounts for urban suppliers, standard financial ratios, cost recovery, and collection of accounts receivable; and (iii) operational efficiency which would include standard measures such as the amount of non-revenue water used, staffing efficiency, and maintenance performance.

The ambitious program required to achieve the MDG goals and ensure adequate capacities for acceptable levels of service provision by local authorities will require substantial capacity building. The program would include the following: (i) improving capacities for investment planning; (ii) project identification, preparation, and management; (iii) developing capacities for sound use of public procurement procedures for award of construction, maintenance, and service contracts; and (iv) strengthening capacities for site supervision of construction and maintenance activities, including the use of private contractors for actual site supervision. With increased emphasis on decentralized provision of urban and rural services, there is also a need for a monitoring and evaluation system at the national level to provide information on a regular basis about progress towards achieving the MDG goals, mobilization and allocation of funding for various program components, adequacy of service provision, and so on.

For major urban centers, the Report proposes a transition to the use of independent water utilities for service provision under PPP-type arrangements. Initially, these utilities may be owned by the municipal authorities, but operated on a commercial arm's length basis with management of the utility contracted out to the private sector. At some point, these utilities could be fully privatized. The program includes provision for funding transaction advisory services required for these activities.

There is also need for clarification of roles and responsibilities for rural water (and sanitation) service provision. A multiplicity of agencies currently share responsibility for these services, including NCU/DID, MLGRUD, MOHCW, ZINWA, and DDF. As noted earlier, this Report supports the proposal made by the World Bank in 2009 to rebuild the role of the Rural Capital Development Fund (RCDF) as the central vehicle for transferring national government and donor funds to rural water (and sanitation) programs. Within this framework it proposes that local authorities assume ownership of the rural WSS assets and are then responsible for their maintenance and upkeep.

To support these various initiatives, a comprehensive program of technical support and capacity building is proposed. Figure 7.9 provides the estimates cost of the various programs. The capacity building component amounts to $12 million (at 2009 constant prices). These include direct support for regulatory reform and capacity building for local government service providers. The proposed program also includes support for developing a larger role for the private sector in service provision in the sector and for work on the details of a PPP framework for water supply and sanitation services. Once a suitable framework is in place, transaction advisory teams would be required for each PPP project entered into with a private investment partner. The arrangement may range from management contracts, to concession arrangement in which the municipalities retain ownership of assets, to full private ownership of utilities.

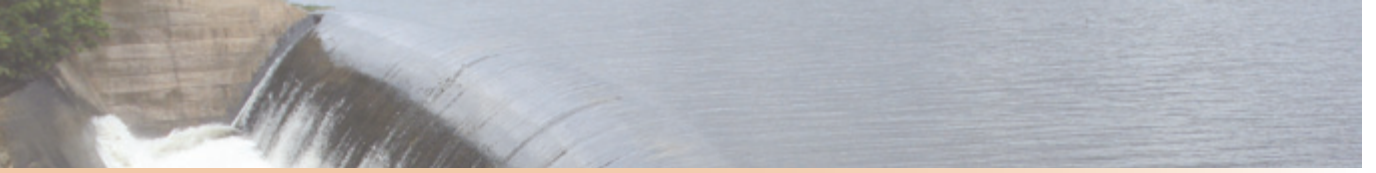
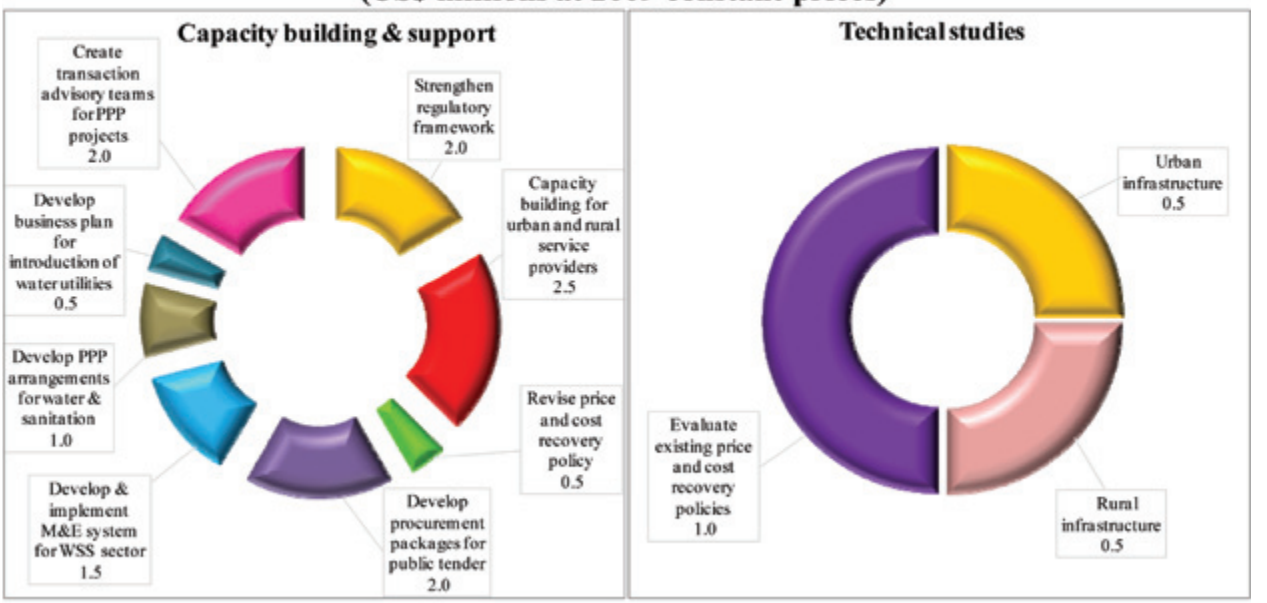


Figure 7.9: Zimbabwe: Program for Capacity Building and Technical Support (US$ millions at 2009 constant prices)



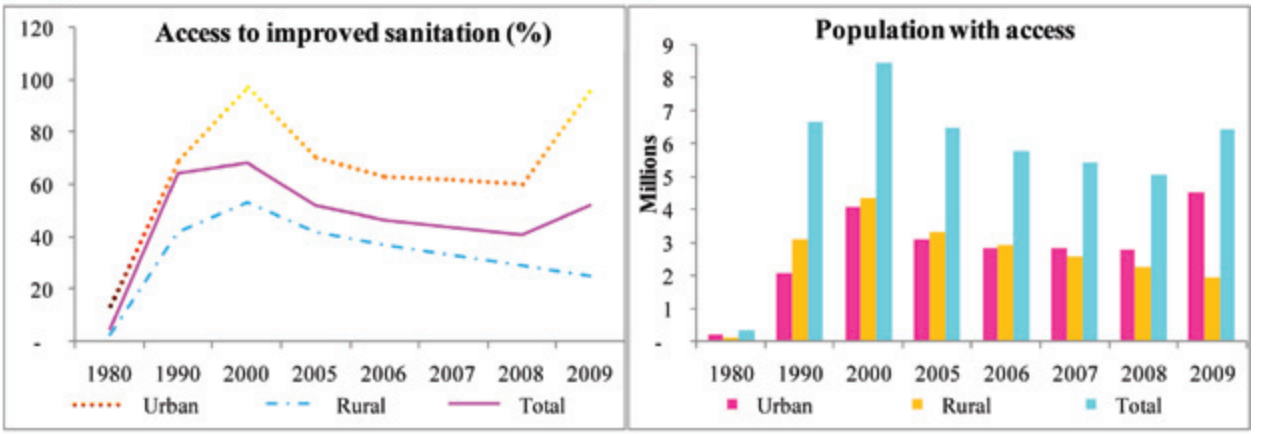
Source: Estimates by authors.

7.6 SANITATION SERVICES

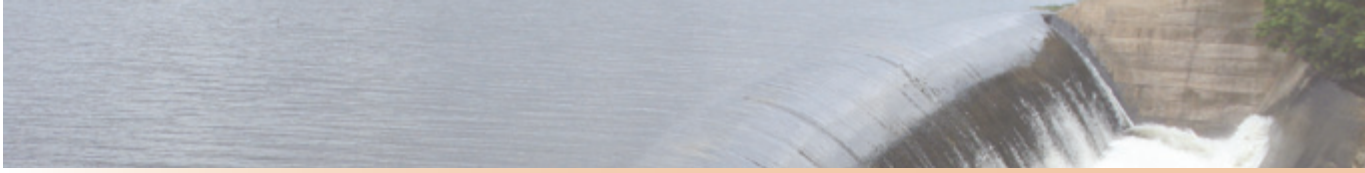
7.6.1 Status of Sanitation Services

The development of urban and rural sanitation services also experienced two decades of impressive improvement in access and service delivery, followed by a decade of decline. As Figure 7.10 indicates, only 5 percent of the population had access to improved sanitation in 1980. At the time, a very large share of the population practiced open defecation. By 2000, 97 percent of the urban population had access to improved sanitation. In rural areas, 4.4 million people had access to improved facilities, compared with 142,000 in 1980. One of the key characteristics of the Zimbabwe sanitation service is the high proportion of sewerage coverage compared with most other SSA countries.

