KENYA

Water Resources Management Issues, Challenges and Options: A Framework for a Strategy[1]

Draft Issues Paper

DECEMBER 14, 2000

[1] This draft issues paper was prepared by Rafik Hirji, Sr. Water Resources Management Specialist, World Bank, with the support from senior staff of many agencies including Ministry of Environment and Natural Resources, Ministry of Agriculture, National Irrigation Board, National Environment Secretariat, Tana and Athi River Development Authority, Kerio Valley Development Authority, Lake Basin Development Authority, Ewaso Nyiro North and Ewaso Nyiro South Basin Authorities, Coastal Development Authorities, KENGEN, Kenya Power and Lighting Company, Provincial Water Office in Nyeri, and Laikipia Research Programme. Any errors however remain the responsibility of the author.

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FORWARD

In response to the expressed request of the Kenyan government, a water resources management specialist joined the World Bank water supply and sanitation economic sector mission to identify the key current water resources management issues and priorities in Kenya, to revive the dialogue on this important subject, and to identify a potential role that the bank could play in supporting the strengthening and improvement of water resources management. The mission met and interacted with senior staff from various government agencies including the Ministry of Environment and Natural Resources, Ministry of Agriculture, National Irrigation Board, National Environment Secretariat, Tana and Athi river Development Authority, Kerio Valley Development Authority, Lake Basin Development Authority, Ewaso Nyiro North and Ewaso Nyiro South Basin Authorities, Coastal Development Authority, KENGEN, Kenya Power and Lighting Company, Provincial Water Office in Nyeri, and Laikipia Research Programme, from the Bank mission and from various cooperating partners including Sida, AfD, Embassy of Sweden, Embassy of France, Embassy of Finland, and JICA.

This draft issues paper has been prepared as a discussion paper and it provides a framework for developing a comprehensive water resources management. It identifies the emerging water resources issues and threats to the limited water resources in Kenya, the central water resources management challenges, opportunities and directions for strengthening water resources management, possible elements of a water resources management strategy and suggested next steps for developing a comprehensive water resources management strategy. The water resources management strategy will form the framework for managing the existing water resources in a sustainable manner and for developing and implementing a sustainable investment programme. The draft paper will be finalized after comments on the paper have been received from the various agencies.

EXECUTIVE SUMMARY

Key Issues

Poor WRM is not only creating serious water use conflicts but also undermining the sustainability of the water resource base itself, possibly, altering the hydrology and the water supplies. In addition, it is also threatening the economic viability of water supply and water resources investments. Poor water resources management is enhancing poverty. Given that water is so scarce, and competition for it is so intense, the imperative for regulating water resources effectively and managing it wisely cannot be understated.

The ongoing water sector reforms need to address the development of an effective WRM regulatory framework to complement the water sector service delivery and utility reforms. Ideally, because a secure, reliable and protected source of surface or ground water supply is essential for a viable utility, the WRM regulatory framework needs to be in place before utility reforms are instituted. A less ideal situation is one in which the WRM regulatory framework is developed in parallel with the utility reforms.

MAIN WATER RESOURCES MANAGEMENT CHALLENGES

Water is a scarce resource. Intense competition and water use conflicts amongst and between groups of water user communities and irrigation users, and various other use interests. Water apportionment and allocation practices and enforcement are very weak and fundamentally are the cause of the conflicts. Poor information base for determining the available supply and use. The process of allocation is often distorted, biased and often undermined by powerful and vested interests. The financial base for supporting activities of the catchment board is weak, and consequently, the decision making process is slow and often distorted. Monitoring and enforcement of the abstractions is weak. The present institutional arrangement for managing water with the MENR playing a dual role, the river basin development authority's mandate changing and the very weak catchment boards is creating a difficult sitaution vis-à-vis effective water resources management.

Catchment degradation is very severe. It is altering runoff and infiltration rates, accelerating soil erosion, increasing sediment transport and deposition. High sediment loads are reducing the economic life of water resources infrastructure, and imposing a huge cost on water utilities (high treatment costs, increased O&M costs, replacement costs—Baricho a very real case in point). Catchment degradation is undermining the productivity of the land, and this enhances poverty.

Increasing pollution undermining water supplies, increasing public health impact, which is disproportionately effecting the poor and enhancing poverty.

Uncontrolled development of groundwater, encroachment on recharge areas and poor management of the resource is causing saltwater intrusion, contamination as well as depletion of the resource.

Invasive weeds are resulting in water losses, impacting water supplies and quality, and causing serious operational difficulties.

OPPORTUNITIES

DROUGHT HAS CREATED A SERIOUS CRISIS BUT ALSO INCREASED AWARENESS ABOUT THE MAJOR CHALLENGES. THE OVERALL REFORMS IN THE GOVERNMENT AND ONGOING WATER SECTOR REFORM PROVIDE A MAJOR OPPORTUNITY TO ZERO IN ON STRENGTHENING THE WRM REGULATORY FRAMEWORK.

In addition, there is a strong interest from several donor agencies to provide support for strengthening WRM regulatory capacity in a coordinated manner with the Bank taking the lead.

ELEMENTS OF THE WRM REGULATORY FRAMEWORK

- Review of the water policy and water act to strengthen water resources management
- Development of a national forum on water management
- Development of an effective institutional setup for managing water resources
- Review the economics and finanacing of water resources management
- Strengthening of the hydrological, hydro-geologic, climatic and water quality networks and water resources assessment capacities
- Protection of priority catchments and recharge areas
- Strengthening groundwater management
- Pollution control
- Catchment management
- Capacity for integrating environmental quality objectives in WRM
- Develop a strategic framework for addressing international waters issues
- Pilot project

Next steps

Review the draft issues paper, and send comments to the bank. the bank will finalize the paper for review by bank management. send request to the bank for support to develop a multi-donor program for formulating a wrm strategy

Water Resources Management Issues, Challenges and Options: A Framework for a Strategy

Draft Issues Paper

1. AN OVERVIEW

The coupled effect of limited renewable water resources, limited level of water supply development, increasing demand of a rapidly growing population and ineffective management of water resources is posing a serious and insidious threat to the economic and social development in Kenya. Drought has further exacerbated an already difficult situation and magnified weaknesses in the water resources management systems. Kenya has an area of 586,000 square kilometer and straddles three climatic zones. The fertile central highlands covering less that a quarter of the land area receives 1000-1250 mm of rainfall annually and supports 75 % of the population. The thinly populated dry plains extending from coastal areas to inland plateaus cover three quarter of the nation and receive 250-750 mm of rainfall per year. The moderately populated narrow coastal strip receives about 1000 mm of rainfall annually. The country is divided into 5 major drainage basins: Lake Victoria Basin, Rift Valley Basin, Athi River and Coast, Tana River Basin and Ewaso N'giro South and North each with a river or lake basin development authority. It shares borders, rivers and lakes with Uganda, Tanzania, Sudan, Ethiopia and Somalia

Water supply shortages are having a severe impact on the country. Mombasa and coastal towns continue to face chronic water supply shortages. Nairobi is experiencing very severe supply shortages. The situation in most other municipalities, small towns and rural settlements is equally difficult. Low river flows have curtailed hydropower production, and significantly impacted the overall economy. Weak water apportionment and enforcement have resulted in over allocation of water in several basins and causing intense conflicts between user groups. The main surface sources and reservoirs are under serious threat from poor catchment management, increasing pollution from industries, sewage, and agro-chemicals, and encroachment on wetlands. Groundwater, an important source of water for domestic, irrigation, and livestock supply, is being developed without adequate controls. Important recharge areas are being encroached and contamination of aquifers is occurring. Growing populations, weak water apportionment and allocation, poor watershed management, deteriorating water quality and drought are all inexorably increasing water scarcity. This draft issues paper identifies the emerging water resources issues and threats to the limited water resources in Kenya, the central water resources management challenges, opportunities and directions for strengthening water resources management and recommendations for developing a comprehensive water resources management strategy. The water resources management strategy will form the framework for managing the existing water resources in a sustainable manner and for developing and implementing a sustainable investment programme.

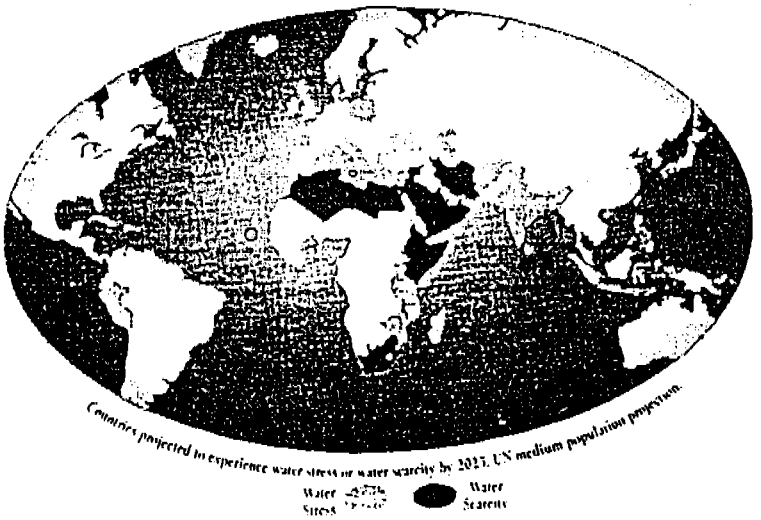
2. EMERGING WATER RESOURCES ISSUES

Growing water scarcity

According to the 1992 National Water Masterplan, the annual renewable water resources in Kenya is 20.2 billion m^3/yr, comprising of 19.59 billion m^3/yr of surface water and 0.62 billion m^3/yr of groundwater. With a current population of 31.2 million people, Kenya has 647 m^3/per capita/yr, which makes it a water scarce country.[2] The imperative for managing a scarce carefully therefore cannot be understated. In 2010, based on a projected population projection of 37.4 million, the amount of total renewable freshwater available will be 540 m^3 per capita per year. Figure 1 shows a 2025 year projection of the

Figure 1

WATER STRESSED AND WATER SCARCE COUNTRIES: 2025 PROJECTIONS



water situation in Kenya and other countries. The national average however masks the tremendous regional variation in precipitation and available supply because rainfall and water is distributed unevenly both temporally and spatially, and water shortages under normal conditions are not uniform. The Kerio Valley, Northern Ewaso Ngiro and most of the Tana and Athi River basins have very low precipitation, high evaporation, high infiltration rates make these areas arid or semi arid. Further, intense competition for

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2 Based on Falkenmark's definition, water scarcity is defined when the upper limit of renewable freshwater stocks for all uses is 1,000 m^3 per capita per year and water stress is defined when the upper limit reaches 1,700 m^3 per capita per year.

Source: 1992 National Water Master Plan

FIGURE 3

WATER BALANCES BETWEEN EXISTING AND PROJECTED DEMAND AND POTENTIALLY AVAILABLE GROUNDWATER AND SURFACE WATER

Source: 1992 National Water Master plan

conveyance losses from furrow system, and systems with poor water control structures as well as poor on farm usage of water. In the future, the reliance on irrigation is likely to increase as food supply requirements of an increasing population grow and markets for flowers and other export horticulture products and crops increases. However, with increasing water shortages it will be necessary to improve water use efficiencies through demand management.

Hydropower supplies a significant portion of the electricity (presently supplying over 70 % of the 127 Kwh per capita). Kenya imports about 18 % of its electrical power from Uganda. Much of the local hydropower is generated from the seven forks cascades on the Tana River and from Turkwel Dam. The heavy reliance on hydroelectricity is likely to remain in the future. The demand for power is increasing at the rate of 6 % per annum, but the development of commercially utilized energy supply lags behind demand and this is impacting urban and industrial development. Drought has reduced power production and caused acute water shortages impacting electricity generation and it is effecting all aspects of the economy: urban and rural water supply has become irregular and intermittent, due to reduced energy shortage load shedding and power outages are common, commercial, industrial, and agricultural outputs have declined, and food prices are impacted and food security threatened. Box 1 describes the water levels at Masinga Dam based on a recent field visit--December 7, 2000--the main water storage and regulatory structure for the Tana River and where most of the hydropower production in Kenya comes from.

Box 1
Water levels at Masinga Dam

Masinga Dam is the main regulatory and storage reservoir on the Tana River. Even though Masinga has a small (40 MW) power plant, it is primarily used for regulating flows for the four other hydropower plants—Kamburu, Gtaru, Kidaruma and Kiambere—which together represent an installed capacity of 481 MW or about ...% of the total production in the country. The present drought classified as the third worst drought resulted in reduced water inflows and reduced the reservoir water level to 1018 masl which was only 8 meters from the bottom level. Present water levels are at 1029 masl, which is still 8 m below the effective minimum operating level of 1033 masl. The lowest intake screens for the Kitui water supply intake at Masinga are about 12 meters above the present water level.

Economic impact of drought

The present drought has had a major impact across the nation and on the various aspects of the economy. In the Tana Basin, low river flows have significantly reduced the generation of electricity from the seven fork cascades where major hydropower stations are located, and this has had a huge financial impact on the energy sector (see Box 2). In the agriculture sector, the drought has led to a 40 % drop in annual production of rice which represents about US $ 2.5 million. It has also increased the cost of implementing mitigation measures such as rotational irrigation and longer run time for pumping stations for less cropped areas, and financial loss due to unproductive staff time and machinery. In the Kerio Valley, 50 % of the livestock was lost due to the droughts. In the Baringo district, 115,872 cattle, and 145,100 sheep and goats died. In the Samburu and Turkana districts the estimates were even higher. In the Baringo district, 2,000 ha out of the 2,550 ha of cropland was lost representing crop losses of 80 %. In the Coastal region, many industries relocated to Nairobi resulting in large job and revenue losses to the region,

Box 2
Drought related losses in the Power Sector

Kenya Power and Lighting Company lost US$ 55 million per month in revenues due to the drought. In October, KPLC reported a total loss of 1.6 billion Ksh in revenue for the year compared to a 1.3 billion Ksh profit last year. The loss was a result of reduced generation and sale of electricity, steep power rationing regime, expenses occasioned by high bulk purchase prices and fuel costs, increased transmission losses, and theft of electricity.

Daily Nation: October 16, 2000.

major tourist facilities incurred high costs due to the installation of desalination plants to obtain secure supplies, prevalence of water borne diseases due to poor hygienic conditions increased, agro based industries lost 30-40 % of production, 40 % of the livestock was lost and a cereal deficit of 2.8 million bags valued at 2.82 billion Ksh was experienced. In the Ewaso Ngiro South Basin, 303,758 heads of cattle (or about 45 %) of the livestock was lost and the value of cattle dropped from 30,000 Ksh per head before the drought to less than 5,000 Ksh after the drought. Also, 5 out of 6 earth dams and pans for community water supplies dried up. This partial list of impacts does not provide a complete picture. For example, the loss in revenue due to reduced sale of water or reduced industrial output, or increased health risk, and other related impacts are not been captured. Nonetheless, the economic impact of the drought is very significant.

Drought has magnified the weaknesses in the water resources management system

During the last two years of drought water supply shortages have become more acute across most parts of the country and felt across all sectoral uses of water including urban, rural industrial, energy, agricultural, livestock, wildlife and environmental uses. In addition, competition for water has increased, while its management has weakened but not because of the drought. It is important to distinguish between the short term effects of drought and the long term systemic problems that have resulted from steady deterioration of water resources management due to the diminishing resources and

support provided by the GOK. Even though drought has resulted in serious water supply deficits and increased the pressures on land and water resources, it did not create the existing problems in water resources management such as the weak water apportionment and allocation procedures, largely as a result of weak enforcement of the water act and also because of the political pressures on apportioning water for private irrigation by politically connected individuals, intense water use conflicts, severe and extensive catchment degradation, growing water pollution problems from point and nonpoint sources and encroachment on important aquatic ecosystems. Drought however has magnified the serious weaknesses and problems in the existing water resources management system in Kenya.

Floods

Like droughts, floods are part of the natural hydrological variability and necessary for a healthy functioning ecosystem, but the negative impacts of floods may include loss of life, damage to infrastructure and property. The 1998 El Niño floods damaged transport infrastructure (bridges, roads, railway and city water supply pipelines) and caused huge losses in agricultural production, infrastructure damage, and increased waterborne and water related disease. The country was only starting to recover from the effects when the drought hit the country.

3. KEY WATER RESOURCES MANAGEMENT CHALLENGES

Competition for and conflict over water

Increasing demand for the various uses has intensified competition and conflicts between and among sectoral uses and this has worsened over the past decade. Inadequate assessment of resource, inadequate water allocation procedures and poor enforcement of abstraction have exacerbated water use conflicts. In the last two decades competition for water on the slopes of Mount Kenya has intensified and become acute during the dry season. Upstream communities are moving intakes at higher and higher elevations in order to secure their own requirements and at the same time are by passing and undermining the requirements of downstream uses and communities. The water allocation problems are worse in the Northern Ewaso Nyiro Catchment. Conflicts on the Naro Moru River in Nyeri District between and among water users for irrigation and rural water supply is very severe. Table 1 lists the percent of illegal (unauthorized) seasonal water abstractions in rivers in the Northern Ewaso Nyiro Catchment in 1994/95. Between January-March, about 68 % of abstractions from all the rivers were unauthorized. A water permit provides the legal basis for abstraction for 10 years for domestic supply and 5 years for irrigation. The illegal abstractions are either due to non adherence to the water permit conditions (such as changed uses with different demands from what was stipulated in the permit, uses exceeding authorized amounts, abstraction amount deviating from

Table 1
Percent of unauthorized abstractions for river basins in the

Northern Ewaso Nyiro Catchment 1994/95

River Basins	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Naro Moru	69.6	32.1	59.0	36.8
Burugct	70.9	56.4	60.3	47.6
Nanyuki	62.4	45.3	56.5	38.3
Likii	58.3	38.1	57.2	43.8
Ontulii	72.5	52.8	70.4	49.9
Sirimon	78.2	47.7	59.5	48.6
Timau	65.8	55.4	61.6	51.6

Source: Laikipia Research Programme (1996)

stated designs, and lack of storage facilities) or due to the use of expired permits or no permits at all. An inventory of the permits upstream of Archers Post showed that out of 901 permits, only 67 were valid by December 31, 1995. The situation today is even worse. The causes of increased illegal abstractions are increased demand, use of poor technology in exploitation and irrigation, poor basis for making allocations, long time for processing the permit, patronage, by passing of the proper procedure by the Ministry in Nairobi, economic pressures for expanding irrigation, poor monitoring and enforcement of the water law, and use of inefficient methods.

