Integrating policy, disintegrating practice: water resources management in Botswana

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Abstract

Botswana is generally regarded as an African 'success story'. Nearly four decades of unabated economic growth, multi-party democracy, conservative decision-making and low-levels of corruption have made Botswana the darling of the international donor community. One consequence of rapid and sustained economic development is that water resources use and demands have risen dramatically in a primarily arid/semi-arid environment. Policy makers recognize that supply is limited and that deliberate steps must be taken to manage demand. To this end, and in line with other members of the Southern African Development Community (SADC), Botswana devised a National Water Master Plan (NWMP) and undertook a series of institutional and legal reforms throughout the 1990s so as to make water resources use more equitable, efficient and sustainable. In other words, the stated goal is to work toward Integrated Water Resources Management (IWRM) in both policy and practice. However, policy measures have had limited impact on de facto practice. This paper reflects our efforts to understand the disjuncture between policy and practice. The information presented here combines a review of primary and secondary literatures with key informant interviews. It is our view that a number of constraints—cultural, power political, managerial—combine to hinder efforts toward sustainable forms of water resources use. If IWRM is to be realized in the country, these constraints must be overcome. This, however, is no small task.

Keywords: Water demand management; Supply-side intervention; Sustainable use; Tourism; Mining; Industrialization; Urbanisation

1. Introduction

Botswana is a semi-arid, land-locked country located in the heart of Southern Africa, where there are distinct wet and dry seasons and drought is endemic. Rainfall varies widely throughout the country, averaging less than 250 mm/year in the southwest up to about 600 mm/year in the northeast. Surface water resources are limited in the country, with most rivers flowing for only a few days per year. These sand rivers have significant stores of groundwater in their beds. It is estimated that approximately 80% of the humans and animals in Botswana are dependent on groundwater (Moyo et al., 1993, p. 32).

Overall, the picture is of a harsh and unforgiving climate whose potential for extensive human habitation and sustained economic development is limited. Indeed, at independence from Britain in 1966, Botswana's 500,000 people had a GDP/cap. of US $75. Forty years later, however, the population has more than tripled, the national cattle herd is more than 3 million, and, with a 2000 per capita GNP of US$ 3300, Botswana is considered an upper middle-income country by the World Bank (2002). Rapid economic growth fuelled by mineral extraction—primarily gem quality diamonds—has facilitated this demographic revolution. Clearly, livelihoods for the majority have improved dramatically. However, there have been many unintended and unanticipated

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negative consequences to rapid and sustained development, paramount among these being stress on land and water resources. Government estimates demand increasing from 193.4 Mm^3/year in 2000 to 335.2 Mm^3/year by 2020 (NWMP, 1992). As demand increases, available supply decreases. Groundwater resources, for example, are being depleted by a combination of overutilisation and low recharge rates. Some estimates suggest groundwater exhaustion by 2020 (Gabaake, interview, 2002). Dam construction, intra- and inter-basin transfer schemes, and technological interventions to better detect and utilize groundwater sources are government's preferred means to achieving water security (NWMP, 1992).

Given these difficult circumstances, achieving sustainable use of water resources is a central goal of government policy. However, a series of cultural traditions and political constraints, coupled with bureaucratic managerial weaknesses, serve to maintain a system of water allocation that is unsustainable in the long run and inefficient in the short term.

Drawing primarily on data obtained through a series of interviews with government officials, leaders of non-governmental organizations (NGOs), and water resource managers and researchers, this paper explores water policy in Botswana. The paper describes key demands placed on water resources, discusses the structure of water policy as it currently exists, and highlights challenges to managing water resources in a sustainable fashion.