Figure 7.10: Zimbabwe: Trends in Access to Improved Sanitation in Urban and Rural Areas



Source: World Bank, World Development Indicators, various issues, and estimates by authors.



The impressive gains made during the 1980-2000 period have eroded in the past decade. Sewerage services have been under-funded because of low water and sanitation tariffs, low rates of collection of accounts receivable, and weak operational performance. As Figure 7.10 indicates, the share of the urban population with access to improved sanitation declined to about 60 percent in 2008, although there was been a sharp recovery in 2009 as a result of the very large emergency assistance program mounted by donors following the cholera outbreak in 2008. In rural areas however, there has been steady decline in access to improved services. By 2009, only 25 percent of the rural population had access to improved services, compared with 53 percent in 2000.

As Table 7.16 indicates, in the past decade Zimbabwe has had levels of access to improved sanitation in urban areas that has been roughly comparable to that of other countries in the southern Africa region. In the case of the rural population, the most notable trend has been substantial erosion in levels of access for Sub-Saharan Africa as a whole, from 47 percent in 1990 to only 24 percent by 2006. The erosion in access in Zimbabwe, while substantial, has not been as severe as in many other countries in SSA.

Table 7.16: Sanitation Access Indicators for Selected Countries (As percent of total population)

Country	Urban population			Rural population			Total population		
	1990	2000	2006	1990	2000	2006	1990	2000	2006
Angola	..	70	79	..	30	16	..	44	50
Botswana	84	..	60	44	..	30	55	..	47
Lesotho	..	93	43	..	92	34	..	92	36
Madagascar	70	70	18	25	30	10	36	42	12
Malawi	96	96	51	70	70	62	73	74	60
Mozambique	..	69	53	..	26	19	..	43	31
Namibia	84	96	66	14	17	18	34	37	35
South Africa	..	99	66	..	73	49	..	87	59
Zambia	86	99	55	48	64	51	67	80	52
Zimbabwe	69	97	63	42	53	37	64	68	46
Sub-Saharan Africa	80	81	42	47	41	24	57	55	31

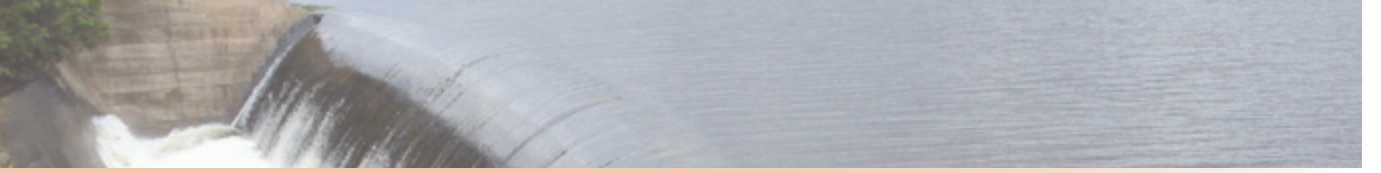
Source: World Bank (2009), *Africa Development Indicators 2008/09* and World Bank (2001),

As with the water supply service, there has been debate about the current levels of access to improved sanitation in urban and rural areas. Table 7.17 reports on recent estimates by JMP, NAC, and VAC. The JMP estimates for the national average are considerably higher than those of NAC and VAC which put the access levels at 30 percent and 45 percent respectively. The VAC survey did not report on rural access, so the population data used for this Report was used to derive the average implied by the VAC data.

Table 7.17: Zimbabwe: Access to Improved Sanitation

Category	Source of estimate		
	JMP 2008	NAC 2008	VAC 2010
National	68	30	45
Urban	75	…	23 to 63
Rural	52	…	34 to 58

Sources: JMP (2008), NAC (2008) and VAC (2010)



7.6.2 Major Challenges in the Provision of Sanitation Services

7.6.2.1 Rehabilitation of the Existing Sanitation Infrastructure

As the earlier discussion of the challenges associated with the rehabilitation of water distribution infrastructure and services indicates, the cholera epidemic is under control. The main challenge for sanitation services, as with water supply, is to rebuild the infrastructure and strengthen local government capacities for service delivery. The CSO (2010) report included estimates of the cost of rehabilitation of sanitation services and of meeting the MDG goals. As Figure 7.7 indicates the required annual outlays for the sanitation sector are put at about $350 million a year, the largest component of which is $280 million a year for rehabilitation of existing assets. The CSO report does not provide separate estimates for the total funding required for new connections and facilities, or for the related total cost of replacement and rehabilitation expenditures.

The working assumption in this Report is that a substantial part of the urban and rural sanitation network requires rehabilitation and or replacement. The Report puts the cost of rehabilitation and replacement fof the sanitation infrastructure at about $430 million (Annex Table 3.14). The bulk of the expenditures are required for rehabilitation of urban sewerage systems ($280 million), and replacement of latrines in rural areas. As noted earlier, a portion of these needs are already being met by the donor community. The recently established Zimbabwe Multi-Donor Trust Fund managed by the AfDB is expected to give a high priority to rehabilitation of the WSS infrastructure, including sanitation.

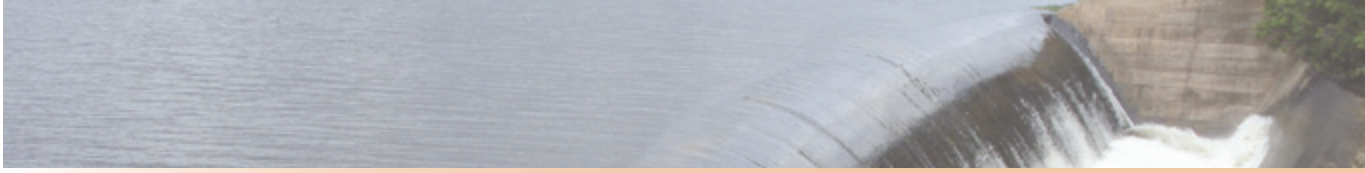
7.6.2.2 Reducing Dependence on Unimproved Pit Latrines

Since the mid-1980s, the urban population has relied primarily on flush toilets for their sanitation service, with the remaining urban population of less than 5 percent relying on dry latrines. In rural areas, there has been very limited access to flush toilets, but there was a steady increase in access to dry latrines until about 2000, at which time these facilities were used by almost 60 percent of the population. In the past decade, access to dry latrines has basically levelled off (Table 7.18). The most recent survey data for 2008 suggest that about 54 percent of the rural population have access to dry latrines. The remainder of the rural population continue to practice open defecation. As of 2008, survey data suggest that about 41 percent of the rural population meet their needs in this manner.

Table 7.18: Changes in the Type of Sanitation Used in Zimbabwe

Source	1988		1994		1999		2005		2008	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Flush toilets	95.2	5.0	94.6	2.5	93.7	2.2	96.8	19.1	97.2	4.1
Pour flush latrines	...	...	...	...	...	...	...	...	...	...
Dry latrines	3.8	46.9	4.7	46.3	5.6	57.9	2.3	35.5	2.1	54.1
Other improved	...	...	...	...	...	...	...	0.1	...	0.4
No facilities	1.0	48.1	0.7	51.2	0.7	39.9	0.9	45.3	0.7	41.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: WHO/UNICEF (2010).



Further progress in reducing reliance on open defecation is not simply a matter of more facilities in rural areas. Experience from other countries indicates that sustained increase in the use of improved facilities must also be accompanied by hygiene education programs. The World Bank (2002) reports that a study in southern India showed that a large public investment in latrines without accompanying hygiene education led to only 37 percent of men using facilities despite 100 percent coverage.[14] Because of its importance in Zimbabwe, the Action Plan includes provision for a continuing hygiene education program for both urban and rural communities.