Poorly coordinated development and generation of electricity on the Tana River is also impacting downstream uses such as flood recession agriculture, dry season supply for livestock and water requirements for downstream conservation purposes. The Tana River Primate Reserve and the Tana Delta Wetlands are dependent on the amount, quality and timing of the river flows.

Weaknesses in water allocation and administration procedures

The existing water resources management system in Kenya is marred by numerous technical, financial, legal, institutional and operational problems which make it ineffective to address the current management needs and challenges and these are contributing to the increasing water use conflicts and unreliable water supplies.

Poor hydrologic and water use information base. Surface and ground water data provide the basis for sound planning, design, construction and operations of all water projects for agricultural, energy, industrial, mining and social development contributing to the national economy. The systematic collection, processing, and analysis of hydrological, climatic and water use data are key processes for accurately assessing, allocating and managing water resources. Given that water is a limited resource, water resources of Kenya must be determined with sufficient accuracy for conserving, developing and managing them efficiently. Water allocation decisions must be made on the basis of sound hydrological and water use data using properly defined allocation principles and procedures. This has to be complemented with effective monitoring and enforcement of abstraction and other factors impacting the resource. Typically, a flow duration curve based on extensive period of record is used for defining the variations in

river flows and water allocation decisions are made on the basis of the low flow conditions. In ungaged catchments, a flow duration curve based on correlation with gaged catchments is used.

In Kenya, most of the hydrological, hydrogeologic, climatic and water quality networks are in very poor shape or broken down due to poor or no maintenance and replacement. This is because of both funding limitations as well as a lack of commitment by the GOK to collect data whose value in the short term is not adequately recognized. The hydrological data for most gaged rivers is poor with numerous gaps and for ungaged rivers almost absent, thus the primary basis for estimating available supply is problematic. Furthermore, it is reported that when a potential water user applies for a permit in ungaged rivers, water bailiffs in the Ewaso Nyiro North have tended to use single gage readings as the basis for estimating supply and determining the allocation, irrespective of the season (Mathwa, J.M, ed., 1996). Readings made during the wet season would indicate abundant supply while dry season readings will indicate limited supply and allocation decisions made on the basis of wet season data result in over allocating a limited supply. After the water availability in the river is determined, existing water uses have to be balanced with the supply to determine the surplus remaining from which allocation decision have to be based. However, the practice of determining an accurate water balance for a river system and using it as a basis for allocation has been abandoned and is now rarely practiced. As a consequence, water allocation decisions are often made on an ad hoc basis. In water scarce regions this is a recipe for creating water use conflicts.

Financial constraints. Water resources management—hydrological and climate data collection, and analysis, water resources assessment, monitoring, apportionment and allocation, enforcement, catchment management, pollution control—requires resources (staff time, funds, hydrological, hydrogeological, climatic and water quality networks, water quality laboratories, chemicals and equipment, transport, etc.). In the last two decades, the GOK has accorded water resources management work a very low priority (and funds and resources) compared to the work on water supply development. There are few well functioning hydrological networks in place, gages are not read on a regular basis and serious gaps exist in the hydrological data, and station rating curves have not been re-calibrated. Overall, the condition of the networks is very poor, and which has created an unsound basis for making informed decisions. In addition, this provides for a very poor basis for planning and operating systems. For example, many systems such as the Mzima Springs have complex hydrologies and some have a time lag between a major event and its response. Without proper monitoring however it will be impossible to plan for a lagged response, if any of a reduced supply caused by an early drought or even to detect changes in runoff and infiltration as a result of major changes in soil cover, for example.

The current retrenchment has also disproportionately reduced hydrologists (almost 32 %) and hydrogeologists (about 32 %) from the MENR's water resources management department at a time when the MENR is intending to focus on being a regulatory agency responsible for managing water resources and to move away from its role as the

developer and implementers of water supplies. Ironically, staff cuts in the water supply department were minimal. Without appropriate level of support for this important function of the MENR which provides the very basis for making sound development, water allocation and pollution control decisions for planning, designing, operating, monitoring, and enforcement is weakened and its effectiveness as a water resources regulator diminished.

Charges for water resources management. The National Policy on Water Resources Management and Development states that "a water abstraction fee would be charged to support the cost of assessing, monitoring, conservation and management of water resources and related research and effluent discharge levies would be introduced on the basis of the polluter pay principle." Part D of the 1995 subsidiary legislation of the Water Act (Cap 372) provides for fees for water used and Part E details fees for water resources data, investigations, laboratory analysis and related services. However, Part D was de-gazetted by the government, thus there is no formal mechanism for generating any revenue for supporting the management of the resource base. Without a financial basis and the lack of support from the government, effective water resources management cannot and will not be achieved. Box 3 discusses some factors that have contributed to the ineffectiveness of the catchment boards charged with the responsibility for allocation of water and for enforcing the provisions of the water permit.

Box 3
Factors contributing to ineffectiveness of catchment boards

There are several factors which contribute to the inefficiencies of catchment boards whose functions are supported by the District Water Officer. The weak financial base to process, grant, monitor and enforce water allocations and degradation is a fundamental constraint. 20 years ago, water permit applicants would report to the water office about their requirements, and officers using government resources would visit the proposed points of abstraction to verify water availability in order to process the water allocation permits. With liberalization and an increased emphasis on cost sharing, water officials are relying more on the resources of the permit applicants for transport and operational costs (including field allowances) and consequently are being influenced by the wishes of the applicants and can no longer remain unbiased and are compromising the decision making process. Water allocation process is favoring large and rich users who are easily able to abuse and manipulate the process. The limited financial resources has prevented regular monitoring and enforcement of the water permit provisions, which is only carried out on a limited and an exceptional basis. In addition, catchment board members do not have a full appreciation of the hydrological conditions of the river systems and the complex procedures that should be used for making allocation decisions. They also have little incentive to carry out their roles and responsibilities effectively and consequently they have only been meeting on few occasions even though by law they are supposed to be meeting on a quarterly basis. The transportation and subsistence costs for their meetings are often not provided in time which is a factor limiting their participation. The catchment board needs to be strengthened legally and made financially autonomous so that it is able to support the necessary technical work for making effective decisions, for monitoring and enforcing compliance.

Kiteme, B.P. and Mathuva (eds.) 1996

Catchment degradation

Catchment degradation resulting from poor land use is perhaps amongst the most serious problem impacting the water resources in Kenya. Population pressures with weak or no soil and water conservation have precipitated poor land use practices which have increased soil erosion and are imposing a huge economic burden on the economy. Examples of poor land uses include cultivation on steep slopes, river banks and lakeshores without proper conservation methods; clear cutting of forests for agriculture in private forests, fuelwood and charcoal, building and construction material; neglect and destruction of cut off drains, bench terraces and works designed to conserve soil, a shift from rotational crops with fallow to continuous cropping of monoculture crops; over stocking and overgrazing, increased wildlife population, and development and access of rural access roads and transport network. Catchment degradation in the Nyambene and Meru districts is severe. The lowland area of Endau Forest has been entirely destroyed. By 1981, forests in Ngong Hills were reduced by 60 %, Kakamega 13%, North Nandi 21 % and South Nandi 22%. Box 4 describes the causes and rates of deforestation.

Box 4
Causes and rates of deforestation

The principal pressures on forest resources include: (a) increased requirement for agricultural land, especially in private forests not controlled by the Forest Department, (b) increased demand for fuelwood and charcoal, (c) increased demand for wood products (e.g., sawn timber), (d) encroachment by herdsmen and grazers who damage seedlings and saplings, and compact the soil, reducing plant productivity, (e) encroachment by landless squatters for shifting cultivation and fuelwood collection, and (f) fire set both accidentally and intentionally. Between 1980 and 1984, fire destroyed on average 520 ha of plantations, 6,700 ha of natural forests, and 15,000 ha of bush and grassland per year. In 1992, it was estimated that 19,000 ha were cleared annually while 10,000 ha were reforested. Current rate of forest loss (50,000 ha annually) exceeds rate of replanting (5,000-10,000 ha) by 5 to 10 times..

National Water Masterplan (1992)

Poor land use depletes the vegetative cover and top soil, makes the top soil and soil matrix vulnerable to erosion, alters surface runoff and infiltration rates and accelerates soil erosion, and significantly affects water resources. Box 5 describes the impact of poor

Box 5
Impact of land degradation on hydrology and water supply

Natural forests and woodlands affect water resources in complex ways. Mechanisms that protect the soil and from erosion also beneficially affect downstream water quantity and quality as follows:

- Optimizes distribution of water in space and time and ensures more even stream flows throughout the year and this results in: (a) reduced flooding and spate flows and less soil erosion and (b) maintenance of dry season baseflows for longer periods
- Enhances groundwater recharge through improved percolation and infiltration characteristics. Studies on adverse effect of cattle grazing in forests have shown the infiltration capacity is greatly reduced in hardwood and softwood forests from 190 to 1.3 mm/hr, and 280 to 33 mm/hr, respectively (GOK/UNEP 1981).
- Water quality is protected by retention of silt and soluble minerals within the catchment soils
- Increases losses of water through evapo-transpiration, but this is offset by improved distribution and availability of water

land use on hydrology and water supply. The 1980 National Water Master Plan stated that "all evidence points to the massive transition in basin runoff regimes which persisted from the times of the earliest streamflow records. The changes have predominantly occurred as a result of clearing of indigenous forests and subsequent low level annual cropping or fallow." Presently, it is not clear how significant and widespread are the changes in runoff and infiltration rates resulting from altered land use even though all indications suggest that major changes may have resulted.

Significant economic impact of land degradation on the water infrastructure

Excessive soil erosion rapidly silts up expensive reservoirs and reduces their economic life, reduces the hydraulic capacities of water conveyance canals and disrupts water supply operations. It is estimated that between 9-14 million tonnes of sediment from the Tana River enter the Indian Ocean. Prior to the construction of the Masinga Dam, the Kamburu Dam on the Tana River was seriously threatened because of the excess rate of sediment deposition. The Masinga Dam was designed with a siltation rate of 3 million tons/year. By 1988, eight years after operations began, the siltation rate into the dam had more than tripled to 10 million tons/year and reservoir storage capacity had reduced by about 6 %. The present status of reservoir deposition is not know as no surveys have been carried out since 1988. The rate of sediment deposition from the Athi-Galana-Sabaki Rivers into the Indian Ocean increased from about 50,000 tons a year in the 1950s to 8.4 million tons a year by 1992. *This represents a 168-fold increase!* High sediment loads in the Galana-Sabaki River has caused serious problems to Mombasa water supply from the Baricho intake and resulted in massive economic losses (see Box 6).

Box 6
Water supply problems at the Baricho intake

The Baricho intake located about 40 km north of Malindi was constructed in 1981 with a design capacity of supplying Mombasa and coastal areas with 60,000 m^3/day. This key sources of supply had a conventional water treatment plant. However, during the short period of operations not more than 35,000 m^3/day was ever realized from the source, and by 1986, very serious siltation problems at the intake had resulted due to upstream catchment degradation on the Galana-Sabaki Rivers. This high sediments in the water during the wet season elevated turbidity levels to 6000 NTUs. Dry season levels were between 40-100 NTUs.

The heavy silt load created severe operational difficulties during the wet season and were very costly to mitigate. The intake facilities at Baricho had to be de-silted every day, dosage and volume of coagulants (Aluminium Sulfate) tripled from 4 to 12 tons/day, and pump and pump bearings wore down frequently due to the abrasive action of silt and sediments. During the wet season pump bearings often had to be replaced every two weeks. Because of the excessive O&M and replacement costs, the surface intake facility at Baricho including the treatment works was abandoned in less than a decade of operation, representing a huge economic and financial cost primarily due to poor catchment management! The surface source was replaced with 9 boreholes located in the vicinity of the Baricho intake along the Banks of the Sabaki River and a 5,000 m^3 contact tank for chlorination. The boreholes provide about 55,000 m^3/day of which 45,000 m^3/day goes to Mombasa and 10,000 m^3/day to Malindi.

Impact of land degradation on the coastal and marine resources. Excessive sediment deposition is also causing a major economic damage to coastal resources: (a) the beach at the mouth of the Sabaki River has extended seaward by over a kilometer and the Malindi jetty has been rendered dysfunctional, and (b) coastal erosion processes have been altered. Highly turbid waters have affected coral reefs near Malindi, which is the largest colonies along eastern part of the Indian Ocean, and this causing a loss in tourism revenue.

Groundwater management

Groundwater provides an important source of urban and rural water supply and needs to be controlled in order to utilize the supply in a sustainable manner. Uncontrolled use of groundwater, overpumping, encroachment on and poor protection of recharge areas, and contamination due to leachate from landfill, poor disposal of industrial and municipal wastewater and poorly constructed sanitation facilities are posing a threat to many important aquifers. Overpumping in the coastal areas is posing a serious risk of saltwater intrusion. Groundwater recharge areas like catchment areas are the fundamental sources of freshwater supplies, and they need to be protected in order to maintain a sustainable and secure supply. Encroachment on recharge areas make them vulnerable to contamination and weak groundwater management can result in over pumping of the aquifer and serious pollution.

The quality of groundwater at any particular location in an aquifer is determined by the chemical, physical, and microbiological parameters of the percolating water, as well as the sequence of geological strata through which the water passes. Because of the slow rates of water and contaminant movement, the filtering effect of flow through subsurface soil and rock, and the relative inaccessibility of aquifers, groundwater may be somewhat protected from pollution. Yet these same characteristics make remediation time-consuming and expensive, and the results of cleanup efforts are uncertain. Box 7 lists the

Box 7
Major challenges for managing groundwater contamination

Because of geological variability, groundwater contamination can remain undetected for a long time. This time lapse is exacerbated in developing countries, where the extent and severity of groundwater contamination remains largely unknown for three reasons:

- Lack of monitoring and surveillance programs
- Time elapsed after polluting event, due to slow migration of contaminants and dispersal in aquifer

- Expense of monitoring, modeling, and remedying contamination.

major challenges for managing groundwater contamination. The main sources of groundwater contamination in Kenya include inadequate sanitation, industrial discharge, urban effluents, agriculture, and salinization from saltwater intrusion.

Water pollution

Kenya does not have a clear strategy for managing water quality. Now that water pollution is slowly becoming a serious problem and impacting the limited resource, there is need for formulating a clear strategy. Water pollution is impacting surface sources particularly in high potential areas and is disproportionately affecting on low income dwellers drawing water from streams within towns. Inadequate monitoring of point and non-point sources of pollution and the lack of effective pollution control are compromising the quality of source water, posing potential health hazards, increasing treatment costs and maintenance costs, and affecting inland, estuarine and coastal aquatic ecosystems. Water pollution exacerbates water scarcity because it limits the use for or imposes a higher cost (for treatment) on downstream users.

The main pollutants in Kenya are: (a) organic residues from municipal sewage and brewery wastes, (b) inert suspensions from soil sediments and mine wastes, (c) toxic wastes from heavy metal and pesticide discharges, (d) fertilizers from agriculture and detergents from domestic use, (e) micro-organisms such as fecal coliform, E coli, cholera bacilli from municipal sewage, and (f) micro-organisms such as parasitic worms, and aquatic weeds. The consequences of pollution on water bodies include:

- Deoxygenation from sewage and agricultural wastes
- Eutrophication caused by fertilizers, sewage and detergents
- Poisoning from biocide residues and heavy metal discharges
- Habitat modifications fro soil erosion and mine tailings
- Disease hazards from untreated sewage

Presently, only a small segment of major urban centers are connected to central sewerage; the rest depend on septic tanks and pit latrines. Most municipal wastewater treatment plants provide inadequate treatment because they are either overloaded, poorly maintained, or are completely broken down. They discharge partially or untreated wastewater into surface water courses -posing significant health hazards and localized eutrophication. Pit latrines and septic tanks located in recharge zones pose a significant risk of contaminating groundwater. Water-related diseases are increasing morbidity and mortality, with malaria, schistosomiasis, cholera and diarrhea posing serious threats to public health.

The major industries discharging into the Nairobi, Athi and Thika Rivers in the Tana and Athi River basins and the Nzoia River and other rivers in the Lake Victoria

Basin, for example, are also overloading these sources with an increasing variety of industrial contaminants. Tanneries, paper and pulp mills, coffee processing factories, breweries, cane sugar processing factories and various other industries typically do not have properly functioning treatment plants or achieve minimal treatment. Their effluent invariably contributes significant organic loads, heavy metals and other toxic substances to receiving waters. Pollution problems in the Upper Athi, Thika and Nairobi Rivers due to increased organic loads are common occurrences, particularly during low flows. Partially treated effluent discharges from pulp and paper mills also result in frequent fish kills in Lake Victoria.

Non-point sources of water pollution from agricultural sources is rarely addressed even though the consumption of fertilizers is high. The Lake Victoria Environmental Management Program is an rare example where this is just starting to be addressed for the lake. Severe concerns have been raised with regards to the deteriorating water quality in Lakes Nakuru and Naivasha, in part related to municipal discharges but also as a result of the agro-chemical usage.