2. Water and people

The vast majority of Botswana's 1.67 million people concentrate along a narrow 'transportation corridor' connecting South Africa to Zimbabwe in the eastern part of the country. The reasons for this are climatological, as this area falls just at the edge of the Inter-Tropical Convergence Zone influenced rain belt extending from the eastern edge of the continent to about 600 km inland. Beyond this lies the Kalahari sandveld, whose soils and water resources pose formidable barriers to extensive human habitation. As with most developing countries, Botswana's population is further concentrated in a primary urban area—the capital city, Gaborone. 'In 1981, approximately 50% of the population was within 200 km of Gaborone. By 1991, 50% of the population was enumerated within 100 km of Gaborone' (NDP 8, p. 11). From a meager 17,700 people in 1971, Gaborone's current population is estimated at 246,800. The character of other towns, villages and cities is rapidly changing. For example, there are now 17 human settlements defined by the government as 'major villages', i.e. villages either with populations in excess of 5000 people or/and headquarters of Districts (NDP 8). Demand for water is not only increasing because of increased wealth and economic activity. It is increasing at a higher rate because more households are demanding private connections. As is well known, ease of access (e.g. through in-house connections) translates into higher per capita resource use (Goldblatt et al., 1999).

The demand for water comes from a variety of sectors including human use, agriculture, livestock, mining, and wildlife (tourism). This demand is increasing due to the nation's continuing urbanization, economic development, and population growth. According to the Government of Botswana (NDP 8, p. 280), during the 1992–1997 planning period, there were two primary aims in the water sector:

- to meet the basic needs of the population through the provision of a safe, reliable and affordable water supply, which is available to all; and
- to meet water requirements of industrial, mining, agricultural, commercial and institutional users in order to achieve the major objectives of rapid economic growth and sustainable development.

It is official policy to achieve sustainable and equitable water resources use (NDP 8, p. 281).

Use can be divided into consumptive and non-consumptive categories. The most obvious consumptive use of water is for *human use* including drinking, sanitation, and hygiene. Per capita use is low by international standards, but demand is increasing while availability remains limited. In 2000 it is estimated that the country used about 193.4 Mm^3 of water. Of this about 24% went to the urban centres, 11% to major villages, 6% to rural villages or other settlements, 18% to mining and energy, 23% to livestock, 15% to irrigation and forestry, and 3% to wildlife (NDP 8, p. 280). Demand is forecasted to increase to 336 Mm^3/year by 2020 (Lado, 1997).

An important feature of human water use is that it increases greatly with urbanization and standard of living (Sullivan, 2002). According to the Botswana National Water Master Plan (NWMP, 1992), urban populations in 1990 used on average three times as much water as rural populations. The NWMP projects that by 2020 the ratio of urban to rural water use will be 5:1 even as rural consumption of water is estimated to increase by nearly 6% over 1990 levels. Just to meet increasing demand in rural villages, more than 60 additional boreholes are drilled each year (Carlsson and Ntsatsi, 2000). Meeting major village and urban needs requires far more extensive increases in supply. In 1998 there were 460 rural village water supply schemes operated and maintained by the various district councils (NDP 8, p. 280).

Tourism places both consumptive and non-consumptive use demands on natural resources, including water and wildlife. Tourist revenues are greatly dependent

upon the presence of wildlife. The main non-consumptive use of water but consumptive use of wildlife is the hunting safari, where foreign tourists pay hard currency to kill particular animals—buffalo, lion, elephant, for example. Safari operations are increasingly involved in both sustainable ecosystems management and rural development through the implementation of community based natural resources management (CBNRM) programmes (Van der Jagt and Rozemeijer, 2002).

Historically, wildlife were found throughout the country. Approximately 35% of Botswana's land is gazetted as protected area—an area larger than Belgium, but one that is criss-crossed by private farms and ranches, communal lands, and whose boundaries are under constant pressure from humans and livestock.

Livestock increasingly compete with wildlife for limited water resources. The wildlife/livestock conflict in Botswana is an important political issue (Muimi, interview, 2002). The conflict, first and foremost, is over land. As personal wealth has increased in Botswana, there has been a corresponding demand for land for cattle. The relatively well-watered east is over-stocked and over-grazed. As a result, the national herd has been pressing westward into marginal lands. The wildlife/livestock conflict has been exacerbated by frequent outbreaks of foot and mouth disease, arguably spread by wild buffalo to free ranging cattle. To help prevent spread government built a series of fences across the country. These Veterinary Cordon Fences remain controversial particularly among the wildlife conservation community (Conservation International, 1998).