7.6.2.3 Strengthening Institutional Capacities and Coordination

Institutional arrangements for the provision of sanitation services in urban and rural areas will need to be strengthened. The humanitarian assistance program that has been mounted by donors in response to the cholera outbreak has been implemented primarily by NGOs in close collaboration with UNICEF. The donor community channeled sector support mainly through NGOs — arrangements that played a vital role in protecting the welfare of vulnerable groups since the outbreak of the epidemic. The arrangements provided the means for a rapid response to the epidemic. However, they have operated in parallel with government entities that have responsibilities for urban and rural sanitation. Continued use of these parallel service channels will detract from the capacity building of the responsible national and local government entities in the longer run. Efforts are now needed to build the capacity, accountability, and credibility of the public entities responsible for provision of sanitation services in urban and rural areas.

The Government has supported the re-launch of the NAC. The experience with the NAC in the 1990s was that it was effective in coordinating the efforts of individual government departments involved with various aspects of sanitation services. However, the current capacity of the NAC is limited by lack of resources. The Report proposes a program of support to rebuild these capacities and to strengthen its role in ensuring effective coordination with the donor community and NGOs.

The ability to service the demand for sanitation (and water) is also constrained by the earlier flight of skilled labor. This has left the sector with limited institutional capacity in terms of human resources, financial/ managerial skills, monitoring, and evaluation systems. The proposed program will require substantial additional skills for successful implementation. More work is needed on the detailed arrangements required for mobilizing these additional skills.

7.6.2.4 Choice of Targets for Sanitation Services

As with the official targets for access to improved water, there is considerable uncertainty about the prospects for meeting the MDG and national goals for sanitation by 2015. Meeting the 2015 targets for access to improved sanitation would require substantial additional capital outlays during 2011-14. As noted earlier, achievement of these targets will, in all likelihood, require financial support from donors. In the event that Zimbabwe launched an arrears clearance process with the international donor community in 2011, a substantial amount of donor support for improved sanitation services in urban and rural areas would very likely be forthcoming, but until there is clarity on the arrears clearance process, the prospects for substantial amounts for donor support for rehabilitation and expansion are uncertain. Given these uncertainties, the position taken in this Report is that the MDG goals for sanitation would be met by 2020. Figure 7.11 sets out the targets proposed in this Report for access to improved sanitation.

14 World Bank (2002), "Urban Environmental Strategic Sanitation Planning: Lessons from Bharatpur, Rajasthan, India." Field Note 23771. Water and Sanitation Program – South Asia, New Delhi.

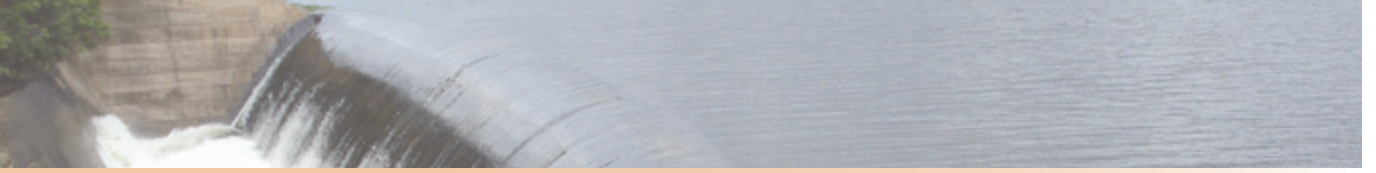
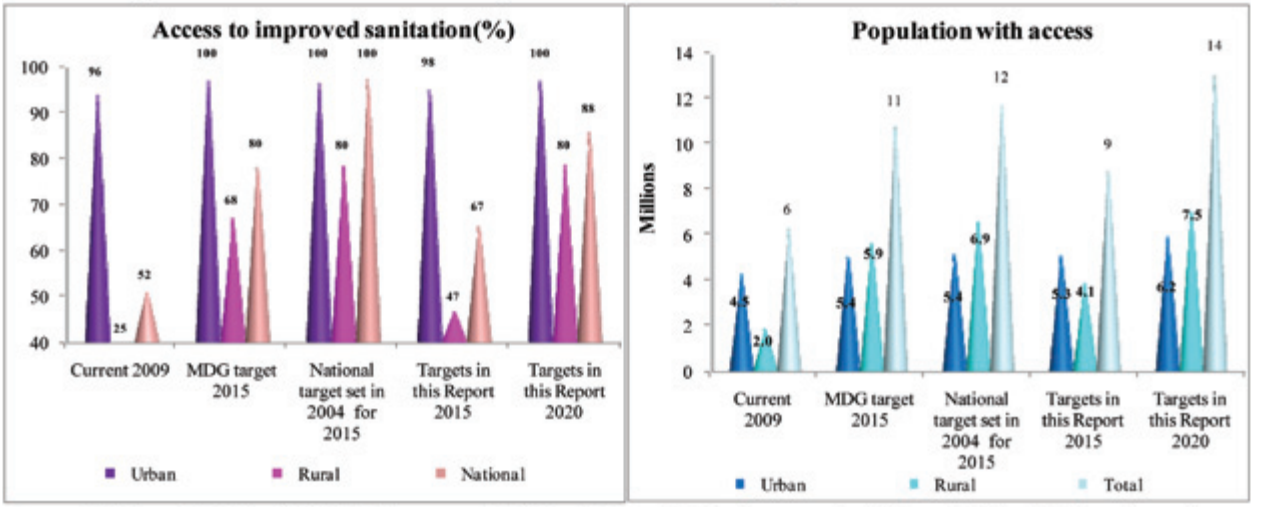


Figure 7.11: Zimbabwe: Targets for Access to Improved Sanitation Services



Source: Official targets for 2015 established by the Government of Zimbabwe. Estimates for 2009 and targets used in this Report for 2015 and 2020 are authors estimates.

7.6.3 An Action Plan for Improved Sanitation

The proposed Action Plan for sanitation has the following four key objectives: (i) complete the rehabilitation of urban and rural network of sanitation facilities within the next four years; (ii) expand access to improved sanitation facilities in both urban and rural areas, with particular attention being given to reducing use of open defecation in rural areas; (iii) implement institutional reforms that will strengthen coordination and implementation of sanitation programs and expand financial support for the program; and (iv) expand the ongoing hygiene education programs for urban and rural communities.

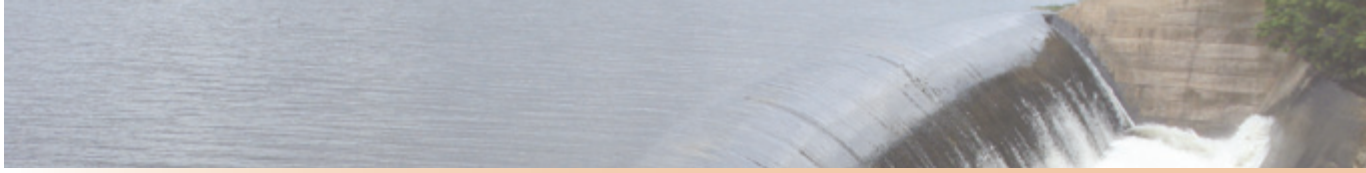
7.6.3.1 Improving Infrastructure for Sanitation Services

As with the water supply program, a high priority is attached to expanding the on-going program of support for rehabilitation of the existing urban and rural network of sanitation facilities. An amount of $325 million is proposed for this component, and subject to the availability of funding, it would be completed by 2014 or sooner if practical (Table 7.19). At the same time, a program to expand access to improved sanitation facilities would be launched. The objective would be to have 100 percent of urban dwellers and 80 percent of rural inhabitants with access to improved sanitation facilities by 2020. The cost of this expanded access to sanitation facilities is estimated at about $540 million at 2009 constant prices. Setting the rural service coverage at 80 percent in 2020 reflects the remoteness of parts of the country and likely difficulties of access. Beyond 2020, the goal should be to provide the remaining 2 million people with access to improved sanitation facilities.

The total cost of the proposed sanitation program for 2011-2020 is estimated at about $980 million at 2009 constant prices. Funding arrangements for the program are discussed below.