Loss of biodiversity

Kenya harbors a variety of unique terrestrial and aquatic biodiversity which are threatened by improperly planned and managed water development projects. The Tana River flows, for example, are important for the conservation of primates of the Tana River Primate National Reserve which supports a unique riverine biological community. Lake Victoria has harbored more than 300 species of cichlids, a unique species family endemic to the Great Lakes of East Africa. These indigenous species face extinction largely as a result of the introduction of exotic species Nile Perch. In addition, the lake ecosystem is undergoing eutrophication at an accelerated rate, and fish kills due to reduced dissolved oxygen levels from increased organic loads are more common

Invasive weeds. The infestation of many different kinds of invasive floating weeds, e.g. water hyacinth, fern, lettuce, are a major cause of degradation of surface waters and cause significant losses, and costly damage to the operation and maintenance of infrastructure. Excessive weeds reduce oxygen and light, deplete plankton, and alter the food chain. This can destroy native fish, aquatic plants, and other wildlife; balanced ecosystems which may have evolved over millions of years can be destroyed within years. Water-weed masses also harbor carriers of human and animal diseases and increase occurrences of malaria, bilharzia, river blindness, encephalitis, and schistosomiasis. This important challenge is being addressed in only a limited sense, but overall problem remains grossly under reported even though the economic and operational implications for water managers remain very significant. Water hyacinth for example doubles in about two weeks and causes significant losses due to increased evapotranspiration. In Lake Victoria, weed infestation impacts: hydropower generation, irrigation and drainage, ports and waterways, fisheries, water supply and sanitation, industrial supply, public health, and ecosystem services. Control of weeds can involve physical, chemical or biological approaches and integrated control employs all of these methods as part of an integrated

management strategy. Some of approaches are being developed and implemented in the Lake Victoria Environmental Management Project, and lessons learned need to be widely disseminated and replicated in other weed infested water bodies.

International waters

Kenya is co-riparian to various water bodies such as Lakes Chala and Jipe with Tanzania, Lake Victoria with Tanzania and Uganda, Lake Turkana with Ethiopia and jointly shares drainage areas for the Mara and Umba Rivers with Tanzania, and Daua River with Ethiopia and Somalia. The Ewaso Ngiro aquifer is probably a transboundary aquifer shared with Somalia. The use or development of those resources have not only cross sectoral, but also potential international implications and pose complex challenges. Lake Victoria (Africa's largest freshwater body) is shared by three shoreline countries—Kenya, Uganda and Tanzania, but it is part of the Nile Basin, a much larger basin also shared by the Democratic Republic of Congo, Rwanda, Burundi, Sudan, Ethiopia, Eritrea and Egypt. While the lake is a vital resource facilitating transport of goods and people, providing water supplies for the urban and rural communities, an important source of local protein and export fishery and a sink for waste disposal for the densely populated riparian communities, it is also the source and a key regulatory feature of the White Nile.

Kenya's water policy promotes regional cooperation as the basis for addressing the development and management challenges related to transboundary waters. On Lake Victoria, Kenya is working with Tanzania and Uganda to address a host key issues that relate to fisheries management, pollution control, water hyacinth management, wetlands management. As part of the Nile Basin Initiative, Kenya is also engaged with other Nile Basin Riparian to develop a cooperative program for sharing the benefits of basin resources.

Uncoordinated water resources management

Water resources development and management in Kenya is generally fragmented. Inadequate co-ordination in developing a coherent water policy and institutional framework, source development and protection, pollution control, and pricing has led to the inefficient utilization of this vital resources, weakened institutions and the deterioration of water resources and the water environment.

The ultimate responsibility of water resources development and management lies with the Ministry of Environment and Natural Resources (MENR) which operates a large number of water supply schemes and is responsible for monitoring both quantity and quality. There are other agencies engaged in parallel or overlapping responsibilities. The National Water Conservation and Pipeline Corporation operates major Water Supply Schemes, previously operated by the MENR. Local Authorities operate some Water Supply Schemes under the direction of the Ministry of Local Government and, in certain cases, under the technical supervision of the MENR. Five River Basin Development Authorities are responsible for planning and implementation of integrated projects,

including development of hydropower and irrigation schemes as well as for the provision of domestic water supply, in cooperation with the relevant Government Institutions. Some basin authorities, are under the MENR, others under the Ministry of Energy. The National Irrigation Board and the Ministry of Agriculture are involved in small and large scale irrigation development. The Ministries of Tourism and Wildlife and Agriculture Livestock Development and Marketing are responsible for maintaining wildlife and livestock water supply, while the MENR is responsible for maintaining adequate instream flows for the various aquatic ecosystems. The Ministry of Health has a responsibility for ensuring that public health is not compromised by inadequate or unsafe provision of water supply and sanitation, and water pollution.

One consequence of poor coordination is that different sector policy developed provide conflicting messages which impact the management of common property resource. For example, the MENR's water policy promotes the conservation and protection of water resources while the Agriculture policy promotes the development of agriculture, which not only impacts land use but in ASAL also impacts water use. Also, the national irrigation potential of 540,000 ha identified on the basis of soil conditions and agronomic potential needs to consider water as a limited resource. The water act provides a flat allocation of 9,000 liters per day per acre of irrigated land, but this is not based on actual crop water requirements which vary from crop to crop (such as rice and wheat, for example).

4. OPPORTUNITIES AND DIRECTIONS

The economic sector work (ESW) on water supply and sanitation in Kenya has provided a major opportunity to revive an earlier dialogue on supporting water resources management (WRM) in Kenya. The ESW includes a small WRM component primarily related to the regulation of the WS&S sector, complementing the management of water utilities. This has also provided an opportunity to identify a stand alone support for the preparation of a comprehensive Water Resources Management Strategy (WRMS) that will cover the cross sectoral aspects of water use and management and include a pilot project to address priority concerns such as rationalizing water apportionment and allocation and catchment management.

An opportune time for addressing priority challenges

Given the social and economic implications and costs of the current drought, the crisis provides a silver lining--an opportunity to examine and address the weaknesses in the area of water resources management. WRM requires widespread stakeholder consultation and participation, at a time when governance and democratization are burning questions. It affects every home and every business in the land. It is at the center of economic and social development and quickly gathers the attention of politicians, the media, and the public, both rich and poor. is a recent example.

A strategy for safeguarding continued benefits from sunk investments

The WRMS will provide an opportunity to develop a strategy for rationalizing water resources management, thereby safeguarding existing investments in energy, agriculture and urban water supplies. The investments in energy, agriculture and urban water supply are all impacted by poor water resources management, some are significantly affected and economic viability of others is threatened. The WRMS will put in place a rational process for allocating water use and for protecting it from abuse and for developing it in a sustainable manner, for developing an effective institutional and management framework in place to operationalize the water policy as well as put in place a process for integrating drought management as part of water resources management.

Strengthening the WRM regulatory framework for WS&S

Governments and the public sector are increasingly being transformed from owners and managers of water installations to enablers and regulators. As part of a growing trend, water utilities are becoming autonomous entities and the private sector is playing a greater role in the management of water utilities. In large part because existing institutional arrangements (with water agencies playing a dual role of regulator and service provider) are inefficient and entail a conflict of interest, government funding is limited, and there is need to promote overall improvement of the performance of the utilities.

An effective water sector, irrespective of whether it is managed by the public sector or the private sector, needs to be complemented by an effective regulatory framework for managing water resources. Box 8 lists some important considerations for WRM regulatory issues for the private sector.

Box 8
Water resources regulation considerations for private sector

The WRM regulator would be responsible for ensuring that utilization of the resource according to the prescribed norms and is not undermined by any sector. It is important to put appropriate safeguards in place to protect consumers from receiving poor quality water, to prevent pollution from municipal wastewater, and to prevent over-pumping of aquifers and over abstraction from surface sources. The WRM regulator would also ensure that there are sufficient incentives in place to promote water conservation—even though this might not be in the interest of a privatized water utility if the revenue base is a function of volumetric sale of water. For the same reason, privately operated utilities would lack incentive to make adequate releases from control structures (such as dams and reservoirs) for in-stream environmental flow purposes unless such provisions are clearly stipulated in the contract and regulations.

Consistency with CAS objectives and approach

The WRMS should address the main CAS objective of poverty alleviation, and promote public sector re-structuring and reform through a process in which ownership, participation and accountability will be the central features. The proposed WRMS should

be a Kenyan strategy developed on the basis of broad based participation of major users of water, key stakeholders and civil society, and through collaboration with development partners and NGOs working in the water sector. The overall objective of the WRMS should be to strengthen local capacity, and build ownership and commitment to policy and institutional reforms for managing water resources. However, the task cannot not be underestimated, given the hydrological complexity, escalating demand, institutional conflicts (between riparian nations, national-local, and inter-sectoral), and the overall political and economic situation. Nevertheless, some basic groundwork has been laid. Key institutions, although often very weak, are in place, such as the Ministry of Environment and Natural Resources, the River Basin Development Authorities, the National Environment Secretariat, the Kenya Power and Lighting Company, National Irrigation Board, Catchment Boards, etc.

Policy and legislative foundation to build upon

The cabinet approved (1999) National Policy on Water Resources Management and Development (NPWRMD) and the draft amendment to the water bill will provide the foundation to build upon the institutional, regulatory and operational reforms that would cut across the various sub-sectors of water. The NPWRMD calls for: (a) strengthening water resources management by preserving, conserving and protecting available water resources in a sustainable and rational manner; (b) promoting water supply and sewerage development through supply of adequate and good quality water and through the proper disposal of wastewater; (c) establishment of an efficient and effective institutional framework; and (d) development of a sound and sustainable financing system for effective water resources management and water supply and sanitation development. However, the NPWRMD policy was formulated through limited consultations and heavily embraces the traditional command and control approach to water management, and only marginally integrates economic and participatory tools in the management of water resources. The WRMS should be used to build consensus among stakeholders regarding the key water management issues and priorities, strengthen the NPWRMD, and support the development of an institutional capacity for effectively implementing the policy. Changes in the policy and water law (for re-instituting water user charges, establishing autonomous catchment boards, strengthening demand management and encouraging economic and participatory instruments) may be necessary for strengthening water resources management.

Promoting a coordinated framework for WRM

The WRMS will provide a basis for managing water resources for the variety of cross sectoral uses in a coordinated manner. Coordination in water allocation, diversions and storage for irrigation, municipal, industrial, livestock and wildlife supply and for hydropower generation and environmental uses is essential for managing the increasingly scarce water resources in a sustainable manner. Coordination will be essential for assessing for re-assessing the available supply and uses and changes in hydrology due to altered land uses. Coordination is important for promoting easy exchange of information,

for building consensus and for improving decision making. Coordination is important for making informed decisions by recognizing the tradeoffs between different, often, competing, uses of water within a river basin and for promoting environmentally sustainable, socially acceptable, and economically efficient development and use of available water resources.

5. ELEMENTS OF A POSSIBLE WRM STRATEGY

For Kenya, the central issues for improving and strengthening water resources management regulations should include the following considerations.

Essential pre-requisites

Effective water resources management can only be achieved if there is a clear and strong political commitment that recognizes the scarcity of water, that underscore the importance and value of water for all Kenyans, and that is willing to take effective actions for managing water wisely, in an equitable, sustainable and economically efficient manner. The set of actions to be taken will incorporate strengthening of the water resources management regulatory framework and capacity and the ***effective enforcement of the regulations***, the development in operational terms economic instruments (economic charges, pricing, subsidies, catchment levies, pollution levies, etc.) and participatory instruments (public education, awareness, consultative and participatory processes, etc.) for encouraging and promoting the efficient, equitable and sustainable use of water.

Review of the water policy and water act to strengthen water resources management

A review of the water policy and water law will be necessary with a focus on water resources management. The review process will be consultative and transparent and will engage and incorporate all water use interests and may result in revised water policy and water law that is owned by the water users and water use agencies. The implications of such a policy and law will be far reaching--the interest that impact water resources or are impacted by over abstraction, poor land, or pollution would be part of the process of the policy review.

Development of a national forum on water management

Given that water is impacting all the segments of the society, all the sectors and indeed all Kenyans, it is vital to recognize and understand how scarce and vulnerable this limited resource is and to also understand the cross sectoral linkages, and the upstream-downstream linkages that are impacting the availability, timing and quality of water. A broad based national forum to promote a dialogues all cross all sectors, regions and all segments of the society dialogue should be organized to understand the importance and limitation of the scarce resource and to also highlight the individual and collective responsibilities towards it proper management. The national forum will be based on

extensive consultations with and across the sectoral user communities, agencies and the public. The goal of the forum would be to improve understanding about and awareness of how one action or the lack of actions taken by individuals, farmers, pastoralist, water supply agencies, industries, energy developers and environmental communities are impacting each other. Another goal will be to improve understanding about a wide variety of water and soil conservation methods that are available as well as the financial and economic implications for adopting them. The dialogue would also discuss a wide variety of technological, financial, and policy measures for managing demand. In general, the overall objective of the forum will be to promote stewardship towards the wise use of an important common property resource..

Development of an effective institutional setup for managing water resources

An affective institutional arrangement will need to have the capacity for developing a national water policy and national water legislation and regulations, as well as guidelines for carrying out water resources assessments, for defining water allocation principles and procedures, for monitoring and for enforcement, for setting water use fees, catchment levies, pollution levies, for establishing guidelines for demand management (for domestic, industrial and agriculture supplies) for establishing protocols for hydrological, climatic and water quality monitoring, analysis and information sharing.

At the catchment level, the present catchment boards are ineffective and the capacity of the *Catchment boards* will need to be strengthened in order to be able to carry out sound water resources assessment, to allocate water based on sound hydrological and water balance information, to monitor and effectively enforce the water abstraction, to promote and enforce pollution control and catchment management. This will require proper representation in the Catchment boards (with the "right persons" who understand and are representative of basin water uses and water use interests). The Catchment board will have to be an autonomous body and well resourced (to be funded by the water use fees, catchment levies, and pollution levies). The. Catchment boards will need to have a clear mandate and powers of enforcement for effectively managing the water resources. A fundamental shift from the current approach of using district based support (district water officers supported by PWO) to that of a catchment based support will also be necessary. This will require the establishment of a catchment water offices which will cover the entire catchment (to be supported with specific local offices in cases where the catchments are large) to serve as a single technical arm for the catchment water boards. The capacity of the catchment office will need to be strengthened for it to carry out its task effectively.

Strengthening of the hydrological, hydro-geologic, climatic and water quality networks and water resources assessment capacities

It will be necessary to review of the appropriateness of the existing hydrological, hydrogeologic, climatic and water quality networks in all the priority districts that were not covered under the Water Resources Assessment Project (WRAP). Priorities should

be given to those districts that are facing serious water shortage and water use conflicts. A review of the current procedures for data collection, data storage and data processing as well as data accessibility will be carried out, and recommendations for strengthening these and improving water abstractions, monitoring and enforcement will be made. A review the water uses in the priority catchments will be made and an assessment of the water availability and use will be carried out in priority basins. Actions against mis-use, abuse or over use of water will be taken, but this has to be determined on the basis of sound water allocation principles. The provision of granting abstraction permits for irrigation will be evaluated to ensure that crop water requirements, storage and other considerations

Protection of priority catchments and recharge areas

Priority catchment and recharge areas will be delineated and specific measures will be taken to ensure their protection. This may include, for example, the prohibition of particular types of activities in important areas that form the sources of water supplies or the purchase of lands by water utilities and delineating them as protected sites. This may require taking actions against decisions siting specific activities (industries and landfills).

Strengthening groundwater management

The capacity for groundwater management will be strengthened to ensure that the water resources are assessed, developed, used, and monitored properly. Measures for registering individual wells and boreholes will be strengthened, well log and pump test information will catalogued and the database will be updated on a regular basis to ensure that the developments are within the specified aquifer safe yield, and monitored to prevent practices such as over pumping in coastal areas (which could cause irreversible damage from saltwater intrusion, or contamination). Pumping will also need to be controlled.

Pollution control

The pollution control capacity will be strengthened to ensure that there is an adequate and well functioning infrastructure in place to monitor ambient water quality, effluent discharges and water quality in the treated distribution networks.

A pragmatic water pollution control strategy will be needed, one that ensure that is based on proper assessment of point and non point sources of water pollution, effective enforcement of the pollution control laws, and one which integrates economic incentives (and subsidies), awareness, etc. and adopts a flexible, phased approach for meeting water quality objectives and effluent discharge standards. Typical water quality and pollution control objectives are presented in Box 9 below.

Box 9

Typical water quality management and pollution control objectives

Water quality management and pollution control measures are instituted typically for meeting the following types of objectives:

- *Protect human health against pollution.* To ensure that health requirements are met, that maximum limits for the concentration of pollutants in the environment and in products are set in light of human health criteria and taking into account the concepts of basic protection level and no effect level.
- *Safeguard the natural environment.* To ensure that ecological requirements are met and other needs are taken into account which are based on criteria applicable to the species or the ecological systems in question. The basic protection level and the zero effect level must be taken into account.
- *Restore, preserve and improve the quality of human life.* To maintain an agreeable, attractive and aesthetic environment. Social requirements constitute an additional factor in the process of drawing up quality objectives.

Catchment management. Effective catchment management is a priority in many major watersheds as poor land use is not only altering the hydrology but also imposing a huge economic cost on the water infrastructure. Effective catchment management will entail working with and bring together diverse communities from upstream areas which impact the land and water resources to the downstream communities (such as water supply utilities, hydropower interests, conservation interests, etc.) to resolve problems that have a common linkage. It will entail the development and promotion of sound soil and water conservation programs and development of funding and administrative mechanisms and the appropriate cost sharing arrangements for ensuring effective catchment protection and management. Experiences from the ongoing programs will be used to develop and strengthen catchment management.