Agriculture is a primary consumer of water. Whereas an estimated 20,000 ha of land are available for irrigation in the country (NWMP, 1992), in 1998 only 1380 ha was under irrigation, mostly in the Tuli Block freehold area of the northeast. Smallholders also irrigate their crops using water from small dams. It is government policy to assist in the construction of small dams and in well and borehole construction/rehabilitation. According to NDP 8, the construction of more than 200 small dams in the Gaborone catchment area has reduced runoff by about 25%, and in the Bokaa catchment, just a few kilometres north of the city, 'the reduction is more than 13% for about 100 existing small dams'. Despite this increased water availability, use is inefficient and economic returns are marginal. Israel is being looked at as a model for improvements to irrigation (Mmopi, interview, 2002). In addition, government is actively pursuing a number of approaches to improved efficiency of water use: e.g., rainwater harvesting; storm water capture and diversion; solar-powered desalinsation plants; waste water reuse (NDP 8, pp. 293–294; Mmopi, interview, 2002).

Considered together, *mineral* and *energy production* (primarily coal) are heavy users of water, though, unlike agriculture, the economic returns in the mineral sector are significant. In 1990, nearly 19% of water used in the country was consumed by the mining and energy sectors, though comprising only one coal-fired power plant and about half a dozen mines. By 2010 that percentage is expected to increase to nearly 22% (Lado, 1997). Water resource use for mines and mining towns has raised many controversies in the country. The major mines (Orapa, Jwaneng, Selebi-Pikwe) have been responsible for providing their own supply of water. As a result, there has been significant overuse of this resource by mining town residents who, in Selebi-Pikwe for example, do not pay for the water reticulated into their homes. Available groundwater has been further depleted through pollution of aquifers by improperly discharged wastewater. Studies have been done to consider the effects of the use of mine wastewater for irrigation (Jovanovic et al., 2001). All mines, and the Morupule coal-fired power station, reuse their water today.

International demands also pose a concern for water in Botswana. All perennial surface water resources in Botswana are shared international watercourses. [1] As such, off-takes made by one state unavoidably affect neighbouring states (Swatuk, 2002a; Swatuk, 2003). For example, Botswana's North South Carrier Water Project (NSCWP) is an intra-basin water transfer scheme that reticulates water via a series of dams and pipelines from the Shashe River in the northeast to all major villages and towns along the eastern corridor. In this case, Botswana is an upstream riparian, so off-take reduces water available to other states (Zimbabwe, South Africa, Mozambique) in the Limpopo River Basin. In contrast, Botswana is a downstream riparian in the Okavango River Basin. The Okavango rises in Angola and passes through Namibia before emptying into the Delta. International law permits Angola and Namibia reasonable use of this water (Turton et al., 2003). Plans for developments in the middle Okavango persist and, with peace in Angola, the prospects of further developments in the upper catchment cannot be dismissed (Heyns, interview, 2002; Pinheiro, interview, 2002). Many positive political, institutional and legal developments have resulted from inter-state bargaining over transboundary water resources (Van der Zaag and Savenije, 2000; Swatuk, 2002b), with the July 2004-established Zambezi River Basin Commission marking a high point.

3. Water policy

With independence from Britain came planning for national 'development', defined then as now as a combination of satisfying basic human needs and

[1] See Savenije and van der Zaag (2000), in particular p. 11, Table 2.

modernization through industrial development. Water has been a central part of this planning effort.

The first regulation of water use came the year after independence with the passage of the Water Act of 1967 and the establishment of the Department of Water Affairs in the same year (Sillery, 1974). The Department was subsequently placed in the Ministry of Mineral Resources and Water Affairs, now renamed the Ministry of Minerals, Energy and Water Affairs (MMEWA). Water scarcity was considered the largest limiting factor for national development (Smit, 1970); securing adequate supply became the central feature of evolving water policy. According to Goldblatt et al. (1999, p. 101),

> Water resources belong to, and are controlled by, the state, but it has delegated power to issue water rights to the Department of Water Affairs and the Water Apportionment Board while land boards are responsible for issuing certificates of land rights ... The Water Act allows for existing water rights to be suspended in the event of a water shortage due to drought or where water is required for public purposes. The act sets borehole abstraction limits of 22.75 cubic metres/day for mining, forestry, and industry. It provides penalties for pollution and for altering and interfering with water flow, as well as requirement to dispose of wastewater with minimal pollutants.