7.6.3.2 Strengthening Capacities for Delivery of Sanitation Services

As noted earlier, there are 31 urban centers in Zimbabwe ranging from the major city of Harare to the three small Local Boards. Full implementation of the proposed program will provide an additional 1.6 million urban dwellers with access to improved sanitation – an increase of 35 percent over existing levels. A concerted effort will be required in the next

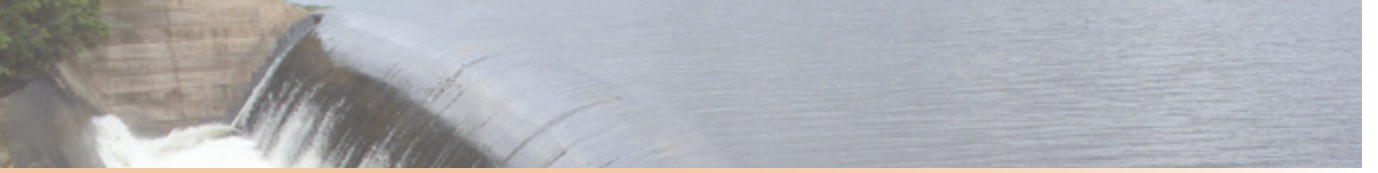


five years to build the services capacities of these 31 urban jurisdictions. At the present time, weaknesses in capacities to delivery adequate services are widespread and include lack of financial resources, manpower, technical skills, and equipment. The Institute of Water and Sanitation is running courses for water treatment plant operators and, depending on their skill level, these range from short courses for operators lacking any formal qualifications to two-year diploma courses for qualified staff. With the large increase in the numbers of people with access to improved sanitation, a substantial expansion in these training programs will be required for personnel responsible for operation and maintenance of urban facilities. When town councils resumed control of sanitation from ZINWA, much technical support was no longer available. The role of ZINWA could be expanded to provide technical support to local governments through the UCAZ and engineering support department. For smaller local councils without well-resourced engineering departments, ZINWA or UCAZ could be contracted to provide engineering support and be remunerated for such support.

Table 7.19: Capital Cost of the Sanitation Program (In US$ '000 at 2009 constant prices)

Indicator	2010	2011	2012	2013	2014	2015	2020	Total 2011-20
Population with access to improved sanitation ('000)								
Urban	4560.7	4654.2	4785.2	4943.5	5114.6	5288.8	6171.8	6171.8
Rural	1973.3	2081.6	2532.7	3021.2	3530.1	4057.1	7519.4	7519.4
Total	6534.0	6735.8	7317.9	7964.7	8644.8	9346.0	13691.2	13691.2
Share of population with access to improved sanitation (%)								
Urban	96.0	96.4	96.8	97.2	97.6	98.0	100.0	100.0
Rural	25.0	26.0	31.1	36.4	41.7	47.0	80.0	80.0
Total	51.7	52.5	55.9	59.5	63.1	66.6	87.9	87.9
Capital expenditure programs (US$ millions)								
New connections								
Urban	5.4	14.2	19.9	24.1	26.0	26.5	28.3	244.9
Rural	1.1	5.8	24.4	26.4	27.5	28.5	39.6	299.5
Total	6.5	20.1	44.3	50.4	53.5	54.9	67.9	544.4
Rehabilitation								
Urban	20.0	60.0	80.0	80.0	60.0	…	…	280.0
Rural	5.0	10.0	15.0	15.0	5.0	…	…	45.0
Total	25.0	70.0	95.0	95.0	65.0	…	…	325.0
Replacement of rural latrines	…	21.3	21.3	21.3	21.3	21.3	5.8	112.4
Total capital expenditures								
Urban	25.4	74.2	99.9	104.1	86.0	26.5	28.3	524.9
Rural	6.1	37.2	60.7	62.7	53.8	49.8	45.4	456.9
Total	31.5	111.4	160.6	166.8	139.8	76.2	73.7	981.8
Memo item:								
Capital stock (US$ mill)	782.9	803.0	847.3	897.7	951.2	1006.1	1327.3	1327.3

Source: Annex Tables 3.13, 3.14 and 3.15.



Delivery of sanitation to the rural communities is more challenging. The technology is simple, but the introduction (or reintroduction) of sanitation into these communities in a sustainable way is more complex. To construct a Blair VIP requires a variety of materials. The cost of each latrine will depend on distances from the supply center plus the base unit cost of each item. The financial capacity of rural communities to collect and have delivered the items required to construct a latrine is usually limited. Cash transfer systems could be used to stimulate interest in the local economy. Such approaches (in partnership with the donor community) use direct payment to individuals within the community to organize and implement the repair or replacement of latrines under the oversight of an NGO. The NGO will pay cash for the functioning latrine. This would be an extension of the "cash transfer" payments already being undertaken in parts of the rural community.

7.6.3.3 Expand Ongoing Hygiene Education Programs

The Environmental Health Service of the MOHCW is responsible for all Government-based hygiene education programs in rural communities. All urban councils have similar departments. Historically, there were only two grades of Environmental Health workers responsible for a range of public health activities ranging from education, enforcement of standards of compliance with the Public Health Act, and testing of water and food. At the District level an Environmental Health Officer (EHO) is responsible for coordinating activities of all the Environmental Health Technicians (EHT) and one EHT is posted to each of the Wards. This requires a staff comprising around 65 EHOs and 2,500 EHTs. There are currently 359 EHTs in the Wards (that is, only 14 percent of posts are filled in the Wards).

Owing to the chronic shortage of skilled operatives and the urgent need to reinforce the fragile government rural environmental health systems with staff, ECHO financing of €1 million is being used to train 510 individuals as Environmental Health Assistants (EHA). Once they complete the basic first year of college training they will be sent to Wards under supervision to get hands-on experience. A second batch of EHAs is being recruited and will be trained in 2011. After one year's experience, the EHAs will return to college for a second and third year of training and if successful in the exams, will leave college with a National Diploma in Environmental Health and, subject to opportunity, be promoted to EHT. Further training is possible for EHTs to convert the qualification to Higher National Diploma allowing promotion to the EHO grade. The MOHCW estimated it costs $5,000 per student to train to an EHT over three years, with additional financial resources also required for field test kits and transport in the form of a motorbike. MOHCW advised that a combined field test kit for testing both water quality and food quality was desirable as stored food can cause complications similar to those of water borne diseases.

7.7 EXPENDITURE PROGRAMS FOR WATER AND SANITATION

7.7.1 Development Expenditure Programs

The proposed program for water resources and water and sanitation services amounts to about $4 billion for the decade ahead (Table 7.20). About half of the proposed program is for urgently needed investments aimed at improving the supply and delivery of water for agricultural and industrial use and for use in urban and rural water and sanitation services. The continued rapid growth in urban population and expansion of access to improved water and sanitation services by 2020 is the main driver behind the proposed expenditure of $1.84 billion on water and sanitation services. A total of $50 million is proposed for capacity building, technical studies, and hygiene education programs as well.

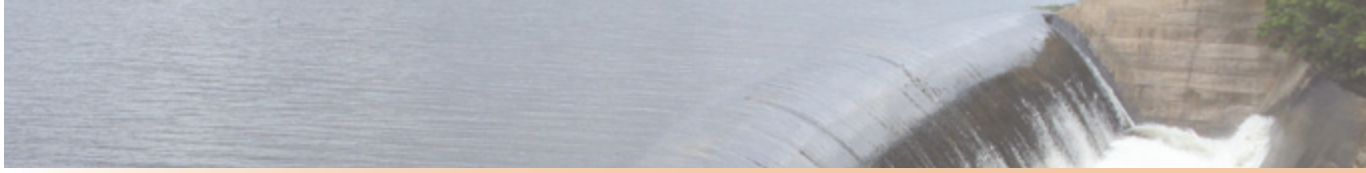


Table 7.20: Development Expenditures for Water Resources, Water Supply and Sanitation (In US$ '000 at 2009 constant prices)