Capacity for integrating environmental quality objectives in WRM

Integrating environmental quality objectives (such as pollution control standards, land use management and the institution of environmental flow requirements—Reserve) in the water policy is an important first step towards mainstreaming environmental management in water resources planning and management decision making. The next step will be the determination of the reserve for each river systems and to define in operational terms the implications on existing storage and regulatory facilities. On the Tana River, for example, upstream reservoirs are utilizing primarily for generating power, and downstream water uses include the Tana River Primate National Reserve which supports the conservation of a unique and diverse riverine biological community in Kenya.

Needs to improve the effectiveness of EIA. A key challenge relates to the over reliance on environmental impact assessment (EIA) as a tool for effectively integrating the environment in project planning and decision making. Although EIAs have become important and necessary tools for screening and predicting the environmental impacts of

projects, they are not sufficient if implemented improperly or if not complemented with proper policies. Adoption of EIA policies have increased awareness about the impacts of different investments and development activities, however, experience has indicated that EIAs are not always implemented effectively, thus their influence on actual project decision making is limited, and often, they are only used to legitimize already made decisions. Box 10 lists examples of factors which can undermine the influence of EIAs on project planning and decision making.

Box 10

Factors which can undermine the influence of EIAs on project decision making

The influence of EIA on project decision making can be diminished if: (a) the scope of the EIA is narrow (for example, if downstream impacts of a dam project located in a sensitive ecological area are not evaluated properly), (b) the methods used to predict and forecast the impacts are not adequate, (c) the EIA is implemented late in the decision making process (for example, after the project has been sited or after the major project design decisions have been made), (d) there is a conflict of interest involved (between the project proponent and a regulatory agency or between the design firm and the firm that is carrying out the EIA), (e) there is no independent oversight body to oversee implementation, (f) there are no alternative analysis carried out, and (g) the economic value of resource degradation is not incorporated in the project cost benefit analysis and decision making.

Promoting cooperation in the management of transboundary waters

The WRMS will provide a basis for building upon the water policy provisions by developing a clear institutional framework for addressing the many transboundary water issues. At the international level and over the longer term, win-win solutions may exist for improved basin-wide cooperation. For example, the Lake Victoria Environment Management Programme was set in motion with the signing of the Tripartite Agreement by the Governments of Kenya, Uganda and Tanzania. The agreement provided the basis for establishing a collaborative process for project preparation and implementation. The key challenge is to manage the fisheries, water hyacinth and accelerated eutrophication due to the cumulative impact of increased population and associated pressure on the natural resources, unregulated disposal of municipal and industrial wastewater, and poor land use in the catchment. Effective cooperation on transboundary waters is only achieved when all the basin states effectively participate in the corresponding administrative institutions. This is, however, not always possible, unless otherwise agreed, states are under no obligation to enter into international agreements of this kind.

Pilot catchment management

One key element of the WRMS will be the development of a specific pilot projects to support the strengthening of the catchment boards to address specific water resources management challenges such as water apportionment and catchment degradation. The pilot project or projects will be selected carefully to address priority issues and they may be identified either on the basis on ongoing projects or new priority

REPUBLIC OF KENYA

REVIEW OF THE WATER AND SANITATION SECTOR

PRIVATE SECTOR PARTICIPATION IN THE PROVISION OF URBAN WATER SUPPLY AND SANITATION SERVICES

A paper supporting the aide memoire of 19th December 2000

REFERENCES

PRIVATE SECTOR PARTICIPATION IN THE PROVISION OF URBAN WATER SUPPLY AND SANITATION SERVICES

INTRODUCTION

This paper supports the "Review of the Water Supply and Sanitation Sector" prepared in Kenya by a World Bank led team during November and December 2000.

This document has three objectives that are dealt with in the three main sections:

The context	Describe private sector participation (PSP) , the benefits it can bring, and the challenges of introducing PSP in water and sanitation services in Kenya
The Current Situation	Reviewing the (limited) experience of PSP in water and sanitation services in Kenya
The Way Forward	Sketch out a road map for the introduction of PSP in cities and secondary towns in Kenya

This document was prepared within the time constraints of the mission and draws extensively on existing documents and information received from third parties (which could not always be verified). Although this document has been written as a stand alone report, its findings and recommendations are closely linked with those made in the other supporting papers, particularly the report on decentralization.

THE CONTEXT

THE FAILURE OF PUBLIC INFRASTRUCTURE SERVICES IN SUB-SAHARAN AFRICA

Sub-Saharan Africa's infrastructure services – electricity, gas, telecommunications, water supply and transport - trail the world in both extent and quality. Poor infrastructure services are a major obstacle to the region's economic growth and adversely affect the living standards of its peoples. They have detrimental effect on health, education, and the ability of industries to compete on international markets.

Despite the importance of these sectors, investments have too often been squandered. Service provision has typically been entrusted to state-owned monopolies that have multiple, poorly defined, and often conflicting, objectives. Investment decisions are often influenced by political considerations and the potential for misappropriation of funds. Tariff policies, despite ostensibly laudable objectives, typically benefit the more affluent with the less well off often suffering from poor or no access to services.

Failure to cover costs through inappropriate tariffs, poor billing and ineffective collection has led to under-investment. Over-burdened and poorly managed cental budgets bring little succor. Utilities are failing to meet the growing demand for their services. There are many examples of the extent and levels of services declining.

Political and economic instability, low per capita incomes and difficult environments are undeniably a challenge to the provision of infrastructure services in Africa. However, inappropriate institutional arrangements and poor governance are the main causes of poor performance. Management appointments are often influenced more by political loyalty and considerations of personal gain than by technical competency. Excessive staff are employed to benefit favored groups and individuals. Bloated, self-serving bureaucracies lacking commercial imperatives, accountability and transparency are, regrettably, common.

Water and wastewater services

Less than half of sub-Saharan Africa's population has ready access to reasonable quality water. This is substantially lower than the average for World Bank client countries in East Asia and the Pacific (68 percent) and in Latin America (76 percent)[1]. The poor suffer the most; they must bare the high cost of seeking alternative supplies through self-provision or the informal sector.

	1990 (population in millions)				1994 (population in millions)			
	Total pop	Pop served	% Pop unserved	Coverage %	Total pop	Pop served	% Pop unserved	Coverage %
Urban water	201	135	66	67	239	153	86	64
Rural water	432	153	279	35	468	173	295	37
Total water	633	288	345	45	707	326	381	46

[1] Kerf M and Smith W, 1996, Privatizing Africa's Infrastructure – Promise and Challenge, World Bank Technical Paper No.337

Urban sanitation	201	130	71	65	239	131	108	55
Rural sanitation	432	99	333	23	468	112	356	24
Total sanitation	633	229	404	36	707	243	464	34

Table transcribed from Black, M, 1998[2]

PRIVATE SECTOR PARTICIPATION IN AFRICA'S INFRASTRUCTURE SERVICES

Infrastructure privatization promises increased efficiency in investment, management, and operation as well as access to private finance for investment. It can reduce government over-stretch; generate government revenues; develop local capital markets; and stimulate foreign investment. It can also signal to international investors, capital markets and the local population that a government is committed to sound fiscal management, efficiency, and a substantial role for the private sector[3].

No region in the world could benefit more from infrastructure privatization than Sub-Saharan Africa. But progress to date has been slow, with the region accounting for only a tiny share of the more than 1,100 private infrastructure projects undertaken around the world since 1984.

Four Mmain challenges

Realizing the potential of infrastructure privatization is not easy in any country. In Sub-Saharan Africa, four main challenges must be addressed.

Concerns over market size, affordability and payment risks.

Low per capita income and low economic growth may make infrastructure markets in Africa appear small and unattractive to potential private investors, and may raise concerns over whether privately financed services would be affordable to low-income consumers. In addition, a long tradition of non-payment by private and public customers in most countries seems to create unacceptable payment risks for private investors.

Closer analysis suggests that these concerns are exaggerated. Private investment for water treatment plants or independent power projects is generally forthcoming, even in small and poor countries. With regard to retail supply, there is ample evidence that significant demand and willingness to pay for reliable telecommunication services exist in Africa, with revenues per main line currently almost twice as high as the world average. In other sectors, such as electricity or water distribution, a substantial proportion of users already pay high prices to

[2] Black M, 1998, Learning What Works – A 20 Year Retrospective View on International Water and Sanitation Cooperation, UNDP-Wotrld Bank Water and Sanitation Program, 1998

[3] Kerf M and Smith W, 1996, Privatizing Africa's Infrastructure – Promise and Challenge, World Bank Technical Paper No.337. (This section is transcribed almost directly from this publication)

obtain services from informal providers or self provision[4], and countries such as Cote d'Ivoire and Guinea have been successful in implementing cost-covering tariffs.

Concerns regarding the affordability of cost covering tariffs are often misplaced. Traditional approaches of subsidizing tariffs usually benefit the relatively affluent members of the society more than the poor, and become non-sustainable when budgets are constrained. As noted above, many of the poorest already pay very high prices through self provision or supply from the informal sector. International experience shows that in some cases the inefficiency of the public provider can be such that better services can be obtained from a private operator at the same or even lower prices[5]. There are also many ways to design tariff and subsidy schemes which are not only consistent with private provision, but also more likely to reach the intended beneficiaries than traditional approaches.

While payment risks are real, experience in Africa and elsewhere illustrates a number of ways of tackling this problem to enable private provision. The threat of disconnection for non-payment, coupled with measures aimed at combating fraud, have helped to substantially increase the collection ratio from private consumers in many cases. Non-payment by public entities is generally more difficult to solve because disconnection is often considered politically unacceptable. However, a range of alternative strategies have worked, even in this area.

Establishing adequate legal and regulatory frameworks.

Private investors require clear "rules of the game" dealing with such matters as the scope and conditions of market entry, the exclusivity of any rights conferred, and the extent and form of any ongoing price and/or quality regulation. In most countries in Sub-Saharan Africa, the relevant legal and regulatory frameworks remain at an early stage of development. Moreover, many governments have weak regulatory capacity, reflecting a limited tradition of adhering to the rule of law, a scarcity of skilled resources and, in many cases, widespread corruption.

The first step should be to eliminate unnecessary restrictions on private sector participation in infrastructure, and to specify clear rules and procedures for awarding contracts or concessions. A growing number of countries are adopting laws that deal with these issues in a consistent way across the infrastructure sectors, and a similar approach would seem appropriate for many countries in Sub-Saharan Africa, including Kenya.

The balance between monopoly and competition in particular sectors is often hotly debated, with investors often requesting long monopoly periods. However, international experience confirms that the benefits of tapping competitive disciplines to the maximum extent feasible, and this view has special force in countries where the priority is to expand investment and to reduce demands on economic regulation.

Where there is concern over the misuse of market power by monopolistic service providers, demands for some form of price regulation may prove irresistible. In responding to this issue in the African context, the priority will usually be to maximize incentives for expanding

[4] The "Willigness to Pay" survey undertaken as part of the World Bank mission confirms this to be the case in Kenya

[5] Competitively let concessions in for water supply to East and West Manila, Philippines led to tariffs of US$0.09 and US$0.20 respectively compared with US$0.35 previously charged by the loss-making public utility

investment, rather than to tame monopolies, which is an objective better suited to countries with more mature infrastructure industries. This suggests relatively loose controls over prices and profits, implemented in a way that reduces risks for investors. Clear rules may also be required on quality standards, environmental, safety, and health requirements as well as on any investment obligations.

Implementing regulatory frameworks in countries with limited regulatory capacity and experience poses special challenges, particularly when investors are concerned over the possibility of discretion being misused. Strategy in this area focuses on the use of relatively simple, fully-specified, and self-enforcing rules. Although establishing autonomous regulatory agencies may be difficult in many country-settings, there are a number of advantages. Regulators can be given a degree of insulation from short-term political pressures, restrictive civil service salary rules that make it difficult to recruit and retain well-qualified staff can be by-passed, and ear-marked funding through industry levies can help to sustain reforms. Creating such agencies on a multi-sectoral basis allows scarce regulatory personnel to work across sectors and facilitates learning between sectors. There is also scope to augment local resources by contracting-out certain regulatory tasks, and to support newly appointed regulators through cooperative arrangements with regulators from other jurisdictions.

Dealing with non-commercial risks

Investments in infrastructure tend to be large and immobile, and infrastructure prices tend to be politically sensitive. This makes infrastructure investments especially vulnerable to political risks, including the risk of government reneging on its regulatory commitments on tariffs or other matters; convertibility of transfer risk; war and civil disturbance; and expropriation. While there are important differences across the region, many countries in Sub-Saharan Africa are considered to be among the riskiest in the world in these areas. Unless risks can be mitigated, investors will shun the country or require much higher prices to reflect the risks involved.

Investors and governments can choose from a broad range of risk mitigation strategies. Investors may seek to protect themselves by targeting lower-risk activities (e.g. those that are less politically sensitive, those that earn hard-currency, and/or those where service can be provided through mobile technologies); by targeting activities and/or structuring transactions in a way that gives the investor some countervailing bargaining power; by entering partnerships with the government and/or the local private sector; by transferring technologies and hiring local personnel; and/or by building comfort through gradually increased forms of private participation.

Mobilizing local finance

Given the under-developed nature of local capital markets in most of the region, in the short- to medium-term most private investment will most likely be financed from retained earnings, owners' equity and/or foreign borrowings. While this pattern of financing has advantages, there are also drawbacks, including exposure to convertibility, transfer and exchange rate risks, and greater risks of political backlash against projects with limited local ownership and financing. For these reasons, mobilizing local finance is an important element in any infrastructure privatization strategy.

There is unexploited potential for mobilizing local capital for private infrastructure projects in Africa. Before significant progress can be made, however, several preconditions must be met. Economic and political uncertainty must be reduced. Governments running significant budget deficits need to increase fiscal discipline to free up part of the existing savings for private investment. And financial intermediation needs to be improved.

The recent expansion of local stock markets in Sub-Saharan Africa can assist in mobilizing local equity for infrastructure projects. Private pension funds and other institutional investors usually find the long terms and relatively stable returns of infrastructure investments attractive, and facilitating the emergence of these entities can also help to mobilize local finance. However, while levels of uncertainty remain high, mobilization of long-term local debt is likely to remain difficult. In the interim, local leasing companies may provide financing for smaller infrastructure investments.

While development of local financial markets facilities infrastructure privatization, infrastructure privatization can itself play a powerful role in developing local capital markets. The return profile of infrastructure projects can attract new investors to the market, and the often large volumes of securities involved can make local stock markets significantly more liquid. International experience also demonstrates that infrastructure privatization, coupled with credible macro-economic reforms, can constitute a powerful catalyst for repatriating flight capital, which was estimated to amount to 85 percent of Sub-Saharan African's GDP in 1991.

POTENTIAL BENEFITS OF INFRASTRUCTURE PRIVATIZATION

The principal source of benefits from privatizing infrastructure is the establishment of an arm's length relationship between the infrastructure provider and short-term political pressures. While commercialization and corporatization initiatives promise this under public ownership, in practice it has proven virtually impossible to keep politics at bay while the government is the owner, regulator, and operator, however, these roles are allocated administratively within the government[5]. Managers of public enterprises have limited leverage to negotiate binding government commitments to tariff or other policies; in contrast, potential private investors will withhold investment until they are satisfied that the government's commitments are credible. Similarly, public enterprise managers are typically in a weak position to insist that governments comply with their undertakings; in contrast, private operators may sue or withdraw service or capital. A corollary is the capacity of government to insist that the operator comply with agreed undertakings - private firms may be sued or ejected and replaced by rival firms; in contrast, public enterprise management is often insulated from such actions by political relationships.

The many specific benefits of infrastructure privatization follow from this fundamental change in institutional relationship. Those benefits include:

Increased efficiency in investment, management and operation

Superior efficiency in investment, management, and operation flows from several distinct but complementary factors.

[6] In Kenya's water services, the UWASAM initiative bears testament to this problem

Commitment to cost-covering tariffs

This is the key to allocative efficiency and to the provision of adequate funds for infrastructure maintenance and expansion. Private firms exposed to commercial or investment risk will require a credible commitment to cost-covering tariffs, and will withhold participation without this assurance. They will also be more diligent in recovery and collection practices, as illustrated by the major turnaround in billing and collection practices in countries like Guinea-Bissau, Cote d'Ivoire and Guinea.

Improved incentives for operational efficiency

With profitability on the line, private firms under appropriate tariff regulation will face strong incentives to contain costs and increase productivity. This is evident in lower cost overruns for new projects, lower staffing levels, more rapid adaptation of new technologies and processes, and enhanced efforts to improve billing and collection practices.

Opportunities to tap competitive discipline

It is typically more difficult to draw on competitive discipline in infrastructure than in other activities, as some element have natural monopoly characteristics. However, competition is feasible in many activities, with examples including cellular and long-distance telephony, trucking, and power generation. Moreover, even when competition in the market is not feasible, it is possible to obtain benefits by promoting competition for the market, such as by awarding time-bound franchises through a competitive process7. Competitive mechanisms of these kinds are not feasible if the state retains a monopoly over infrastructure provision, and it is difficult to sustain effective competition between two or more state-owned enterprises.

Access to management expertise and technology

Private infrastructure arrangements allow countries to access modern technology and skills and expertise in running complex enterprises in a commercial manner. Considerations of this kind will be particularly important in Sub-Saharan Africa, where skilled resources are limited and have a high opportunity cost.

Access to private finance

When assured of predictable revenue flows and sound management, private firms are prepared to commit owner's equity and to borrow on their own account, without the need for full sovereign guarantees. For example, a US$70 million independent power project (IPP) in Cote d'Ivoire is being financed from private sources, without burdening taxpayers. The need for private infrastructure finance in Africa is acute. In the power sector alone, it has recently been estimated that some $18 billion needs to be mobilized over the next decade in just 21 countries.