The MMEWA has overall responsibility for water policy. It is assisted in implementation by the departments of Water Affairs (DWA) and Geological Surveys (DGS), and the Water Utilities Corporation (WUC), a for-profit parastatal responsible for the supply of water to the six urban/mining centres and other designated areas, Orapa mine excepted. DWA (with DGS) is responsible for groundwater investigations, protection and monitoring of resources. It is also responsible for the protection of surface water, for administering water legislation, and for the provision of water supply to all villages. Operation and maintenance of these village schemes is the responsibility of District Councils through the Ministry of Local Government, Lands and Housing (MLGLH) (NDP 8, pp. 279–880). In all, this means that WUC supplies 21.5% of the population with water, DWA provides for the 22.5% of the population living in the 17 major villages. While District Councils (through the MLGLH) are theoretically responsible for supplying water to the 22% of the population living in rural villages, DWA, in practice, constructs most of these through its in-house facility. Devolution of responsibility to District Council Water Departments proceeds slowly (NDP 8, p. 284). The remaining 34% of the population relies on boreholes, wells, or water transported from villages (Atlhopheng, 1998). While most of these are private sources, DWA is often called upon for the rehabilitation and maintenance of small dams, boreholes and wells.

In terms of meeting the costs of delivery in urban areas, the WUC has established a graduated step tariff structure. Most consumers fall within the lowest band (0–5 m^3/month) where charges are nominal, so contributing very little to cost recovery. In addition, the largest users tend to be public institutions (e.g. schools, hospitals), so costs are met by Government. In cities and major villages, people pay a connection fee for private water, be it an on-property standpipe or in-house facility. Those with access to a communal standpipe pay nothing for the water. Costs for the provision of water by the District Councils to rural users are assumed by the DCs. It is government policy to try and recover the 'full recurrent costs of all the major village water supply schemes' (NDP 8, p. 286). As wealth increases in rural areas, demand for private connections increases. According to Goldblatt et al. (1999, p. 101), 83% of households have access to piped water in Botswana. [2] Cattle herders may be required to pay a small sum per head each year to cover the costs of water pumping and maintenance (Atlhopheng, 1998).

Guiding present day policy is the National Water Master Plan (NWMP) of 1991. The NWMP focused on supply-side interventions in response to increasing demand. Water demand management (WDM)—defined at the 1991 Dublin Conference as 'actions which promote more desirable levels and patterns of water use'—is not reflected in this document, it being a new concept made popular via the 1992 Dublin Principles and Earth Summit. [3] The NWMP projected major increases in water demand between 1990 and 2020: urban areas by a factor of five; mining, rural consumption, and energy by a factor of three; and irrigation will double (Atlhopheng, 1998).

Countrywide, the main issue is security of supply, followed by containing and managing burgeoning demand. In Government's own words, 'In order to ensure that water does not become a constraint on national development or economic growth, it will be necessary to maintain water demand projections in line with other expected growth rates in the economy, especially population, urbanization and industrial development' (NDP 8, p. 291).

3.1. Supply

Augmenting supply is a continuing focus of government activity (Gaolathe, 2001; 2002; Mogae, 2002). Government has developed significant human and technical capacity in exploiting both surface and groundwater resources. Current policy focuses on conjunctive use of surface and groundwater supplies (NDP 8,

[2] In contrast to 77% in 1991 and 56% in 1981 (Lado, 1997, 44).
[3] The authors thank H.H.G. Savenije for this point.

p. 294). This is best illustrated in the NSCWP. Phase I (completed) entailed construction of the Letsibogo Dam and a 360 km pipeline to bring water to villages, towns and cities all along the eastern border region. Phase I costs were an estimated US$ 1.5 billion. Phase II, which will see construction of the Lower Shashe Dam and a parallel pipeline, is estimated to cost US$ 2–2.5 billion.

On a significantly smaller scale, DWA continues to assist in the development of rural water supply and water-borne sanitation systems (Mogae, 2002). It is also involved in the construction of water systems for major villages. This includes investigation of possible dam sites and exploitable groundwater resources. Having assumed responsibility for managing the NSCWP, and having taken control of all of its assets, the WUC now assumes responsibility for bulk potable water supplies to major villages along the NSCWP, including all those in the greater metropolitan Gaborone area.