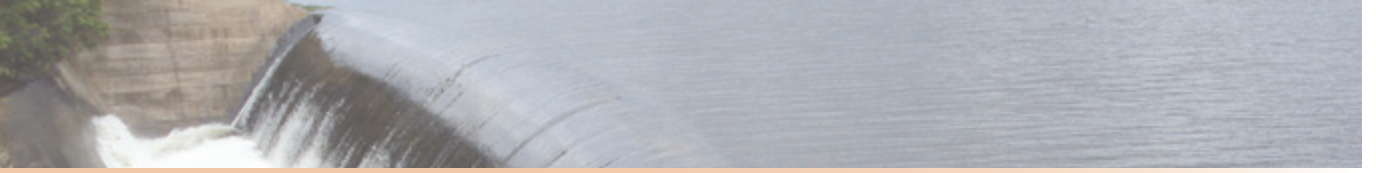
Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total 2011-20
Capacity building & support												
Water resources management	...	5.0	4.0	2.0	11.5	11.0	9.0	...	...	...	...	42.5
Water supply and sanitation	...	2.5	4.0	2.0	1.5	1.5	0.5	...	...	...	...	12.0
Sub-total	...	7.5	8.0	4.0	13.0	12.5	9.5	...	...	...	...	54.5
Technical studies												
Water resources management	...	7.0	6.0	...	...	...	...	...	...	...	...	13.0
Water supply and sanitation	...	1.5	0.5	...	...	...	...	...	...	...	...	2.0
Sub-total	...	8.5	6.5	...	...	...	...	...	...	...	...	15.0
Dams												
Rehabilitation of existing dams	...	5.0	20.0	30.0	25.0	...	...	...	...	...	...	80.0
New dams	...	...	...	...	...	...	...	...	...	...	...	...
Irrigation	...	...	...	...	...	28.3	42.5	56.7	56.7	70.8	70.8	325.8
Multipurpose & other	...	...	...	...	...	23.2	34.8	46.4	46.4	57.9	57.9	266.6
Total	...	5.0	20.0	30.0	25.0	51.5	77.3	103.1	103.1	128.7	128.7	672.4
Water transfer												
Rehabilitation of existing assets	...	5.0	10.0	10.0	5.0	...	...	...	...	...	...	30.0
New pipelines & canals	...	...	...	10.0	30.0	100.0	250.0	350.0	350.0	350.0	...	1440.0
Total	...	5.0	10.0	20.0	35.0	100.0	250.0	350.0	350.0	350.0	...	1470.0
Urban WSS program												
Water	24.1	66.8	112.0	116.2	68.8	40.2	40.6	41.6	43.3	45.0	46.9	621.3
Sanitation	25.4	74.2	99.9	104.1	86.0	26.5	25.9	25.9	26.7	27.5	28.3	524.9
Sub-total	49.5	141.0	211.9	220.2	154.8	66.6	66.5	67.5	69.9	72.5	75.2	1146.2
Rural WSS program												
Water	7.9	21.4	42.5	53.5	29.2	14.5	14.3	14.4	14.8	15.3	15.4	235.4
Sanitation	6.1	37.2	60.7	62.7	53.8	49.8	35.2	36.2	37.4	38.6	45.4	456.9
Sub-total	14.1	58.6	103.2	116.2	82.9	64.3	49.6	50.6	52.2	53.8	60.8	692.3
Total												
Capacity building & studies	...	16.0	14.5	4.0	13.0	12.5	9.5	...	...	...	...	69.5
Water resources	...	10.0	30.0	50.0	60.0	151.5	327.3	453.1	453.1	478.7	128.7	2142.4
Water distribution	32.1	88.2	154.5	169.7	97.9	54.7	55.0	56.0	58.1	60.3	62.3	856.7
Sanitation	31.5	111.4	160.6	166.8	139.8	76.2	61.1	62.1	64.0	66.1	73.7	981.8
Total development expenditures	63.6	225.6	359.6	390.4	310.7	294.9	452.9	571.2	575.3	605.1	264.7	4050.4

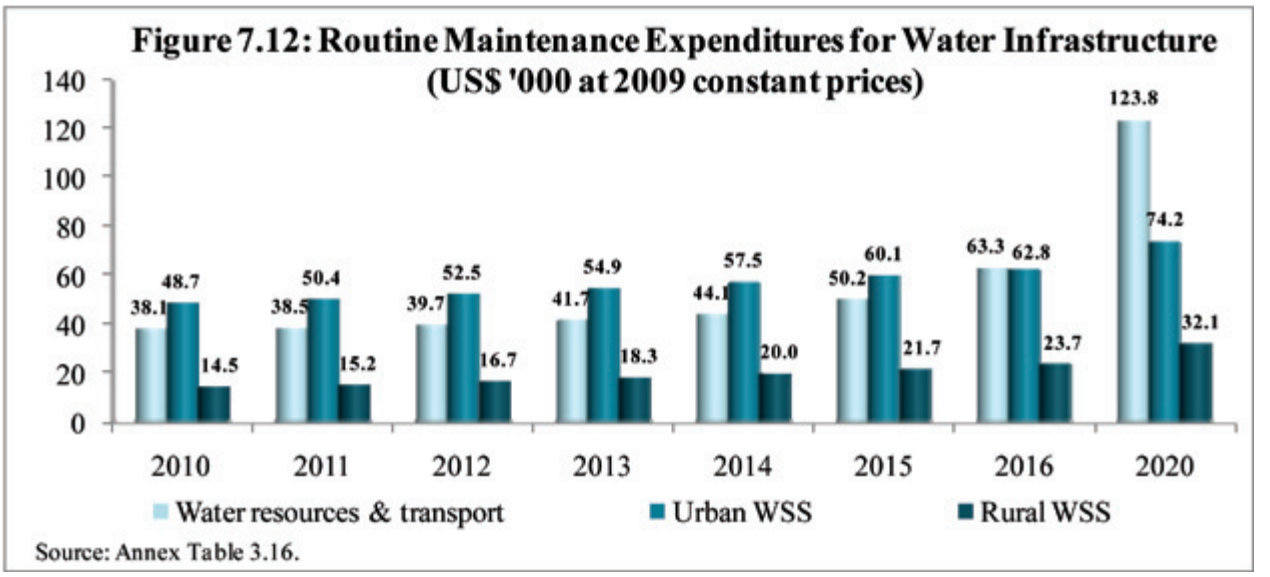
Source: Table 7.8, Annex Tables 3.9, 3.10, 3.11 and 3.14.

A rapid build-up in expenditures is proposed for the next five years. The build-up is driven by full implementation of the rehabilitation and replacement program in water supply and sanitation of some $760 million over the next five years, and by outlays of $460 million for new connections. In the second half of the decade, the proposed program of spending on new water resource storage and transport arrangements is under full implementation. As a result, total spending peaks at about $600 million in 2019.

7.7.2 Requirements for Routine Maintenance

The deterioration in the water and sanitation infrastructure over the past decade stemmed from the lack of maintenance of these assets. A central objective of the proposed Action Plan for the decade ahead is to ensure that routine maintenance is undertaken on a regular basis and that funding arrangements for these activities are adequate. For the purposes of this Report, it is assumed that routine maintenance is equivalent to 4 percent of the value of the water and sanitation infrastructure. Figure 7.12 sets out the required maintenance outlays for the decade ahead. (Actual data for 2010 are not available; the estimate of $101.4 million is an indication of the level of maintenance spending that is required. Anecdotal evidence suggests that actual spending may be no more 10 percent of this required amount.)





In the case of the water resources infrastructure, the cost basis of these assets is put at about $950 million as of end 2010, which suggests that routine maintenance should be in the range of $40 million. It would appear that actual spending on maintenance is substantially lower. According to the income statement of ZINWA (Annex Table 3.3) spending on maintenance of dams was about $540,000 in 2009, while maintenance outlays on property plant and equipment, which would include water treatment works (WTW), pumping stations, and related facilities, was about $3.2 million. As the earlier discussion about the financial position of ZINWA indicated, the basic problem is the low price set for the sale of raw and treated water. Full implementation of the proposed investment program in water resources would raise the required level of spending on routine maintenance to about $125 million by 2020.

In the case of the urban water supply and sanitation network, the cost basis of the infrastructure assets is put at $1.2 billion. Routine maintenance requirements would therefore be in the range of $50 million a year at the present time. Information is not readily available on the current level of spending by local authorities on routine maintenance, but informal estimates suggest that it is much less than $50 million a year. Full implementation of the rehabilitation program and increased access to improved water and sanitation in all urban centers in the decade ahead would raise the required level of maintenance spending to about $74 million a year. Again, the issue is the low levels of tariffs for provision of WSS services in urban areas.

The value of the rural WSS infrastructure is put at about $360 million at the present time. Routine maintenance requirements are therefore put in the range $15 million a year. This expenditure requirement would increase to about $30 million a year by 2020 with full implementation of the proposed rural WSS program.

7.7.3 Sources of Funding for the Program

There are three distinct, but closely related, sets of issues related to arrangements for funding the proposed program for water resources management and water and sanitation services: (i) funding arrangements for capital and recurrent expenditures for water resources management; (ii) arrangements for covering the recurrent costs of water and sanitation service provision by municipalities; and (iii) funding sources for the WSS capital expenditure program.