Reducing government over-stretch

Infrastructure privatization permits governments to focus on the principal policy challenges of economic and social development, without distraction by day-to-day operational concerns of

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[7] In the water services sector, competition in the market can be vigorous amongst small independent service providers (tankers, handcart vendors, etc.) but is more difficult for piped water systems where PSP usually taps competition for the market.

infrastructure enterprises. This benefit can be particularly important where government capacity is weak and skilled human resources are already over-stretched.

Government revenues

A corollary of access to private finance is reduced public expenditure and indebtedness. In addition, where privatization is accomplished through the divestiture of existing enterprises the revenues generated may be used to pay down public debt. When an infrastructure enterprise is operating efficiently, it may also be the source of ongoing taxation revenues, in contrast to the large budge-drains typically represented by public enterprises in many countries.

Opportunities for capital market development

The large scale and predictable cash flows associated with appropriately regulated infrastructure projects allow them to issue debt and equity instruments which are often highly valued by institutional investors. Infrastructure privatization can thus be used to deepen local capital markets and sometimes to induce the return of flight capital.

In a divestiture of infrastructure enterprises, privatization may also be used to widen participation in local capital markets and, hence, promote "popular capitalism," (e.g. UK and Hungarian privatization programs). Allocating a portion of shares to the local population may have several concrete benefits. As many countries have discovered, this strategy may help defuse domestic opposition to privatization. No less important, this strategy changes the political economy of infrastructure regulation, as it creates a broader domestic constituency having an interest in the government upholding its commitments to cost-covering tariffs and other elements of sound infrastructure policies. Cote d'Ivoire provides an example. Even though SODECI, the private water company, has limited capital (about US$4 million) and does not have to raise money to invest in the infrastructure, the sale of a majority of its shares to domestic investors helped increase the liquidity of the local capital market. It has also helped create a domestic constituency in favor of the private operation of the water system.

Potential to stimulate foreign direct investment

Experience in reforming economies in Latin America and Eastern Europe confirms the potential of infrastructure privatization to catalyze large inflows of foreign direct investment (FDI). This is particularly important in Sub-Saharan African, when FDI is very low.

Potential signaling device to international investors and populace

Infrastructure privatization is not easy. It requires governments to enter a number of commitments related to sound infrastructure policies, including commitments to cost-covering tariffs, and adoption of a "hands-off" approach to managerial and operational decisions in a large sector of the economy. There may also be transitional issues similar to those associated with privatization of other large enterprises, including possible labor redundancies. Overcoming these challenges in the face of short-term political pressure not only promises benefits of the kind outlined above, but can also send a clear signal to international investors, capital markets, and the local population that the government is committed to sound financial management, efficient policies, and a substantial role for the private sector. Infrastructure privatization can thus have strategic significance well beyond a

single enterprise or industry, and can play an especially important role for governments intent on restoring a country's tarnished reputation and credibility.

PRIVATE SECTOR PARTICIPATION IN WATER

The development of water and sanitation services is capital intensive and returns are long to materialize.' In Africa, sovereign risk and poor governance of the water sector have severely limited funding through private equity and commercial debt. Private sector participation in the water and wastewater sector has so far primarily been sought for improving efficiency, through "lease", "management" or "service" contracts. Long term "concession" contracts are likely to be feasible only when most of the future capital expenditure programs can be financed from retained earnings or where donors provide co-financing.

There are several examples of successful PSP in the urban water and wastewater services in Africa (Cote d'Ivoire, Guinea, Senegal, Gabon, Mozambique), and of countries actively seeking PSP options (Tanzania, Nigeria, Zambia, Niger, Ghana). These schemes typically involve a local private operating company, with majority shares held by an international professional operator. Local operating companies operate (or will operate) either on the entire national territory (Cote d'Ivoire, Guinea, Senegal, Niger...), large geographical areas (Ghana) or in a limited number of large cities (Mozambique, Tanzania, Nigeria...). They are (or will be) under medium or long term contracts with the central governments (Cote d'Ivoire) or "asset holding authorities (Guinea, Senegal, Mozambique, Tanzania, Ghana).

Where PSP schemes are implemented for the entire national territory, a uniform tariff typically applies to all centers, thus allowing for cross subsidies between geographical operations. A successful subsidy scheme to support the customer tariff was implemented in Guinea in parallel to the privatization of the water and wastewater operations, to "jump start" implementation of the government's cost recovery policy.

There are limited examples in Africa (Zambia, South Africa, Namibia) of PSP schemes implemented in a decentralized environment with operators contracted by local authorities or autonomous water boards. There are also few examples of efficient and independent regulation with significant discretionary power. Most regulatory needs are built into the PSP contracts. However, the governments of Uganda, Ghana, Tanzania are moving towards multi-utility regulatory bodies.

PSP models

Private sector participation[8] (PSP) refers to the formation of private sector-partnerships through the structured opening to the private sector of activities formerly reserved for government departments or other public sector organisations. PSP is not "a model" but a whole range of possible arrangements from the outsourcing of specific activities such as meter reading through to the private development and operation of an entire city water system under a concession.

Private sector partnerships offer opportunities for the mobilisation of private sector skills, know-how and incentives to improve the efficiency with which services are delivered, and to access and mobilize finance for new investments. The evidence from countries that have

[8] In this report, we use the term "private sector partnerships" to describe the outcome of private sector participation. In many circumstances, the terms are interchangeable and the abbreviation PSP refers to both.

already involved the private sector in water and sanitation provision is that a well-designed PSP arrangement can yield substantial improvements in the quality, availability and cost-effectiveness of services to consumers. To achieve these benefits, however, PSP arrangements need to be carefully designed to meet local circumstances and procured through transparent, competitive processes.

Overview

Private sector partnership options can be located on a spectrum, with full public water utility responsibility for operations, maintenance, capital works, financing and commercial riskbearing at one end, and largely private responsibility for all of these functions at the other. Each option is really a different kind of partnership between the public and the private sectors. Even where the private sector takes on full operational and financing responsibilities, as in the concession and asset sales options, it does so within a framework created by the water authority or government. This framework consists, most importantly, of regulatory arrangements designed to protect consumers from monopolistic behaviour, such as over-pricing, and to ensure that health and environmental standards are maintained, and subsidy regimes to ensure access to services by the disadvantaged.

PSP is not a panacea for problems in the water sector. For PSP to be effective, it is necessary to recognize from the outset that it requires a partnership between the water utility and its private sector partner. The nature of this partnership, and the rights, responsibilities of each partner, and the benefits and risks to each party, depend on the PSP option chosen.

In order to choose the PSP option that is best suited to local circumstances, a water utility must clearly identify the problem that currently beset the provision of water and sanitation services , evaluate the extent to which different PSP options address these problems, and analyse the capacity of the water utility and the private sector to accept the roles, duties and risks implied for them by these solutions.

The following section (which is largely based on the World Bank and United Nations documents cited in the References) briefly reviews the main PSP options which could be considered by a typical water utility in Kenya.

For simplicity, the term "water utility" has been used to refer to the organisation ultimately responsible for proving water services, be it central government (MoENR, NWCPC), local government (councils) or a water company (e.g. Nyeri).

Key features of the PSP options that will be discussed in this section are tabulated on the following page.

Key Features of Private Sector Participation Options

PSP Arrangement	Advantages	Disadvantages
Service contracts and Management Contract	• access to technology • access to expertise and knowledge • short-term commitment	• no private sector investment in new works • prescriptive contract as commercial incentives limited • limited term may mean limited commitment
Leasing (affermage)	• access to technology • access to expertise and knowledge • access to some capital (limited) • transfer of commercial risk of operations to private sector	• no private sector investment in new works but can facilitate investment from development partners
Build -operate-transfer (BOT) Design-Build-Operate (DBO) ROT	• access to technology • access to expertise and knowledge • access to capital • transfer of commercial risk of design, construction and operations to private sector • private sector provides funding through to successful commissioning	• not well suited to system developments comprising a number of separate projects • water utility required to take over investment after commissioning • does not address institutional issues
Build-own-operate-transfer (BOOT)	• private sector technology, expertise and knowledge • all funding of new infrastructure provided by private sector • transfer of almost all commercial risk of infrastructure development, operation and financing to private sector • water utility monitors only plant outputs (i.e. essentially water quality and availability) and not design, construction or operations	• the legal and financial on-costs of contract development may be high • does not address institutional issues
Concession	• can cover entire system of water and wastewater plants and networks • private sector technology • access to expertise & knowledge • access to capital; all funding of system improvements/expansion provided by private sector • addresses many institutional issues • transfer of almost all commercial risk of system development (planning, design, construction, operation and financing) to private sector / development partners • water utility monitors only system outputs (i.e. adequacy of supply) and not means of service delivery	• it is unlikely that a private sector concessionaire will be prepared to invest significant amounts in Kenya • could facilitate investment from development partners • considerable stakeholder education may be required. • the legal and financial on-costs of project development may be high
Divestiture and Joint Venture	• can cover entire system of water and wastewater plants and networks • private sector technology • access to expertise & knowledge • access to capital; all funding of system improvements/expansion provided by private sector • transfer of all commercial risk of system development (planning, design, construction, operation and financing) to private sector (full divestiture)	• Complete divestiture essentially limited to England & Wales • Chile and Germany have chosen partial divestiture and joint venture models • Requires a strong & independent regulatory system or other mechanisms (eg contracts) to assure outcomes • Likely to meet strong political and public opposition

Descriptive framework

The main categories of private sector participation can be distinguished by the way in which they allocate responsibility for controlling components of the water system or performing activities. They can also be differentiated by the level of risk transferred to the private sector, by their duration, and by their need for institutional changes[9]. In the following sections we present a description of the main options.

Service contracts

Service contracts transfer responsibility for discrete operations and maintenance activities to the private sector. These contracts generally have a term of three to five years.

The simplest form of service contract involves the payment of a fee for the performance of specified tasks such as meter installation. Service contracts such as meter installation will specify where and when meters must be replaced. Provided there is genuine competitive bidding for the contract, even this limited form of PSP can yield cost benefits. Although service contracts will typically allow tasks to be performed at a lower cost, they do not question the necessity of these tasks. For instance, a contractor responsible for replacing meters is unlikely to suggest reducing meter replacement frequency even if this is to the benefit of the water utility.

Management contracts

The term "management contract" is loosely used and can refer to a range of arrangements from secondment of technical experts to the management team[10] of a utility through to the outsourcing the management (and execution) of a significant part of the operations and maintenance operations of a water utility[11].

Although management contracts generally involve a transfer of managerial responsibility to the private sector, the contractor does not typically bear much of the associated commercial risk associated with investment or revenue collection. For management contracts to improve efficiency and reduce costs, contractual arrangements need to define performance targets and make at least a part of the contractor's remuneration on the degree to which these targets are achieved. Potential efficiency gains accruing from such contractual arrangements must be large enough to offset the additional costs involved in establishing and targets and monitoring contractor performance.

Management contracts are most likely to be useful where the primary objective is to rapidly enhance the technical capacity and, efficiency of a utility to perform specific tasks.

Management contracts leave all responsibility for investment with the water utility. They are thus, for example, not a very good option if one of the primary objectives is to access private sector finance for new investments.

Given that management contracts represent a low risk option for the private sector, they have been used in other countries as a transitional mechanism until a more stable and effective regulatory framework is established. Once the regulatory framework is defined and the

[9] Examples of institutional changes are the establishment of a regulatory framework, and/or the corporatisation of a government owned enterprise..
[10] E.g. Trinidad and Tobago
[11] E.g. Malindi, Adelaide (Australia)

efficiency and level of information of the utility are improved, options involving greater private sector participation, such as a concession, can be implemented. The Malindi management contract fits this sceanrio.

Advantages	Disadvantages	Comments
• access to technology • access to expertise & knowledge • short-term commitment	• no private sector investment in new works • prescriptive contract as commercial incentives limited	• this model does not address the issue of designing, implementing and financing rehabilitation and new works • requires attention to specification of outcomes • limited term may mean limited commitment

Leasing (affermage)

Affermage contracts are popular in France. In appearance, an affermage is similar to a management contract covering operations and maintenance except that the affermage contractor provides the working capital, and undertakes the billing on behalf of the residual water utility. However, a fundamental difference is that the affermage contractor obtains its revenue through appropriation of revenue from the water bills paid by consumers. This difference effectively transfers the risk of divergence between revenue and operating costs from the water utility to the affermage contractor.

The consumers are the clients of the affermage contractor who has responsibility for providing the agreed level and standard of service using the technical means that he selects. At the end of an affermage contract, all system assets and non-system assets required to deliver the services are handed back to the water utility in good repair. The water utility would then assume responsibility for arranging continuing operation, perhaps by retaining operations, or by entering into a new private sector participation arrangement.

The affermage contractor is not responsible for financing any infrastructure expansion, reinforcements and rehabilitation; that responsibility remains with the water utility. However, the affermage contractor would be responsible for providing working capital and funds for routine repair and replacement of components with short lives.

The water utility may also request the affermage contractor to deliver (design and construct) new infrastructure but this would be under a separate arrangement. Clearly, close liaison must be maintained between the water utility and its affermage contractor in the case of major expansions, to ensure that the proposed new work is the most appropriate for both water utility (as asset owner) and the affermage contractor (as asset operator). Such an arrangement could be appropriate to secondary towns in Kenya where most capital funding is likely to come from central funds/donors.

The affermage contractor collects revenues from the customer based on the tariffs set by the "regulator". The affermage contractor forwards a pre-agreed franchise fee to the water utility. This franchise fee would typically cover part or all of the following:

- lease of / return on managed assets (cf. system assets)
- the cost of financing new capital works including depreciation and any outstanding debt on existing works (this assumes that network assets remain on the water utility's books but this needs to be reviewed on a case-by-case basis depending on the tax system)
- regulatory costs

- other miscellaneous costs incurred by the residual water utility such as contract management costs, strategic planning, public relations, and any residual customer services and administrative costs.

The affermage contractor should also pay compensation for failure to perform to both its end customers (customer rebates) and to water utility provided such failures to perform are manageable by the affermage contractor (and not, for example, because the water utility is failing on its responsibility to invest in new assets).

One of the advantages of an affermage arrangement over a concession is that regulation can be achieved through the contract. It is the financial implications of capital investment that typically require an independent regulator, whereas, in an affermage, capital investment remains with the water utility.

Advantages	Disadvantages	Comments
• access to technology • access to expertise & knowledge • access to limited finance • transfer of commercial risk of operations to private sector • regulation by contract	• no private sector investment in new works (but could facilitate securing multi-lateral finance)	• in its traditional form, this model does not address the issue of designing, implementing and financing rehabilitation and new works • requires attention to contractual definition of outcomes

Build-operate-transfer (BOT)

Under a contractual arrangement of a BOT type, the contractor builds (and usually designs) the facility, operates it for a specified period and then hands it over to the water utility in good condition. The contractor may not provide finance, in which case he does not own the facility as he does in the case of a build-own-operate-transfer (BOOT) scheme (see below). In Build-Transfer-Operate (BTO) arrangements, the contractor hands over the facility when it becomes operational rather than at the end of the contracted operation period, but would continue to operate it for a specified period under a lease arrangement. Such arrangements have proved popular in Australia where utilities do not have a financing problem.

These approaches are most appropriate where the performance of the facility is assessed by the quality of the endproduct. In the case of water treatment, the water quality criteria are specified and the operational procedures, rates of flow and chemical dosing would be adjusted by the operator to respond to changes in raw water quality. Success, in terms of quality and efficiency, depends on establishing good operational procedures over a few seasons.

BOT/DBO type arrangements are suited to the provision of a discrete pieces of a system or new infrastructure. For example, such models could be used for developing the Mzima Springs source and transmission to Mombasa. These models, however, are not well suited to multiple and diverse developments including networks such as required in most water utilities in Kenya. Furthermore, this type of arrangement requires water utility finance, albeit following commissioning.

Advantages	Disadvantages	Comments
• access to technology	• not well suited to system	• this model could be used to

• access to expertise & knowledge • transfer of commercial risk of design, construction and operations to private sector • access to capital; private sector provides funding through to successful commissioning	developments comprising a number of separate projects or networks • water utility required to take over investment after commissioning • does not address institutional issues	provide medium sized treatment plants provided the water utility has finance • requires attention to regulation of outcomes

Build-own-operate-transfer (BOOT)

BOOT is similar to a BOT and its variants, except that the BOOT contractor also provides finance. An alternative term for BOOT is design-build-finance-operate (DBFO).

BOOT contracts are used for the provision of capital works where finance comes entirely or mainly from the contractor, who then earns his return through operation over a period of years. Generally, this mechanism is used where a large new facility is to be purpose-built, such as a water or sewage treatment works. Residual value is of little relevance in such cases as the operation period is long enough for the capital costs, debt repayments, equity earnings and profit to be recovered from income.

The income earned can be based on a variety of arrangements, ranging from a fixed annual fee (i.e., flat rate) to the measured quantity supplied (i.e. unit rate). However, as demand may be uncertain, the fairest, most equitable and cheapest arrangement could be a two part tariff with the client water utility paying a fixed amount per month (say) for the "availability" of the plant and a volumetric rate per cubic meter for the amount of water delivered. "Take-or-pay" arrangements are effectively two part tariffs expressed in a different manner.

In a conventional BOOT contract, income would be earned by selling water to one bulk buyer (the water utility) or a limited number of large consumers (industrial supply). A concession would be used where the intention is to serve numerous individual consumers (urban supply).

BOOT contracts (or BOT with finance) are the main means of providing infrastructure components that can be built and operated relatively easily as separate entities, and where financial constraints prevent a government from carrying out the work itself. The cost of the facility is repaid over a period of years, thereby avoiding temporary cash shortages for the government. The mechanism is attractive politically as it provides a facility at little or no direct cost to the government and with deferred payment terms.