There are two further supply elements worth noting. One is government's commitment to exploring the utility of *new technologies* and/or approaches to increasing existing supply. The most significant new development here is wastewater recycling and reuse. Porter et al. (1997, p. 86) estimate that 50–65% of water sales in Gaborone end up discharged into the municipal sewerage system. Government estimates that out of Gaborone's total demand of 30 Mm^3/year, return flows are in the neighbourhood of 20 Mm^3/year (NDP 8). Investigations are on-going regarding the feasibility of wastewater use in agriculture, and of the social acceptability of using wastewater if treated to potable standards. Changes to government policy—e.g. an end to special water tariff rates—have encouraged the mines at Orapa and Selebi-Phikwe to install recycling and other water-saving technology. Government is also actively supporting both high (e.g. portable desalinization plants in remote locations) and appropriate technology (e.g. rainwater harvesting, storm water diversion and impoundment) approaches to increasing water supply (NDP 8; Goldblatt et al., 1999, pp. 102–104).

The second element concerns *water quality*. A polluted water source is an unusable water source, so constituting a de facto decrease in supply. The main quality issues confronting Botswana water are salinity, high fluoride levels, and nitrate pollution. While legislation exists to control pollution levels (through, for example, polluter-pays principles), Government is often reluctant to penalize key employers in the country (Goldblatt et al., 1999, pp. 102–104).

Supply is complicated by problems of *distribution*. System water losses average 15–25% but may run as high as 35% when older pipes are used (Atlhopheng, 1998). According to Lado (1997, p. 48), 'average total water losses per year for 450 villages is estimated to be 3.5 Mm^3 of water. In monetary terms, this means that it costs about P10.5 million'. Despite such inefficiencies, government policy requires that all new housing be fitted with in-house water and sanitation systems (Mogae, 2002).

3.2. Demand

Controlling demand and improving both current use practices and forms of delivery are considered in policy circles as important ways to increase supply. Water demand management is a relatively new management philosophy in the southern African region (Kansiime, 2002; Gumbo and van der Zaag, 2002; Schachtschneider, 2002). Goldblatt et al. (1999, p. 104), highlight a number of possible WDM measures being considered in Botswana: e.g., rainwater collection, storm water run-off diversion and collection, re-use especially for irrigation of fodder, progressive pricing policy, water-efficient appliances in households, industries and agriculture, farm gardens using minimum tillage and grey-water irrigation, reduction of leaks from distribution systems, use of lower pressures, development of non-water-borne sanitation systems (eco-sanitation), and consumer education.

However, Government's approach to the actual implementation of these measures is haphazard at best, tending to surface only in the face of severe drought. A primary reason is that controlling demand—particularly through punitive measures—stands to upset the political status quo. The ruling BDP continues to think of itself as the pater-familias of the nation. While it may reprimand on occasion, it clearly prefers to buy favour through a patrimonial approach to 'public goods'. This results, for example, in water prices that remain far below operating and maintenance costs—a policy that runs against both regional and global trends and stated government policy in support of full cost recovery.

4. Challenges to sustainable management

There are many challenges to sustainably managing water resources in Botswana. While space does not permit full elaboration, five will be briefly mentioned: the character and pace of development, institutional overlap, human resource capacity, cultural impediments, and power relations.

4.1. The character and pace of development

There is no doubt that, the rhetoric of 'sustainability' notwithstanding, in policy making circles, development is of higher importance than the environment (Monagen, interview, 2002; Gabaake, interview, 2002; Ramberg, interview, 2002). As a rentier economy based on the extraction of raw materials, Botswana is subject to

cycles of boom-bust. [4] This is reflected primarily in the construction industry as government has placed most emphasis on the provision of public goods—roads, schools, hospitals, sporting facilities, water and power—in the effort to spread economic activity, wealth and employment beyond the capital-intensive mining sector. The focus on infrastructure development in support of jobs has a huge impact on local environments, from hardening of the soils to the mining of aquifers. Surplus capital reinforces the belief that water can be acquired from *somewhere*: in other words, technology will provide.