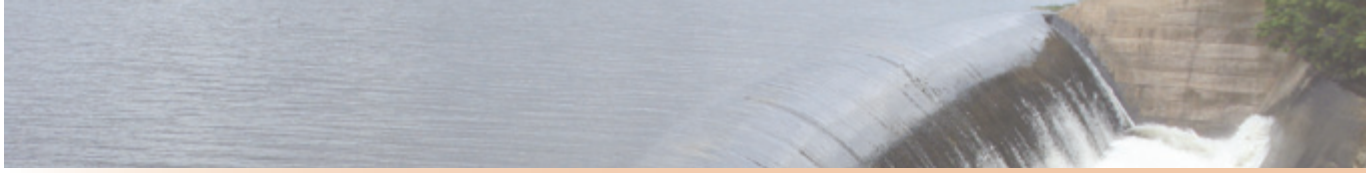


Table 7.21: Indicative Funding Program for the Water and Sanitation Development Program

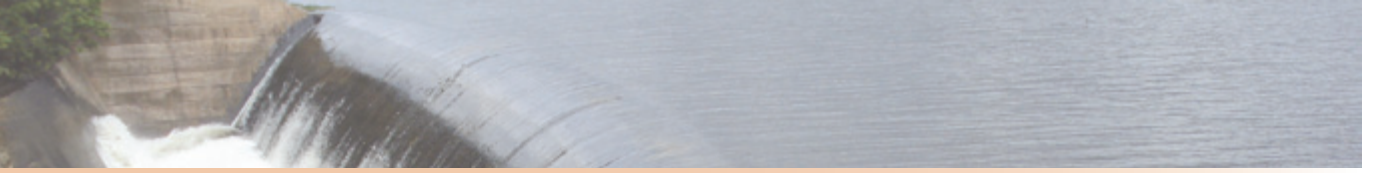
Source of funds	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total 2011-20
	(US$ millions at 2009 constant prices)											
Capacity building & studies												
National budget	...	2.0	2.0	2.0	2.0	2.0	2.0	...	...	...	...	12.0
Donors	...	14.0	12.5	2.0	11.0	10.5	7.5	...	...	...	...	57.5
Total	...	16.0	14.5	4.0	13.0	12.5	9.5	...	...	...	...	69.5
Water resource development												
National budget	...	...	10.0	15.0	10.0	16.5	17.3	33.1	33.1	38.7	38.7	212.4
ZINWA	...	5.0	10.0	15.0	15.0	15.0	25.0	25.0	25.0	25.0	25.0	185.0
Donors	...	...	...	...	...	10.0	15.0	15.0	15.0	35.0	35.0	125.0
Private investment	...	...	...	...	...	10.0	20.0	30.0	30.0	30.0	30.0	150.0
Total	...	5.0	20.0	30.0	25.0	51.5	77.3	103.1	103.1	128.7	128.7	672.4
Water transport & storage												
National budget	...	...	5.0	10.0	25.0	25.0	25.0	...	...	...	...	90.0
ZINWA	...	5.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	...	80.0
Donors	...	...	...	...	...	15.0	15.0	15.0	15.0	15.0	...	75.0
Private investment	...	...	...	...	...	50.0	200.0	325.0	325.0	325.0	...	1225.0
Total	...	5.0	10.0	20.0	35.0	100.0	250.0	350.0	350.0	350.0	...	1470.0
Urban WSS program												
National budget	0.0	81.0	51.9	60.2	19.8	6.6	6.5	2.5	4.9	7.5	10.2	251.2
ZINWA	...	5.0	5.0	5.0	5.0	...	...	...	...	...	...	20.0
Municipalities	...	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	50.0
Donors	49.5	50.0	150.0	150.0	125.0	45.0	45.0	40.0	40.0	40.0	40.0	725.0
Private investment	...	...	...	...	...	10.0	10.0	20.0	20.0	20.0	20.0	100.0
Total	49.5	141.0	211.9	220.2	154.8	66.6	66.5	67.5	69.9	72.5	75.2	1146.2
Rural WSS program												
National budget	(0.0)	18.6	43.2	56.2	22.9	14.3	14.6	15.6	17.2	18.8	25.8	247.3
ZINWA	...	5.0	5.0	5.0	5.0	...	...	...	...	...	...	20.0
Municipalities	...	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	50.0
Donors	14.1	30.0	50.0	50.0	50.0	45.0	30.0	30.0	30.0	30.0	30.0	375.0
Total	14.1	58.6	103.2	116.2	82.9	64.3	49.6	50.6	52.2	53.8	60.8	692.3
Total Program												
National budget	(0.0)	101.6	112.1	143.4	79.7	64.4	65.4	51.2	55.3	65.1	74.7	812.9
ZINWA	...	20.0	25.0	35.0	35.0	25.0	35.0	35.0	35.0	35.0	25.0	305.0
Municipalities	...	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	100.0
Donors	63.6	94.0	212.5	202.0	186.0	125.5	112.5	100.0	100.0	120.0	105.0	1357.5
Private investment	...	...	...	...	...	70.0	230.0	375.0	375.0	375.0	50.0	1475.0
Total	63.6	225.6	359.6	390.4	310.7	294.9	452.9	571.2	575.3	605.1	264.7	4050.4

Source: Estimates by authors.

7.7.3.1 Funding Arrangements for the Water Resources Program

The development of these water resources in the decade ahead is essential if the proposed expansion in access to water and sanitation services is to be achieved and if the supply of water for irrigation is to be increased as well. Successful implementation of the water resource investment program is a prerequisite for improved water security in the decade ahead. The total cost of the proposed water resources program is $2,142 million (Table 7.21). The Report proposes four sources of funding for the program:

- Private investment under PPP-type arrangements in the amount of $1.375 billion for the Zambezi River pipeline and one or more multipurpose dams;
- Direct funding by ZINWA in the amount of $265 million for dams and water transport facilities;
- Donor support of $200 million for multipurpose dams;



- A little over $300 million of support from the national budget to meet the balance of funding requirements for the program.

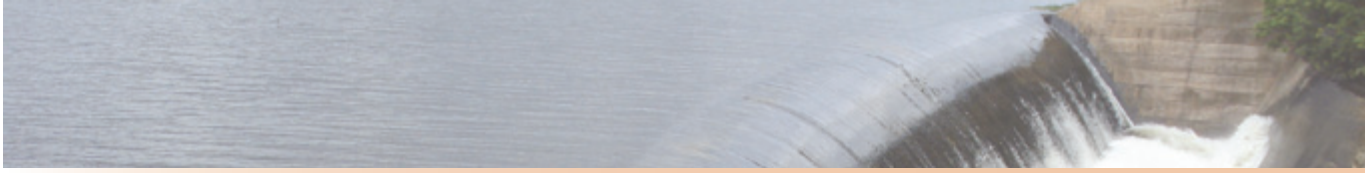
Governments have traditionally assumed responsibility for financing large water resource projects, often with assistance from international financial institutions. The Report proposes a concerted effort be made to mobilize private sector funding for one or more of the dams to be constructed in the decade ahead, as well as the $1.2 billion Zambezi-Bulawayo pipeline. As Table 7.21 indicates, the Report assumes that construction of the Zambezi pipeline project would begin in 2015 and would be completed by 2019. The proposed program also provides for $150 million for possible private sector participation in one or more storage dams, and $100 million for private investment in a water utility that would provide water and sanitation services in a major urban center.

7.7.3.2 Financing the Capital Expenditure Program for Water Supply and Sanitation

In the past two years, the bulk of the funding for water supply and sanitation services has come from the donor community and NGOs. As noted earlier, the international community has made a concerted effort to meet the immediate humanitarian needs associated with the cholera outbreak in 2008. South Africa Government financed the emergency rehabilitation works for the water and sanitation infrastructure in Harare. The German Government through GTZ provided funding for the rapid review assessment of eight of the largest urban areas in the country, including Harare, and provided US$6 million to finance the emergency rehabilitation of the WSS systems in urban areas of Gweru, Kadoma, and Kariba. The Australian Government contributed US$10.2 million towards rapid assessments, chemical provision, and rehabilitation works for various towns through UNICEF and NGOs and provided US$4.15 million for further investment in the rehabilitation of the Bulawayo water and sanitation systems and the expansion of the UNICEF ERR&RR program to include Masvingo. The World Bank committed US$3 million to finance works for Beitbridge Town and is supporting the Analytical Multi-Donor Trust fund (A-MDTF) which is providing funding for WSS-related technical assistance to Harare City ($300,000) and to the Ministry of Water Resources. The AWF financed €2 million for the rehabilitation of water supply and wastewater systems within Chitungwiza Municipality. The AfDB provided two consecutive emergency relief interventions valued at US$2 million to help contain the cholera outbreak of 2009 and strengthen the GoZ cholera response plan in 2010.