Alternatively, a build-own-operate (BOO) contract can be used. The BOO contract has a specified duration but the assets are not transferred to government when it expires. At that time, either the current arrangement could be renewed or the responsibility could be passed to a new operator. In a BOO concession, the facility would remain in the private sector although the ownership could change.

Advantages	Disadvantages	Comments
• private sector technology • access to expertise & knowledge • access to capital; all funding of new infrastructure provided by private	• the legal and financial on-costs of contract development may be high	• can provide larger, discrete plants or groups of plants • requires attention to

sector and/or development partners • transfer of almost all commercial risk of infrastructure development, operation and financing to private sector • water utility monitors only plant outputs (i.e. essentially water quality and availability) and not design, construction or operations	• does not address institutional issues	regulation of outcomes

Concessions

Concessions usually involve whole systems (plants and networks) much of which may already exist. Concessions involve the private sector financing all, or most, of the investment costs of the system. For this reason, water utilities seeking to reduce the burden on their own budget find this type of private sector involvement particularly attractive. Furthermore, investment from the private sector releases public funds for other activities, including the many social programs that are required but which would not attract private funds themselves.

Concessions are most beneficial where government budgets are severely limited and where the private sector is able and willing to raise its own capital and invest. In a low risk environment, substantial funding can be provided by the private sector and its financiers. Kenya certainly has public sector investment constraints but it is not clear how much capital the private sector would be able to raise and invest. It is unlikely that the private sector will invest significant amounts although co-financing arrangements with development partners could be explored. The duration of a concession depends on the speed with which the concessionaire can obtain his return on investment; 20 to 30 years is typical.

The *concessionaire* finances the investment costs including replacement costs, agreed expansion costs and working capital. The concessionaire's revenue from consumers could be based on a pre-defined tariff formula to allow for agreed costs of running the system (price cap) or on a return on investment (rate of return), or a combination of these methods. The water utility may still provide a subsidy in kind (by providing the existing works free of charge) or in cash to the concessionnaire or through subsidies to consumer groups. It may or may not seek to recover those costs through tariffs.

At the end of a contract of 20 or 30 years, the concessionaire must hand over the system in good order. The concessionaire should either have been paid in full for the infrastructure provided or compensated for the residual value of the facilities. This aspect can be particularly important for any items constructed within the final few years of a concession. The concessionaire will need to be compensated through tariff levels for the difference between the original construction cost and financing costs, and any residual value paid by the government at hand-over.

The potential problems that can arise on hand-over, at the end of a long concession, are not usually addressed thoroughly when the concession is set up. This may be reasonable, as conditions are likely to change drastically over the duration of the project. However, in a competitive bid for a concession, some firm guidance should be given on the procedures that will be employed. This is particularly critical as a significant part of the concessionaire's return on investment may be made during the later years of the concession.

Advantages	Disadvantages	Comments
• can cover entire system of water and wastewater plants and networks • private sector technology • access to expertise & knowledge • access to capital; funding of system improvements/ expansion provided by private sector (where risks acceptable) • addresses many institutional issues • transfer of almost all commercial risk of system development (planning, design, construction, operation and financing) to private sector • water utility monitors only system outputs (i.e. adequacy of supply) and not means of service delivery	• considerable stakeholder education may be required. • the legal and financial on-costs of project development may be high • private sector unlikely to provide significant investment in Kenya, at least initially	• can cover all water and wastewater development needs in one arrangement • requires attention to regulation of outcomes to assure results • co-financing arrangements with development partners could provide investment

Divestiture and joint ventures

Divestiture involves the selling of all or part of the water utility to the private sector. Complete divestiture of assets or shares gives the private sector full responsibility for operations, maintenance, and investment, as well as the ownership of the assets. A divestiture leaves the government the task of regulation only, in order to ensure that the services provided by the private sector meet the expectations of the government and the customers.

Divestitures have been generally used by governments that are seeking efficiency improvements and that are undergoing mass privatisation programmes. This was the case of England and Wales where the government was privatising state-owned enterprises to reduce the size of the public sector, extend share of ownership, and improve efficiency. An additional consideration of the divestiture of water assets in England and Wales was the increasing need to finance large investment programs resulting from the directives of the European community regarding the quality of bathing and drinking water.

Of all the options available for PSP, partial or complete divestitures require the highest degree of regulation. Considering that a divestiture transfers the ownership of the assets – essentially a natural monopoly - to a private firm for an indefinite period, regulation of service and environmental standards, economic efficiency and levels of profit become extremely important. In the case of England and Wales three different agencies have the power to regulate water and sewage services. OFWAT, the Government Economic Regulator, regulates the amount that companies may charge for their services. The Secretariat of State regulates the quality of water supplied by the companies, and the Environmental Agency regulates discharges of wastewater and abstraction of water.

Divestitures vary mainly by the percentage of shares sold to private investors. Complete divestitures transfer to the private sector the ownership of all the shares and assets. Partial divestitures (sometimes described as joint ventures) limit the sale to a percentage, providing the private sector limited ownership and control over the assets. This model has been used in Germany and Chile. Partial divestiture is an option that is politically attractive, but

regulation and the allocation of risks between the private and public sectors can be problematic and must be carefully designed.

Advantages	Disadvantages	Comments
• can cover entire system of water and wastewater plants and networks • private sector technology • access to expertise & knowledge • access to capital; all funding of system improvements/ expansion provided by private sector • transfer of all commercial risk of system development (planning, design, construction, operation and financing) to private sector (full divestiture)	• Strong regulatory structure required • Difficult to reverse • May meet strong political and public opposition	• Complete divestiture essentially limited to England & Wales • Chile and Germany have chosen partial divestiture and joint venture models • Requires a strong & independent regulatory system or other mechanisms (eg contracts) to assure outcomes

THE CURRENT SITUATION

PUBLIC PROVISION OF WATER AND WASTEWATER SERVICES IN KENYA

Kenya's water and wastewater services are in a sorry state. Urban water services are better than those in the rural areas but this is purely relative. In its Draft Strategy on the Water Sector[12], the Ministry of Environment and Natural Resources Department of Water Development includes the following candid description of the urban water services for which it is largely responsible:

"Government policy requires that urban consumers should meet operation and maintenance costs together with capital amortization outlays to ensure regular replacement of major components over the life-span of the water systems. None of the urban public water service providers has even come close to achieving this policy objective.

So far the performance of urban water supplies has been dismal. Revenue collection is poor, and does not exceed an average of 50% to 70% of billed revenue. In any case, collections tend to lag behind by several months leading to mismanagement of earned revenue and unnecessarily high operational costs. Staffing levels and patterns are often inappropriate, and personnel related costs consume between 50% and 75% of recurrent expenditure. Leakage rates are high and as much as between 40% to 60% of the piped water is "unaccounted for" due to illegal connections, burst pipes and inefficient operations.

The problems facing urban water supplies arises also from the unique characteristics of local authorities which influence their performance as water undertakers and sanitation providers.

Typically local authorities develop their water an sanitation schemes with the financial backing of central government. Many of them therefore rarely perceive these investments as loans which must be repaid, and rarely repay them. Most local authorities perceive water revenues as a source of money for financing the general activities of the council. Consequently, water revenues are usually siphoned off from the water and sewerage account to the general fund, leaving hardly any money for even loan repayments or reinvestment. In many instances, even funds meant for regular maintenance of water and sewerage services are not available, resulting in a deterioration of the facilities.

Employment of staff is often not based on the requirements of the organization, but rather is dictated by political expediency and the need to provide jobs to people. Pay is also low. The result is overstaffing, low morale and poor performance. This is exacerbated by a lack of public accountability within the water department of local authorities as shown by poorly maintained accounts and a lack of systems for responding to public complaints.

Many urban water supplies have a low service ration of individual connections and stanpoints leading to shortfalls in revenue collection against water sold. They suffer from poor billing procedures. For instance, the average age of water bills in Nairobi is 770 days (2 years and 1 month) while that of the schemes under the National Water Conservation and Pipeline Corporation (NWCPC) is 455 days (1 year and 3 months). These overly long periods make it difficult to guarantee enough financial resources for operating and maintaining the water

[12] Ministry of Environment and Natural Resources, Republic of Kenya, December 2000, Draft Country Strategy paper for the Water Sector

utilities: a well run urban water utilities register should have an average water bill age of 45 days.

Other problems afflicting the sector include poor maintenance of records, leakages, misappropriation of revenue collected, lack of technically qualified personnel and poor revenue collection especially from government departments, parastatals and educational and health institutions all of whom have over the years accumulated huge arrears.

As a result of these problems urban water and sanitation provision is facing a major crisis. Water shortages have become a common feature in urban areas creating a health hazard to urban dwellers. The shortages have also affected urban based industries which in the course of the year 2000 were operating below capacity on account of water and power shortages. These shortages affected other sectors including the hotel and tourism industry.

Faced with a water scarcity crisis many enterprises and even individual urban dwellers have resorted to sinking their own boreholes in search of a more reliable alternative source of water. In many cases, water which is licensed for abstraction for domestic consumption on the premises of the licensee is sold commercially as there is a large unsatisfied demand for water, particularly in major urban areas like Nairobi. This leads to over abstraction and depletion of aquifers with serious long term implications for the sustainability of the water resource.

The sanitation sub-sector suffers similar afflictions. Sewerage systems perform poorly due to decay of infrastructure, uncoordinated urban development and expanding urban population. Further, inadequate repairs and maintenance of entire sewerage systems lead to overflows from treatment works, sewerage pipes and manholes, and contaminate water reticulation systems."

PRIVATE SECTOR PARTICIPATION

Historically, urban water and wastewater services in Kenya have been dominated by the public sector. To date, formal involvement of the private sector has been essentially limited to consultants and contractors (civil, electrical, and mechanical) and the management contract in Malindi. However, the failure of the public services to provide adequate water and wastewater services to a significant proportion of the urban population has encouraged "informal" private service providers to step in to meet demand, particularly in informal areas.

Malindi management contract

To date, the management contract in Malindi (4200 connections; 66,000 people) remains the only example of formal private sector participation in the provision of water and wastewater service.

The Malindi Water Supply Area is currently under the National Water Conservation and pipeline Corporation (NWCPC) as part of the Sabaki Water Project. The system is operated and maintained for the Corporation by a private contractor under a management contract. This arrangement was introduced as a requirement of donor (KfW) funding for network rehabilitation and expansion. The contract was signed in February 2000 and has a term of 4.5 years.

The Manager, who is under contract for 4.5 years from February 2000, is responsible for "the complete technical and commercial management of the Malindi Area of the Client, including

its operation and maintenance, meter reading, billing, accounting and reporting."
Remuneration comprises two components:

Fee component and amount	To cover expenditure related to
Sub-area expenditure approximately KSh 3 million per month paid against actual expenditure	• all staff costs (NWPC seconded staff and staff employed by the contractor) except "professional staff" • operations and maintenance costs including transportation • minor works improvements • sub-area office running costs
Agent's Professional Staff approximately KSh 1.5 million per month lump sum	• agent's professional staff (including expatriate support) • discretionary investment of the Agent • Agent's margin

These fees are adjusted for inflation and performance based on financial collection efficiency and unaccounted for water efficiency (target based bonuses/penalties). The final amounts are paid to the contractor out of the revenue collected. The contractor suffers from any shortfall and excess amounts are transferred to the NWCPC, ostensibly as a contribution to the running costs and depreciation of the Sabaki Waterworks (NWCPC operated headworks providing treated water in bulk to the contractor).

Tariffs were increased substantially in November 1999 and at the time of the World Bank team visit, monthly collection was of the order of KSh 6 million. At takeover, the contractor inherited KSh 18.5 million in payment arrears. In that collection rates remain below 100%, these arrears had increased to approximately KSh 20 million by December 2000. Revenues generated in Malindi are sufficient to cover the cost of operations and maintenance, the fees of the management contractor and an increasing part of depreciation.

As a managment contract, all large capital investments remain the responsibility of NWCPC and this limits the impact that the management contractor can have on network efficiency. However, the management contract was designed to complement current efforts of NWCPC (supported by KfW) in network improvement and expansion. It is expected that these coordinated initiatives will eventually lead to the current tariffs being sufficient to cover the full costs (O&M, capital investment and depreciation) of the water system.

Achievements

It is too early to evaluate the performance of the current management contract however, the achievements and limitations of its predecessor, the "Improvement in Billing and Revenue Collection" service contract, are probably indicative of what can be achieved by this type of arrangement.

The "Improvement in Billing and Revenue Collection" contract from 1995 to December 1997 and was financed by the Word Bank from residual funds from the Second Mombasa and Coastal Water Supply Project. This contract was introduced on the insistance of various funding agencies that revenue collection had to be improved before further development

funding could be considered[13]. Funding included KSh 30 million on setting up the office, developing the billing program, casual staff, training, rent, support staff, etc and a further KSh 35 million to cover the service contractor's fees.

The contractor took over billing from the NWCPC's regional office in Mombassa and reconciled 2137 accounts out of approximately 4,000. After one year, in February/ March 1996, the service contractor also took over responsibility for revenue collection.

Over the period, the number of estimated billings (blocked meters) was reduced from 75% to 10% and billings were increased by a factor of 2.3. Collection rates also increased from an average of KSh 1.4 million per month prior to the contract to an average of KSh 3.8 million (with a maximum of KSh 5.2 million). The collection rate over the period during which the contractor undertook collections averaged 97.85% (including arrears). Average turnover increased by 133.5%.

In December 1997, the activities under the service contract reverted to the NWCPC and many of the performance levels also declined towards their previous levels.

Service reliability improved although the increase in distribution pressure limited the reduction in network losses from 52% to 45%.

The original service contract collapsed due to unclear terms of reference[14].

Preliminary indications are that the new management contract is also producing benefits, particularly with respect to reliability of supply and collection. Nevertheless, the private manager has come under criticism for increasing staff numbers from 22 to 77 (19 per thousand connections). In fact this management decision is a rational consequence of the commercial provisions of the contract and illustrates the importance of careful preparation of even relatively simple PSP arrangements.

Limitations

The following limitations apply to both original service contract and the on-going management contract:

- Neither the initial service contract nor its current successor, the management contract were competitively bid and they may be over-priced.
- All large capital investments remain the responsibility of NWCPC limiting the improvements in network efficiency that can be brought about by the contractor
- Where the contractor is required to work with NWCPC (e.g. network rehabilitation, legal cases, writing off debt), NWCPC's slow response hinders performance.
- The obligation to follow government procurement (NWCPC) guidelines slows procurement and makes quality control difficult.
- The contractual arrangements transfer only limited commercial risks and incentives to the private sector. Nevertheless, the potential of gaining further projects based on the successful outcome of these pilot projects appears to have provided sufficient incentive for the contractor to perform well.

[13] Pipal Limited, September 1999, Private sector Participation in Municipal Infrastructure Projects – The Case for Malindi, Kenya, Report prepared for the Municipal Council of Malindi

[14] MLG & GTZ, October 2000, Provision of Urban Water and Sanitation Services by Local Authorities in Kenya – Recommendation on Commercialization and Private Sector participation, and Preparation to become water Undertaker, prepared by Urban Water and Sanitation Management project (UWASAM)

Conclusions

The Malindi contracts have demonstrated that:

- The bureaucratic processes of the NWCPC greatly hinder performance
- Even limited private sector participation can significantly improve technical performance (reliability of supply) and financial performance (billing and collection). These gains are largely attributable to commercial incentives, managerial freedom and the streamlining of administrative processes
- Such contracts can be self-financing through improvements in financial performance for systems of a similar size or larger than Malindi.
-

Management contracts are an "entry level" PSP arrangements. They do not (directly) provide capital investment, and they only partially address the fundamental institutional issues underlying the poor performance of urban water services in Kenya. Nevertheless, the Malindi experience has demonstrated that they can provide significant improvements in levels of service and revenue generation. Management contracts can provide a useful first step in preparing the way for more comprehensive PSP arrangements and should be designed with this in mind.

Contractual arrangements should clearly specify outputs and link the management contractor's remuneration to achievement of these outputs. The pricing of contracts should be subject to competitive pressure, either through open tendering or a structured process for dealing with unsolicited proposals.

The informal sector

The failure of public water utilities to provide adequate water and wastewater services to a significant proportion of the urban population, particularly in informal settlements, has lead to the development of a vibrant private sub-sector of "informal" private service providers.

Informal settlements are a feature of Kenyan towns. Of the estimated 2 million inhabitants of Nairobi, more than half live in informal settlements. The populations of informal settlements are increasing at a rate of 7% - 12% per year compared with 3% per year for Kenya as a whole[15].

Since 1988, the government has advocated upgrading informal settlements as part its housing policy although this is not carried out in practice. Nairobi City Council now provides water connections to those who apply and pay the connection charge. However the network is poorly developed and the majority of inhabitants in informal settlements obtain their water and sanitation services through the informal sector.

Privately developed sources (boreholes and wells), distribution systems (tankers, hand carts) and private kiosks are an integral part of Kenya's water services. These informal providers respond to the needs and preferences of a clientele composed primarily of low-income families. Although the presence of such providers are often an irksome reminder to the public water utilities of their shortcomings, informal providers are likely to remain a useful and, indeed, essential element of the urban water sector in Kenya for the foreseeable future. They must be part of the solution and, at least in the short-term, will play an increasingly important role in providing water services to the urban poor.

[15] UNDP-World Bank Water and Sanitation Program, 1999, Small Scale Independent providers of Water to the Urban Poor – A Case of Nairobi, Kenya

Small-scale independent providers

The informal sector comprises small scale independent providers (SSiP) which can be grouped into two main categories; secondary and independent primary operators[16].

Secondary SSiPs operate mainly as vendors and are mostly dependent on municipal or utility primary services. Secondary SSiPs serve mainly medium to low income areas which do not receive regular water supplies. Two main types of service offered are *static services*, which commonly rely on supplies from water kiosks and standpipes and *area-mobile* services, which employ water tankers and handcarts. An operator could provide both services. In many instances, area-mobile service operators depend on point sources e.g. handcart operators collect and sell water from private wells/boreholes (Mombasa town). Earnings from SSiP operators are mainly for subsistence support and so self-employment and family-based enterprise, which depend on moderate to low level of investment, are key features.

Independent Primary operators provide individual operations such as from boreholes, wells and also operate as small water companies. They are independent of municipal or utility primary services, have higher level management skills, moderate to high level of investment and serve high to medium income and urban poor communities.

SSiPs are a good example of the private sector meeting a demand for water services which large, public organizations are poorly adapted to meet. Although small, the SsiPs exhibit many of the benefits of involving the private sector in the provision of water services. SSips:

- invest their own capital
- provide a range of services to suit customer preferences and willingness to pay
- respond quickly to changes in demand
- achieve very high billing and collection rates
- self-regulate through competition.

Recommendations

The legal and institutional reform of the water sector should encourage Ssips by:

- repealing bylaws which discriminate against SSips
- preventing harassment and unfair (subsidized) competition from tanker drivers of the large metropolitan water authorities
- requiring metropolitan water authorities to provide facilities and tariffs for the wholesale provision of water to SSips
- exploring ways of providing technical and business support and micro-finance to SSiPs
- only where necessary, progressively introduce light weight regulation (e.g. licensing) to ensure competitive pricing, customer protection and protection of the environment (e.g. inappropriate dumping of septic tank sludge)

[16] UNDP-World Bank Water and Sanitation Program, undated, Water and Sanitation Services to the Poor, Small Service Providers Make a Big Difference in East Africa

THE WAY FORWARD

OBJECTIVES OF THE REFORM PROCESS AND PRIVATE SECTOR PARTICIPATION

The proposed reform of the Kenyan water and wastewater sector is based on achieving reliability, sustainability, and affordability. These objectives are to be achieved by applying six key principles[17]. These principles and their implications for private sector participation are set out below:

Principle 1 **Development of methods of assessing proper demand in relation to consumers' willingness and ability to pay**

Private sector participation can relieve the public sector of the responsibility for estimating demand and willingness to pay. Arrangements that assign the financial risk of system development to the private sector will focus the developer's attention on optimizing levels of service, demand, and willingness to pay. The private sector will ensure that it assesses demand properly and the role of the public sector will be limited to verification/benchmarking. "White elephants" are less likely to occur, as these will be at the expense of the private sector and its financiers.

Arrangements such as concessions and BOOT where the private sector's return on investment are based on accurate estimation of demand and willingness to pay are an effective way of respecting this principle and often lead to innovative solutions and the staging of projects.

Principle 2 **Development of appropriate capacity to operate and maintain water supply and sanitation services including the level of decision making and effective participation of the private sector**

Performance based private sector participation arrangements encourage the private sector to develop appropriate capacity. Where advanced capacity is required, arrangements should be structured to attract international operators and ensure knowledge transfer. (Eg. introduction of private management of the wastewater reclamation plant in Windhoek, Namibia which treats wastewater for direct potable reuse.)

Principle 3 **Establishment of an appropriate financing policy and mechanism and achievement of full cost recovery**

Given the declining investment capacity of the government, financing policy should seek to maximize private sector investment. Appropriately structured PSP arrangements for Nairobi and Mombasa may be able to attract significant private investment. In smaller projects, private investment may be limited to working capital and transferable assets. Many schemes will require both public

[17] Refer to Support Paper on Decentralization

(GoK / donor) and private finance. Private investment can be maximized by making it a key criterion in competitive tendering processes.

Principle 4 Creation of a robust and flexible framework for the sector which separates water resources management from water supply and sanitation service delivery, and separates regulatory and implementation functions

The robustness of the water sector framework determines the "sector risk" and the attractiveness of investment to the private sector. For arrangements which require a third party regulator (where tariffs and levels of service cannot be "regulated" by competition or contract), the extent to which the regulator is independent, competent and rational will determine the amount and cost of private investment. The establishment of effective regulation is one of the greatest challenges for sector reform. (Experience in other african countries has been discouraging.)

Principle 5 Establishment of a pricing policy which balances financial viability, recovery of true economic cost, and equity objectives for all consumers

Establishment of pricing policies is the responsibility of the government and the regulator. Care needs to be taken to avoid sending inappropriate economic signals to consumers and service providers (e.g. in another sub-Saharan country, artificially low connection fees meant that the private operator lost money on connections in low-income areas. Not surprisingly, the rate of new connections in such areas was low!)

Principle 6 Creation of an enabling environment and framework which encourages competition in order to minimize costs

Vigorous competition is the most effective form of regulation. The private sector will compete vigorously when returns are commensurate with risks. Ensuring this balance requires the careful development of industry reform and private sector participation arrangements.

PROVIDING AN ENABLING ENVIRONMENT

The framework for reform suggested in the aide memoire has been derived to facilitate private sector participation and competition.

Strategy and legal framework

The Draft Strategy on the Water Sector (December 2000), recommends implementation of "reforms in the water sector to facilitate better service delivery by making room for the private sector providers to supply water to consumers, among them the industrial sector" (section 2.5, Water and Industry). The Strategy Paper also supports the development of private sector participation by:

- recognizing the need to remove the conflict of interest inherent in the current arrangements whereby from the Ministry of Environment and Natural Resources is developer, operator and regulator of water schemes (section 3.1 Organizational Arrangements) and recommending the establishment of an independent regulator to

regulate all water utility operators, set performance standards and approve tariff structures

- Keep tariff structures under constant review with a view to ensuring a reasonable return on investment in order to attract private sector participation

- Arranging for the syndication of smaller water supplies to ensure that they are financially viable (4.4 Handing over of Rural Water Supplies and 5.4 Implications for the Strategy)
- Examining ways to encourage small scale private sector participation in rural water supplies (4.5 Poverty Levels and Revenue Collection)

The Draft Strategy also notes that "The Government is currently carrying out studies on financing and private sector participation in rural water schemes. In addition, a study will shortly be undertaken on PSP options for Nairobi water utilities. The recommendations of these studies will have a far reaching effects on the financing and PSP in the water sector as a whole. These studies will carry forward the recommendations made at recently held water policy workshops which concluded that there is need for a clear strategy on how PSP could be enhanced in the water sector particularly in the management of urban water utilities."

At present there is substantial PSP in project contracting and consultancy services in the sector. The Government therefore proposes to implement a strategy of involving the private sector in water utilities and, eventually, where appropriate, the takeover of water facilities (8.1 Private sector involvement)

Unfortunately, the proposed e Draft Water Bill 2000 (July 2000) does not reflect the recommendations of the strategy document on the key issue of an independent regulator. On the contrary, the proposed "Water and Sanitation Regulatory Board" advises the Minister (MENR) how to regulate with the Minister enjoying full discretionary powers. This needs to be changed to provide reassurance to private sector investors.

The Draft Water Bill also provides too many opportunities for the Ministry to interfere in and slow down private projects and operations. Many clauses resemble internal management procedures of a government department. For example, Part VII *Procedure on Issue of Permits*, requires applications for permits for the right to construct work across a road, etc. Such issues should already be covered by local planning requirements, etc.. Part VIII *Execution and Maintenance of Works*, requires that any works under construction can be inspected by officers of the Board and specifies in detail how road crossings should be constructed. This level of (potential) interference in projects and operations will be considered as a risk by the private sector. The necessity of following certain NWCPC procedures is seen as a major source of inefficiency by the private management contractor in Malindi.

Attracting the private sector

To attract the private sector the Draft Water Bill should be redrafted to:

- Reflect the Draft Strategy on the Water Sector
- Be elevated to a higher level. The Water Bill should set out a clear framework (the institutional requirements of the current draft are confusing) with details transferred into subsidiary regulations
- Provide for an independent regulator (not attached to either the Ministry of Environment and Natural Resources or the Ministry of Local Government).

- Provide for and, indeed, facilitate all private sector participation arrangements (except, perhaps full divestiture)

The Draft Strategy and the Draft Water Bill are dealt with in greater detail in section???

The institutional model, regulation and PSP

In the proposed institutional model (section ??), local authorities hold the inalienable responsibility of providing water and sanitation services. The local authorities, however, will be required to deliver these services through "Water Supply and Sanitation Companies". These companies have the options of delivering the service themselves or entering into performance contracts with private operators, Ngos or community organizations.

The Water Supply and Sanitation Companies must obtain an "Undertakership" from the Water Supply and Sanitation Regulatory Board. The undertakershgip is based on the the WSSC providing a business plan which meets the requirements of the Regulatory Board. To encourage private sector participation, the Regulatory Board should require the WSSCs to address the following issues in their business plans:

- Syndication - the feasibility of achieving economies of scale by extending the WSSC's area to include other (not necessarily contiguous) local authorities. Where there is potential to achieve significant economies of scale, issuance of the undertakership should be made conditional on syndication unless there are demnonstrable, over-riding reasons why not.
- Private Sector participation - the feasibility of involving the private sector in providing the services including the availability of private finance. Should the WSSC wish to deliver the services directly, it should demonstrate that this will deliver significant benefits compared with private sector delivery.

The Regulatory Board should facilitate the above by:

- providing implementation guidelines and pro-forma agency agreements supporting the establishment of WSSCs serving multiple local authorities (pro-forma agency agreements would deal with issues such as the composition of the board, limitation of interference by council, performance obligations, etc.)
- provide guidelines on different private sector participation arrangements and pro-forma contracts

The success of the suggested model resides largely on the effectiveness of the Regulatory Board and the professionalism of the WSSCs. Development partners can contribute by:

- Supporting the Regulatory Board (undertaking a study of syndication potential, development of operational procedures and documentation, evaluation of applications for undertakership, analysis of requests for tariff adjustments, auditing of undertakerships, etc.)
- Supporting the establishment of WSSCs (development of business plans and applications for tariff adjustment, development and introduction of PSP arrangements, etc.)

PRIVATE SECTOR PARTNERS AND CAPACITY

Private sector participation in water services in Kenya will come from both local companies and international water service companies. Only international water companies can provide the technical, financial and managerial capacity required to take-over and improve water services in large cities such as Nairobi and Mombasa although arrangements can be

structured in a way to involve local players. International operators are of high caliber, however they focus their business on large urban centers and will evaluate opportunities in Kenya against opportunities elsewhere in the world. This is why it is so important to develop legal and institutional arrangements that provide these companies with confidence, particularly in Kenya where the market perceives sovereign risk to be high.

Given the current domination of water services by the public sector, it is not surprising that there are few companies with experience in water system operations in Kenya. Nevertheless, there is a good understanding of water technology (consultants and contractors), and, perhaps more importantly, management in the private sector. Furthermore, experience elsewhere in the world has demonstrated that many competent operators in the public sector who would doubtless be attracted to work for private companies should these be given the opportunity to provide water services. The management team of the recently established (council owned) company providing water services in Nyeri is evidence of this. The ability of this company to offer salaries in line with the private sector (typically five times the remuneration offered by the public water providers), has attracted a competent management team drawing upon management expertise from the private sector and technical expertise with a public sector background.

The advantage of well designed private sector participation arrangements is that it provides the private sector with incentives to develop capacity. This capacity will be focussed and the required investment will not be wasted (as has been the case of much of the training of public sector water personnel under the UWASAM project). Private sector capability building should provide revenues to the public purse (through KEWI) rather than be a further cost.

Capacity building within the Kenyan private sector may be accelerated by encouraging arrangements which bring together international water companies with local companies, e.g. joint ventures, consortia, sub-contracting and even franchising.

To obtain the benefits of private sector participation in the secondary urban areas, a range of smaller, national contractors or privately owned private companies have to be empowered. This requires a process which will accept occasional private sector failure within the development of the enabling environment[18].

THE DEVELOPMENT OF PSP KENYA

Creating an enabling environment

Private sector participation in Kenya's water and sanitation services should be both an end objective and a motor for reform. The creation of an en environment conducive to private sector participation involves:

1. Review and finalize policies and strategies to encourage PSP (in this respect, the Draft Country Strategy Paper for the Water Sector, December 2000, is acceptable although more emphasis on achieving economies of scale through syndication would be helpful)

2. Redraft the Water Act to reflect the strategy. From the point of view of encouraging private sector participation, the Act needs to provide adequate checks and balances and create an independent regulator

[18] MENR, November 2000, Commercialization and Private Sector Participation, Water and Sanitation Sector Programmes Co-ordination Committee, The Urban water Group

3. Set up an "Independent Water and Sanitation Transitional Commission" (representing key government stakeholders: MFP, MENR, MLG, MH, Public Secto. Reform, consumers, NGOs and professional organizations) to drive reform including decentralization. The Commission would also function as a regulator during transition.

4. Ensure support from the highest decision makers and implement reform purposefully. This will provide confidence to the private sector, encourage private investment and reduce its cost (by reducing the perception of risk).

Private sector participation should not be delayed until reform is complete. On the contrary, PSP should be used to help drive reform and should be pursued immediately provided arrangements are consistent with the long-term reform objectives. (Care should be taken to avoid PSP arrangements which strengthen the status quo.)

PSP – the long-term objectives

The following table summarizes the type of private sector participation arrangements which are likely to provide options for water and sanitation services in Kenya in the long-term.

Sector	Issues to be Addressed	PSP Arrangements to be Considered
Large cities (Nairobi, Mombasa, possibly Nakuru, Kisumu)	• Large technical, managerial, financial resource requirements; • Large-scale capital investment requirements for water distribution and sewerage; as well as production (Mombasa and Coast) • Large informal settlements; • Complex political environment; minimization of municipal councils interference; • Large turnover and high growth potential; • Attractiveness to international operators; • Regulation capacity.	• *Concession* with international partner as majority shareholder in local operating company; mostly private financing of capital investment to complement cash generation; • *Affermage* with international partner as majority shareholder in local operating company; mostly public financing of capital investment to complement cash generation; • *Support to SSIPs* by main operator in informal settlements; • *BOOT* for bulk water supply (Mombasa and Coast)
Secondary cities (Nakuru, Kisumu, Eldoret, Kiricho, Eldoret, Nyeri, Thika, etc.)	• Significant technical, managerial, financial resource requirements; • Increased attractiveness if economies of scale achieved through "syndication"; • Minimization of potential council interference; • Limited attractiveness to international operators; • Potential for developing local operators; • Address limited success to date of UWASAM.	• *Affermage* with mostly local operators; mostly public financing of capital program to complement cash generation; • *Performance based Management* contracts with mostly local operators; • *Franchising* arrangements between international franchisor and local franchisee;

Smaller towns and piped rural schemes	• Significant technical, managerial, financial resource requirements; • Increased attractiveness if economies of scale achieved through "syndication"; • Minimization of potential council interference; • No attractiveness to international operators; • Multitude of point sources and piped systems; • Low ability to pay; • Low local capability; and • Local "ownership" of supply driven projects.	• *Affermage* with mostly local companies; mostly public financing of capital program to complement cash generation; • Performance based *Management* contracts • *Franchising* arrangements between international or local franchisor and local franchisee.

These options should, preferably be delivered through an open, competitive bidding process, however, unsolicited proposals should also be encouraged. The case of Nairobi is dealt with in greater detail below.

PSP as a driver of reform

Private sector participation should also be used to drive reform. Both local and international companies have expressed a strong desire to work in water and sanitation services in Kenya. This interest should be encouraged and channeled to help drive forward reform because:

- The limited experience of private sector participation to date (Malindi) has demonstrated that significant gains can be made quickly. Gains in levels of service and reliability are a worthwhile objective in their own right. Gains in financial sustainability on a limited scale provide greater confidence to the private sector that similar outcomes can be achieved on larger scale initiatives.

- Successful PSP arrangements, even on a limited scale, provide confidence to the private sector and reduce the perception of risk (and hence price) of more comprehensive private sector participation arrangements.

- The private sector is prepared to invest money and effort in developing potential private sector participation initiatives. The private sector is likely to develop potential PSP initiatives far more quickly and cost-effectively than the public sector. Such proposals are also likely to be more innovative and commercially viable. There is no reason to believe that the public sector actors will be any more effective in promoting PSP initiatives than they are in their core business of providing water services. Indeed, public servants usually lack the commercial skills required to develop PSP arrangements. Finally, there is likely to be a slight resistance against such initiatives based on public sector conservatism, and the threats that such arrangements may pose to existing interests.

- Short-term and limited PSP arrangements can be used to prepare the ground for more comprehensive, longer-term PSP arrangements. For example, short-term management contracts can be used to develop customer databases, network maps, and collect information on assets. Such information allows for finer tuning of subsequent arrangements and provides useful information to bidders, reducing uncertainty, and cost.

Low level PSP arrangements can also help overcome community, and political hesitancy and prepare the way for stakeholder consensus on more comprehensive arrangements which may otherwise appear to be a daunting leap in the dark.

- Short-term PSP arrangements will provide opportunities for Kenyan companies to enter the market and develop capacity. This will enhance the degree to which they can participate in subsequent, larger PSP arrangements.

- Experience gained on short-term PSP arrangements will provide insight into the issues that will be encountered on more comprehensive arrangements and how these should be dealt with. Failure on a limited, short-term initiative is preferable to a similar failure on a larger scale initiative, the political consequences of which could jeopardize the whole reform process.

- The specter of business opportunities will align the private sector behind reform and create a lobbying force that can be used to drive through reform.

Despite the many advantages of pursuing short-term, low level PSP, there is one potential disadvantage that needs to be taken into account. Short-term, low level PSP arrangements, if successful, can be used to stall further reform and more comprehensive PSP. Overall, however the advantages of introducing low-level PSP in the short-term outweigh the disadvantages.