Donor assistance was also channeled through the Water Sanitation and Hygiene Cluster (WASH) with UNICEF with OXFAM GB as co-leaders. The members of the cluster include UNDP, WFP, WHO, Governmental organizations, and international and local NGOs. The WASH partners are currently concentrating on rehabilitating water points, distributing non-food items, and providing safe water to communities, including drilling of 200 boreholes in urban areas. Training in hygiene promotion has been extensively carried out to help prevent the return of another cholera outbreak.

The proposed water supply and sanitation program calls for total expenditures of $1.84 billion in the decade ahead, including $1.15 billion for the urban program and about $700 million for the rural program. The Action Plan calls for a major expansion in the level of support by the donor community in the decade ahead. As Table 7.20 indicates, the proposal is for mobilization of $1.1 billion from within the donor community for the urban and rural WSS programs during 2011-2020. This would cover 60 percent of the cost of the proposed program. Assuming that an arrears clearance process is agreed with donors and then launched in 2011, the expectation is that the donor community would provide strong support for a sustained



program of rehabilitation and expansion for water and sanitation services.

The program proposes the establishment of one or more water utilities in the major urban centers of the country under PPP-type arrangements with participation by private investors. A notional amount of $100 million of private investment is proposed. It is assumed that such utilities would become operational by 2015. As noted above, a substantial amount of work will be needed in the next few years to create the required operating environment for these investments, the details of which are discussed in Chapter 4.

ZINWA would contribute a total of $40 million for rehabilitation in those towns and communities for which it is currently responsible for service provision. However, as noted above, this Report proposes that these responsibilities be transferred to other entities, leaving ZINWA to concentrate on the management and supply of water resources in the country. It is assumed that these alternative arrangements are in place by 2014, or at an earlier date, at which time ZINWA would cease to disburse funds for capital expenditures on the water supply and sanitation network. To the extent that ZINWA funds rural components of the program, responsibility for these activities would be assumed by the RCDF as discussed below.

The municipalities would contribute a modest portion of financing for rehabilitation and expansion in those urban centers not covered by the proposed private utilities. Implementation of these proposals would leave an unfunded amount of about $500 million which would be covered primarily by the national budget. For the rural component of the program, the RCDF would become the mechanism for prioritizing the use of these funds and for their disbursement.

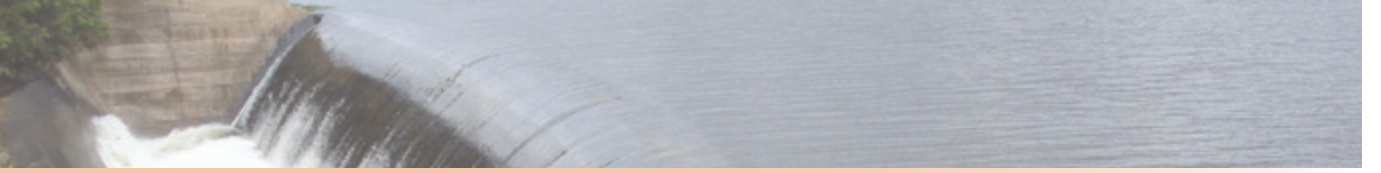
7.7.3.3 Role of the Rural Capital Development Fund (RCDF)

There is a strong case for rebuilding the role of the RCDF as the primary vehicle for channelling funds from donors and the national budget into the rural WSS program. As the World Bank (2009) has noted, the RCDF has an existing constitution, implementation guidelines, and accounting procedures. And there are existing mechanisms whereby projects are developed at the district level, reviewed at provincial and national levels, and prioritized by the NAC. This type of mechanism has worked well in the past and has been successful in other countries.

As Table 7.21 indicates, the cost of the rural WSS program is put at about $700 million for the decade ahead, with the donor community and national government contributing at least $620 million of the required funding. Assuming that there is an arrears clearance process in place, and that donors were able to step up their support for rural WSS activities, the national budget could make annual allocations to the RCDF and these would then be matched by donors on a one-to-one or two-to-one ratio.

7.7.3.4 Funding the Recurrent Cost of WSS Service Provision

At this stage, there is not enough up-to-date information about the financial performance of each of the urban and rural service providers to determine the extent to which these services have prices that are designed to cover operating costs and the extent to which a large amount of accounts receivable are more than 60 days due. As Figure 7.10 indicates, there is provision in the program for a full assessment of the financial accounts of each of the service providers. This information would then clarify the extent to which national budget resources may be required to fund shortfalls in operating revenues until remedial plans can be implemented. The latter would be drawn up once the results of the financial assessments of service providers are completed. These remedial programs would involve some combination of increases in prices, improved collection of accounts receivable, and efficiency improvements that lower operating costs.



7.7.4 An Increased Role for the Private Sector

The proposed build-up in the program for water resources management and urban and rural water and sanitation services offer substantial opportunities for an expanded role for the domestic private sector. As Table 3.1 indicates, about 30 percent of the $4.5 billion program for rehabilitation and new construction will involve civil works for construction of dams, pipelines, and water and sanitation service facilities that includes pumping stations, water reservoirs, sewerage plants, borehole drilling, supply and installation of latrines, and so on. The position taken in this Report is that the bulk of these activities should be undertaken by private contractors. For large civil works projects partnerships between domestic and international contractors would be attractive. Many of the contracts will not be large enough to attract major international contractors and would provide considerable opportunities for local business. In the case of borehole drilling, for example, there is little justification for retaining the continued use of government entities to provide this service. The objective should be to contract out these activities for urban and rural programs. With the use of competitive tendering processes, a significant domestic borehole drilling and maintenance industry can be developed in the decade ahead. Larger firms would then have the capability to bid on contracts in other SSA countries as well.

Similar opportunities arise with respect to routine maintenance of these assets. As Figure 7.12 indicates, outlays on maintenance are projected to increase to about $230 million a year by 2020 (at 2009 constant prices). These activities can all be contracted out to the private sector under competitive bidding arrangements. As the discussion in Chapter 3 indicates, the size of individual contracts can be varied to meet the capacities of local firms. Over time, the size of contracts can be increased and in this way, the capacities of the local industry can grow. Initially, such maintenance contracts may be for a period of 12 months. But as the discussion in Chapter 9 on road maintenance indicates, period contracts can be used for maintenance of a portion of the urban or rural WSS networks, and dams and pipelines. The duration of these contracts could be extended to two years and then, say, three years. These types of measures have been used with great success in Asia to build the domestic capacities of companies that provide maintenance services.

A third area where there will be substantial opportunities for local business is in billing and collection activities. In urban areas, for example, full implementation of the program would mean that there would be about 1.14 million household accounts to be serviced by 2020.[15] Billing and collection on this scale offers considerable opportunities for efficiency gains and cost reductions for municipalities or water utilities by contracting out services to qualified private companies rather than building small units within every municipality.

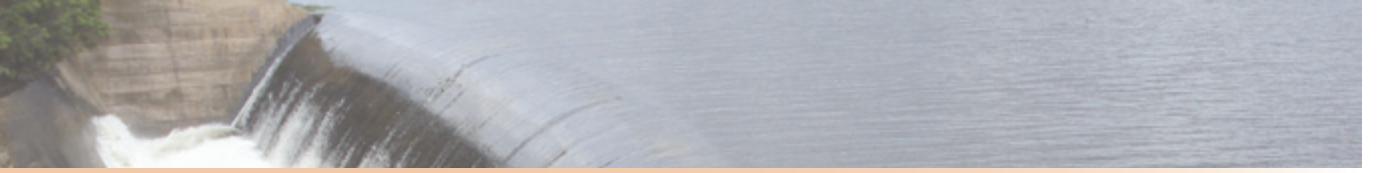
15 This estimate assumes that the 6,172 thousand persons with access to improved water in 2020 have an average household size of 5.4 persons.

7.8 MANAGEMENT OF RISKS AND UNCERTAINTIES

A number of risks and uncertainties are associated with the proposed program for water resource management and provision of water and sanitation services. For the purposes of this Report, these risks and uncertainties can be grouped into three broad categories. First is the impact of high climatic variability in Zimbabwe on the availability of water and economic performance of the country, and the implementation of measures required to mitigate this risk. Second is the availability of funding for the rehabilitation of existing infrastructure and construction of new facilities, the total cost of which is estimated at about $4 billion for the decade ahead. Third are the prospects for building the institutional and human capacities required for effective implementation of the proposed program.