Unsolicited bids

Procedures should be developed to encourage unsolicited bids. These procedures should balance rewarding the initiative and effort of those who develop unsolicited proposals with bringing competitive pressure to bare on the final outcome. Such a procedure could be designed around the following principles:

1. The regulator issues guidelines on the type of projects for which unsolicited proposals would be welcome and the manner in which they will be dealt with

2. A private sector proponent submits an unsolicited proposal to the regulator

3. The regulator evaluates the proposal. If it is judged to be worth pursuing, the regulator prepares an outline of the concept with particular emphasis on the outcomes to be achieved.

4. The concept is put out to competitive tender

5. If no other more attractive proposals are received, the regulator precedes to negotiate directly with the original proponent.

6. If more attractive proposals are received, the original proponent is given the right to better the most attractive proposal. If he declines, then negotiations for implementation commence with the proponent of the most attractive proposal.

Such procedures have been developed and used in the Philippines where they solicited a strong interest from the private sector. Although the number of initiatives finalized under this procedure may have been few, the flow of unsolicited proposals promising improvements in infrastructure services helped drive sector reform and the letting of two large concessions for the delivery of water and wastewater services to east and West Manila. It is recommended

, that a similar strategy be used in Kenya to make the step from policy formulation to implementation.

PSP – THE NEXT STEPS

Private sector participation is both an objective of reform and a driver for reform. The next steps involve the development of demonstration projects which will help drive reform:

Cities and secondary towns

Identifying cities and towns where PSP could usefully be pursued in the short- to medium-term. Nairobi has already been confirmed and an options study is to be funded by PPIAF. Mombasa and the coastal region is also under consideration. These projects are likely to attract interest from international water companies. Although these projects are sufficiently large to be standalone projects and dealt with through specific legislation, if development partner funds are required, such funding should be made conditional upon adequate progress having been achieved on reform of the water sector as a whole.

PSP should also be pursued in secondary towns but this first requires the identification of towns which should be attractive to the private sector and a preliminary review of potential PSP arrangements (see below).

The framework for successful introduction of PSP

Experience worldwide has demonstrated that PSP can be introduced successfully if the following conditions are met:

- Appropriate PSP options are evaluated by specialist, independent advisers
- Once a preferred option has been identified, broad consensus must be achieved among the many stakeholders
- Selection of the private partner must be subject to maximum transparency and probity
- The perception of risks by private partners must be minimized by developing a clear regulatory framework

Option selection

If the framework is conducive, proposals for PSP arrangements should arrive from three sources:

- The business plans of Water Supply and Sanitation Companies
- The regulator and central government sponsored initiatives
- The private sector (water companies / investors)

The challenge is to develop PSP arrangements which best serve the interests of the consumer whilst ensuring commercially attractiveness to the private sector. This will require:

Option Selection

Identification and development of stakeholder objectives

Customers comprise the most important stakeholder group but the WSSC and the private sector also have legitimate objectives and, finally, the objectives of government and development partners also need to be taken into account.

Identification of constraints

The main constraint is likely to be financial, however, other constraints such as the availability of expertise (both on the public and private side) and political acceptability need to be considered. If the reforms recommended in this paper are implemented, legal and institutional arrangements should not constrain PSP arrangements.

Allocating risk

For example, should the private sector take raw water supply risk (i.e. development and operation of source works and drought preparedness). Should the cntractor's remuneration be a function of revenue collected (thereby assigning demand and collectiopn risk to the private sector)? The most cost-effective and robust outcomes are achieved when risks are allocated to those parties which are able to manage them most cost-effectively. Arrangements will be project specific.

Developing the optimal scope of PSP arrangements

Should the PSP arrangement include both water and wastewater services? Should it include informal settlements? Should the private sector be responsible for capital investment, how long should the term be, etc.? Definition of scope should follow, not precede the three tasks described above. Developing PSP arrangements from a pre-conceived scope is likely to lead to sub-optimal outcomes.
An independent assessment of the best feasible option requires the participation of technical, financial, economic and legal experts. From a technical and financial point of view, particular attention should be paid to:

- Proper assessment of demand and willingness to pay for different levels of service
- Evaluation of the condition of the assets and technical performance (coverage, reliability, UfW, etc.)
- Analysis of the financial performance of the existing service (billing and collection, outstanding debt, etc.)
- The potential cash generation capacity of the system based on reasonable assumptions for improvements in technical and financial performance
- Investment requirements for rehabilitation and expansion of services and internal cash generation potential

The selection of the preferred PSP option can be facilitated by organizing a study tour to countries that have had to address similar issues.

Consensus building

The building of a broad consensus among the various stakeholders including:

- the various ministries involved
- the local authority
- the management and staff of the existing utility
- consumers
- small-scale independent suppliers
- non-governmental organizations concerned with the provision of services to the poor
- the international and local private sector
- local financiers and international funding agencies (including development partners)
- the media

This often requires professional facilitation and organization of communication and targetted public relation campaigns.

Transparency

Open competition and the use of carefully designed probity procedures helps achieve transparency. The support of international agencies, such as the World Bank Group in the selection and negotiation process can also help.
Unsolicited proposals should be dealt with using a clear, transparent. Propósals for BOOT contracts for water production and wastewater treatment must be considered in the overall context of the provision of WSS service. The Regulator should develop and oversee a process which does not discourage unsolicited bids but which also brings competitive pressure to bear on the final solution (see below).

Minimizing risk

Reduction of the perception of risk by private partners requires a clear regulatory framework and in particular a clear definition of the role of the Regulator (see aide memoire section H). Most PSP schemes that can be envisaged in Kenya, will be regulated by provisions in the contract. Guidelines on these provisions should initially be drafted by the regulator whose role thereafter would be to ensure that contractual provisions are respected. The regulator may also need to have some limited discretionary power.

Example of a city - Nairobi

Two-stage process

Introduction of appropriate private sector participation in Nairobi will have an important demonstration effect that should drive both sector reform and private sector participation. Implementation will be in two stages:

- Options study – to identify and develop the most appropriate option and build stakeholder concensus around it.
- Competition – development of contract and tender documents, management of an international tendering process, negotiation with the preferred tenderer(s) and closure

The PPIAF have approved funding of the options study and the following sections are based on the proposed terms of reference for this study. These sections are included as they clearly set out the many complex issues thjat need to be investigated and taken into account when selecting and developing private sector participation arrangements.

Background information

Nairobi has a population of about 2.5 million in 2000, of which no more than 50 % has direct access to piped water through about 145,000 residential connections (out of a total of 160,000) and no more than 25% to sewers. The Nairobi water distribution system also provides bulk supply to several neighboring urban districts. Significant investments have recently been made to increase water production (to a capacity of about 520,000 m3/day) and waste water treatment (to a capacity of about 125,000 m3/day). But, the quality of the water supply and sewerage services have progressively deteriorated during the last ten years as a combination of insufficient investment for rehabilitation and extension of water distribution and sewer systems and inadequate commercial and financial management.

Intermittent water supply has become the rule and households and businesses have to rely on costly substitutes, such as individual boreholes, tankers and water vendors. The poor, comprising 40% of the total population and mostly living in informal settlements, are the most affected by this situation. Only a small fraction of the wastewater collected by sewers

- management and staff of the WSD; customers; NGOs; international professional operators; local and international investors; and multilateral and bilateral financing agencies.

Risk assessment - water resource

The Consultant would have to carry out a preliminary assessment of the reliability of the water resource in the long term, based mostly on a review of the existing documentation, discussions with Kenyan specialists and site visits. The Consultant would have to assess the possibility of developing ground water as a "public" permanent or stand-by source for the public WS service and the need for developing a new raw water storage capacity during the next ten years. The Consultant would also have to identify measures to be taken in the short and medium term to strictly enforce "private" ground water abstraction and river basin management. The Consultant would have to outline a medium term action plan, and define a preliminary related capital expenditure program, with the main objective of providing potential investors and operators a reasonably accurate picture of the risks involved and of the magnitude of solutions to be envisaged by the Government for mitigating them.

Risk assessment - investment program and financing plan

Water production and wastewater treatment capacities are currently well above demand but water distribution and sewers systems are still underdeveloped. It is thus likely that the largest share of the investment program for the years to come would be related to the rehabilitation and extension of the distribution and sewerage networks. Well managed WSS utilities finance extension of their distribution and sewerage systems primarily from cash generated from operations; this applies in particular to African water utility companies for which private equity and long commercial debt have so far not been available.

External financing

The Consultant would have to estimate the need for external financing by:

- Assessing the WSS market: this would require a review of existing studies and willingness to pay surveys, site visits (including in low income areas) and comparisons with African cities with well managed WSS service. The review would be concluded by a forecast of water sales and an identification of key parameters of the commercial and pricing policies that could influence them;
- Reviewing (or proposing) an investment program for the next ten years: a particular attention would be paid to water distribution, sewers, operating equipment as well as to other expenditures associated with implementation of the new structures; and
- Assessing the cash generation capacity of the WSS operations: this would require the definition of forecast parameters (unaccounted for water, staffing ratio, operating costs, account receivable using well run WSS operations in Africa as a benchmark) and the preparation of a medium term forecast of the WSS operation. The main objective being to identify the need for initial working capital and the volume and acceptable characteristics of long term external financing required.

Business valuation

With the objective of assessing the feasibility of the "divestiture" option, the Consultant would also have to carry out a preliminary "valuation" of the WSS operation by conducting a preliminary review of WSD existing assets and related debts as well as forecasted profits of the WSS operations.

Risk assessment - legal and regulatory environment

The Consultant would have to carry out a review of the existing legislation related to among others:

- Surface water resource management and abstraction;
- Groundwater management and abstraction;
- Provision of the public WSS service;
- Competition for and in the WSS service;
- Regulation of privately provided public services;
- Setting of WSS tariffs;
- Joint public/private ownership of public utility companies;
- "Concession" of public service; and
- Tax regimes.

and to suggest amendments that would be needed to provide a solid legal basis to the various privatization options that can be envisaged.

Study tour

The Consultant would have to organize a study tour for (a maximum of) eight key Kenyan stakeholders to (up to) two countries that have successfully implemented the option(s) that appears the most adapted to the case of Nairobi. The study tour could be organized, for example, in the UK (divestiture, discretionary regulation), the Philippines or Côte d'Ivoire (concession); Senegal (lease) or Jordan (management contract). Key stakeholders identified are currently:

- The Chairman of the Oversight Board of the NCC;
- The Investment Secretary, Head of the Department of Government Investment and Public Enterprises, Ministry of Finance and Planning, the Treasury;
- The Permanent Secretary of the Ministry of Environment and Natural Resources;
- The Permanent Secretary of the Ministry of Local Authorities;
- A key representative of the Parliament, with special interest in public utility reform;
- A representative of a Consumer Association;
- A councilor at the NCC; and
- A representative of the staff currently employed by the WSD.

The leader of the Consultant Team would also participate in the study tour to arrange meetings and guide discussions with:

- The key staff of the agency(ies) that designed and implemented the privatization process;
- The management and staff of the privatized WSS utility companies;
- Representatives of consumer associations;
- Representatives of the public agency with whom the operator is under contract (if applicable); and
- The Regulator.

Consensus building on the preferred option

The Consultant would have to prepare a summary description of the four options envisaged, including:

- The proposed structure of the "divested" WSS utility company;
- The contractual arrangement between the various parties for the concession, lease and management options, including an outline of the various contracts involved;
- The regulatory arrangement and the terms of reference of the Regulator; and

- The proposed financing plan of the development of the WSS service during the upcoming ten years (cash generation, public financing, commercial financing).

The Consultant would have to organize a series of consultations with various stakeholders with the main objective of assessing:

- The "political" acceptability of "divesting" the WSS service, traditionally associated with poverty reduction and public health improvement, to local and international private investors or "concessioning" the WSS service to a locally incorporated company whose majority share would be held by an international WSS operator. The main stakeholders to be contacted during these consultations are probably the parliamentarians and NCC councilors, consumer associations, the media, local and international NGOs, management and staff of the WSD of the NCC;
- The "technical" acceptability of each of the options. The main stakeholders to be contacted are probably selected international water operators; "public granting authorities" and regulators of countries that have implemented similar schemes could be contacted as advisers; and
- The "financial" acceptability of each option. The main stakeholders to be contacted are likely to be international and local institutional investors and banking institutions and international financing agencies (World Bank Group, African Development Bank, bilateral agencies...).

The Consultant would have to include a "public relation and communication specialist" who would prepare a series of messages targeted to specific audiences. The Consultant would also have to organize a one-day stakeholder workshop for about 60 participants to present the findings and recommendations of the preliminary analysis and of the study tour and recommendations that take into account the concerns raised by the various stakeholders during individual consultations. This workshop would be held in the Nairobi area.

Presentation of the preferred option – road map for implementation

Following the preliminary technical, financial and legal review, the study tour and the consultation with key stakeholders, the Consultant would prepare a summary final report on its findings and recommendations, bearing in mind that the objective is to improve the WSS service to all categories of consumers in Nairobi, including to low income groups, and not only to "privatize" a public WSS utility. The summary final report should include a "road map" for implementation of the preferred option and in particular:

- Describe the "privatization" option that is likely to be accepted by most stakeholders;
- List needed amendment to the existing legislation or legislation being prepared to provide a solid legal basis to the preferred option;
- Suggest an outline of the terms of reference of the advisers to be appointed for preparing the documentation for privatizing the WSS service;
- Suggest an outline of the terms of reference of the consultants to be appointed for preparing the documentation for financing for the development of the WSS service;
- Propose a realistic timetable for implementing the preferred option including approval of needed amendment to the legislation, selection of private partners, approval of financing, based on recent similar experience; and
- Estimate a preliminary budget for getting to a closure.

Secondary towns

PSP should also be pursued in secondary towns. The table on the following page provides a preliminary evaluation of the attractiveness of selected secondary urban centers. It is

recommended that a more comprehensive comparative evaluation be undertaken to allow focussing of government and development partner efforts on demonstration initiatives.

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KENYA SWEDEN RURAL WATER SUPPLY AND SANITATION PROGRAMME

INTEGRATED WATER RESOURCES MANAGEMENT PROJECT

1. Introduction

The MENR/Sida Programme focuses generally on poverty alleviation through improved socio-economic conditions for people in the rural areas of Kenya. Specifically, the Programme supports improved and sustained access to water services and improved and sustained health status. Towards this end, the Programme is committed to ensuring that the necessary institutional and legislative amendments are put in place, in addition to directly supporting the rural communities' initiatives in their efforts to gain sustained water and sanitation services.

The Integrated Water Resources Management (IWRM) Project is one of the components being implemented under the Kenya-Sweden Rural Water Supply and Sanitation Programme.

The basic intentions of this project are to create public awareness about the importance of IWRM, and to initiate the first steps eventually leading to environmentally sound management of water catchment areas in the future, thus ensuring the sustainable use, protection and conservation of the country's limited water resources.

2. Pilot Areas

The project is being implemented in five (5)pilot areas:

i) Nyandarua
ii) Nyamira
iii) Kirinyaga
iv) Murang'a
v) Laikipia

3. Water Resources and Catchment Issues Identified

i) The communities are experiencing serious water shortages due to poor, inefficient or over abstraction of existing rivers and streams and especially at the water sources where intense irrigation is being carried out for commercial purpose.

ii) Deforestation - the forestland in the catchment is mostly bare or under cultivation due to destruction of various trees for construction, pasture, farming among others and without replacement.

iii) Inappropriate farming methods - the communities undertaking subsistence and commercial farming do not put soil and water conservation measures which leads to soil erosion and siltation of the water bodies. This subsequently leads to less water being retained in the water bodies for maintenance of the ecosystem and human use.

iv) Group formation and organization - the existing self help groups are poorly organized and fail to integrate catchment conservation measures in their activities. Most groups lack managerial skills and are not gender sensitive.

v) Human - wildlife conflict - settlement of people on the riparian zone added to the conflict as the grazing area was used for settlement. Wildlife migrate seasonally to nearby water bodies thereby creating peaks of conflict.

vi) Infrastructure - poor roads hinder the exploitation of available natural resources, marketing of produce, exploitation of tourism potential, poor access to amenities like health, school and many others.

vii) In Kirinyaga two wetlands have been encroached, and extensive and uncontrolled rice farming is taking place.

viii) Horticultural farming is taking place in all the areas with heavy application of agro-chemicals.

ix) There is no organized system of sharing water resources or resolving conflicts.

x) There is a high demand of water since most of the streams traverse densely populated areas.

4. Proposed Activities

1. Identification of various resources within the catchment
2. Creation public awareness on IWRM and catchment conservation among existing groups.
3. Identification of monitoring stations and rehabilitation
4. Stakeholder workshop to synthesize findings and present case studies and have a collective appreciation of the complexities of IWRM
   After this workshop a detailed insight in IWRM will be gained which will enrich the process of implementation and even include implementation guidelines.

Brief comments on the Draft Initiating Memorandum on WRM Strategy

1. Poor demand management is a major contributor to the increasing unreliability of water supply: unaccounted for water is upwards of 50% of all water supplied;
2. Our water resources assessment data is hardly reliable and the measuring and monitoring stations require either extensive rehabilitation or complete replacement;
3. Irrigation wastes more than half of the water it claims it uses;
4. In my view siltation and land degradation, not least forest cover depletion, and an inadequate monitoring system are our major problems which may require priority action. The measured rates of siltation in our water storage/flow regulation/power generation reservoirs is many times higher than design rates;

5. Rural/user communities should be empowered to protect/conserve the water catchment areas they directly depend on, while the Government should create the enabling environment and as much as possible its actions should reflect a mutual interest in protection and conservation of water resources.