7.8.1 Hydrological and Climatic Variability

As indicated elsewhere in this Chapter, high climatic variability is one of the major challenges facing Zimbabwe in its management of water resources. The country depends heavily on surface water to meet its various requirements; but rainfall is variable and unpredictable. Only 37 percent of the country receives adequate rainfall for agriculture. For



the rest of the country the rainfall pattern is insufficient, erratic, and unreliable. Many of the rivers in the country are not perennial, and even major rivers may not flow in dry years. The evidence from the past 30 years indicates that hydrological variability experienced by Zimbabwe causes significant economic shocks. There is a strong correlation between rainfall variability and fluctuations in GDP growth. Improved water resources management is therefore critical to the stability and security required for sustained strong economic growth.

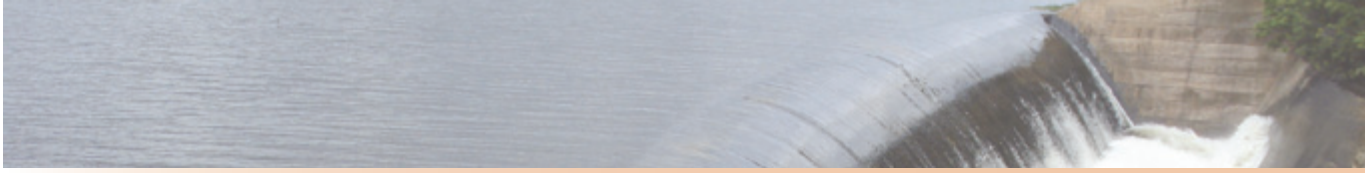
Irrigation is indispensable for successful agriculture and significant quantities of stored water are required to meet agricultural and non-agricultural requirements. Currently, the supply of water is not sufficient to meet demand. To meet these existing shortfalls and the expected growth in aggregate demand for water resources, and to reduce the vulnerability of the economy to water shocks, the country will require an increase of some 6 million km³ in the stored water capacity of dams by 2020. A substantial investment in pipelines and other means of water transport will also be required. The total investment in water storage and transport for the decade ahead is estimated at $2.142 billion (at 2009 constant prices). The indicative financing plan for this component of the program calls for $1.375 billion of investment by the private sector, including $1.2 billion for the proposed Zambezi-Bulawayo pipeline, some $570 million of funding from the national government and $200 million of support from the donor community.

7.8.2 Mobilization of Funding for the Proposed Program

The proposed financing plan for the $4 billion program for the sector calls for $1.48 billion of private investment, $1.34 billion of donor funding and $1.22 billion of funding by national and sub-national government entities (all at constant 2009 prices). The mobilization of these funds poses a significant challenge for the decade ahead. With the support of the donor community, the Government will need to draw up a detailed master plan for the sector and translate that into a coherent set of follow-up actions that include policy and institutional reforms and a series of program and project proposals that can then be funded from these various sources.

Private funding. Mobilization of $1.48 billion of private support will require concerted efforts to strengthen the supporting environment for such investment. As Chapter 5 indicates, there are a number of important pre-conditions for the successful launch of a program of private investment in the supply and transport of water resources. The most urgent include: (i) early approval of a law and regulations that will govern PPP investments; (ii) improvements in the regulation of services related to the water resource management and supply; and (iii) ensuring that ZINWA or other public partners are seen by potential investors as financially sound and reliable and able to comply with the contract obligations of one or more PPP arrangements.

International experience suggests that private sector participation under PPP-type arrangements is possible for these types of water supply projects; however, the projects must have clearly identified revenue-creating components, such as the supply of water for irrigation and for consumption in urban centers. A potential investor in a stored water or water transport project would typically expect to have an off-take purchase agreement that secures a revenue stream for the project. The most likely arrangement would be a take-or-pay contract with ZINWA, which would look for a guaranteed long-term supply of water from the project. The implication is that early action would also be required to strengthen the financial position of ZINWA and focus its responsibilities for the management of the nation's water resources and the supply of raw and treated water to various types of users. Lack of progress in establishing these enabling requirements would very likely lead to delays in mobilizing the required private funding.

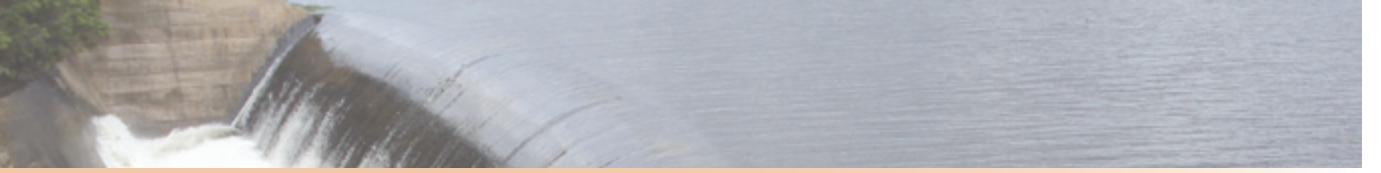


Donor support for water and sanitation services. The $1.34 billion of donor support proposed for the Action Plan for the decade ahead includes about $1.1 billion for rehabilitation of existing, and construction of new, infrastructure required for provision of water and sanitation services for households and industry. This represents a substantial ramp-up in donor support for these basic services in the decade ahead. However, on an annual basis the average of a little over $100 million a year is not inconsistent with the level of donor support in the past two years. As noted elsewhere in this Report, the launch of an arrears clearance process in 2011 will be central to sustained donor support at this level for the decade ahead. There will, of course, be other competing demands for donor funding so a clear set of priorities will be required for management of these various claims. Assuming that an arrears clearance process is launched and the total average annual inflow of donor assistance in the decade ahead is about $50 per capita for Zimbabwe – equal to the current average per capita inflow for Sub-Saharan Africa – the total donor funding available to Zimbabwe may be in the range of $650-750 million a year. An allocation of about 20 percent of this annual level of donor funding would then be required to cover the cost of the proposed donor-funded component of the program for the decade ahead.

Funding from government sources, pricing policy and cost recovery. The remaining $1.22 billion required for the ten-year program, equivalent to an average of about $120 million a year, would have to be mobilized by the national government and municipalities responsible for service provision. In addition, expenditures on routine maintenance of the water- and sanitation-related assets will need to increase from current very low levels to about $230 million a year by 2020. This build-up in maintenance outlays will be essential to ensure that the asset deterioration of the past decade does not recur. The starting point for this part of the program must be a careful assessment of pricing policy for water and sanitation services and arrangements for cost recovery. The objective would be to ensure that the operations of municipalities and ZINWA generate modest financial surpluses each year that can then contribute to the funding of the capital expenditure program.

At the present time, average tariffs for water and sanitation services are significantly lower than average production costs in almost all cities and towns. Because of the low tariffs and low collection rates, service providers are not able to cover their costs of basic operations and maintenance, let alone fund renewal and replacement of facilities and system expansion. The price of raw water provided by ZINWA also needs to be reviewed. The proposed Action Plan therefore calls for increases in the pricing of services, including provision of raw water and water and sanitation services for households and business. The program provides for evaluations of the cost of service provision and the design of appropriate pricing policies. A related issue is the ability of municipalities and ZINWA to ensure timely payments by clients. Anecdotal evidence suggests that many service providers have large levels of accounts receivable. Lack of progress on this front will also undermine the ability of service providers to fund their share of capital expenditures and to meet the costs of routine maintenance.

In the event that price adjustments are not made, and there is lack of progress in keeping accounts receivable at acceptable levels, it is unlikely that the proposed level of donor support will be forthcoming. Proposed capital expenditure programs would have to be cut. The implication is that increases in access to services will grow more slowly, or even stagnate at current levels. Moreover, there is a serious risk that assets that are rehabilitated will deteriorate through lack of maintenance. This combination of events



may also deter private investors because of concerns that the government counterparts in PPP arrangements may not be able to meet their contract obligations.

7.8.3 Building Institutional Capacities

Successful implementation of the proposed $4 billion program for water resource management and water and sanitation services for the decade ahead will require a sustained commitment to building institutional and human capacities within the sector at the national and sub-national level of government. It will also require development of private sector capacities for service provision. The existing capacity constraints will need to be addressed in the near- and medium-term to ensure successful implementation of the ambitious program for the decade ahead. Slow progress in addressing these issues will result in smaller programs for the supply of water to agriculture, industry and households, lower levels of water and sanitation service provision. It will also increase the risk poor overall economic performance because of climatic variability and associated water shocks.

The proposed Action Plan sets out a wide-ranging and comprehensive program of capacity building in the decade ahead and proposes outlays of about $70 million to fund these activities. A high priority should be attached to the detailed design of these capacity building programs, to the mobilization of the funding required for them, and for their early implementation. It is proposed that the donor community provide the necessary technical support required for this program and the bulk of the funding. ■