4.2. Institutional overlap

Water policy is primarily the cumulative result of piecemeal, often reactive decisions taken over time. The problem of limited and overlapping jurisdictions among concerned agencies plays a role in preventing smooth and rational policy implementation at all levels of government. The WUC has authority only in cities, DWA only has control of state lands, and communal lands are controlled by the District Councils. In addition to this fractured structure, other ministries such as Agriculture, Minerals, Lands, Wildlife and Tourism compete for the water they need to make their missions a success. A principal problem is that the Department of Lands has authority to allocate and manage land but generally does so without consideration of water, sanitation, agriculture or waste management. Once land is allocated, other agencies frequently raise these issues. For instance, land might be allocated for industry without full consideration of the pollution effects on water resources. Groundwater, while logically associated with land, is separated from land for government purposes (Monagen, interview, 2002).

To add to the complexity, each district manages its own multi-faceted system of inter-governmental affairs to ensure that water is provided within the district (Gabaake, interview, 2002). At the local level, concern for water when land is being allocated is extremely restricted. The main concern is for potential rangeland degradation. Another concern is for the increase of saline boreholes. New occupants of lands will almost certainly increase water use and are likely to drill additional boreholes. This multiplies the potential for saline boreholes as the water table drops (Maswibilili, interview, 2002).

Government is not unaware of this problem. To address it, the National Conservation Strategy Coordinating Agency (NCSCA) was formed. The NCSCA was to be an umbrella organization to unify water policy across ministries (Nchunga, interview, 2002). NCSCA, however, is not powerful enough to fulfill this mission. The water needs of livestock, wildlife, mines, and agriculture are often in conflict. The more powerful ministries that exercise control over these issues weigh heavily on decisions regarding water access (Monagen, interview, 2002). The people in these ministries are often the same people who lobby in support of, say, industry or ranching or mining over less powerful ministries and lobby groups, such as Tourism and the Environment and international environmental NGOs. The failure of NCSCA to be effective has another important consequence. Many issues related to water are simply ignored because the major agencies (including water agencies) do not see them as central to their individual missions (Mbaiwa, interview, 2002).

While Government continues to state that it will 'streamline' and 'coordinate' decision-making among all those active in the exploitation of water resources (NDP 8), coordination tends to take the form of consultations *ex post facto*.

4.3. Cultural impediments

Underpinning many of these problems is the fact that there is no general belief that water will run out. This combines with a sense that 'government will provide', an attitude that the ruling BDP has consciously cultivated during its long years of neo-patrimonial rule (Swatuk, 1997). As the population urbanizes along the eastern transportation corridor (the 'rain belt'), and benefits from large-scale supply projects, drought conditions as experienced elsewhere in the country become 'other people's problems'. [5] Moreover, as drought impacts livestock most seriously, and as majority cattle holdings are concentrated among elites, 'solutions' are to be found in more boreholes, not fewer livestock. There is much rhetorical support for the concepts of sustainability, but serious policy implementation is limited. Clearly, there is need for an intensive education campaign targeting the public and government officials (Gabaake, interview, 2002). Various (I)NGOs are engaged in consciousness-raising activities (Fritz, interview, 2002; Sekhute-Batungamile, interview, 2002).

4.4. Human resource capacity

Sustainable water policy is hindered by shortages of scientific data and ineffective monitoring. Expertise needed for government decision-making is lacking (Monagen, interview, 2002). Policies that monitor water

[4] These cycles are somewhat muted by the presence of the Central Selling Organisation (CSO) which still manages to control the supply of most of the world's diamonds so stabilizing price. Botswana provides roughly 30% of the CSO's diamonds (Gaolathe, 2002).

[5] In Zimbabwe there is a saying that 'if it is raining in Harare, then it is raining in Zimbabwe'. The same sort of parochial attitude may be applied to those living in Gaborone.

use and purpose for use do not exist (Gabaake, interview, 2002).

While most of Botswana's water policy is supply oriented, one of the main policy mechanisms to create sustainable use might well be demand management. One problem hindering implementation of demand-side policy measures, however, is that there is currently no accurate measure of demand (Kgathi, interview, 2002). Neither is there an accurate measurement in place to determine water use or need within segments of the population. Even if such measures existed, for an effective pricing policy to be put in place there would have to be additional studies to determine, *inter alia*, willingness and ability to pay (Gabaake, interview, 2002).

4.5. Power relations

Non- and partial-implementation remain major barriers to sustainable water policy. While there are many good laws on the books, they are written in large part to address issues raised by donors, international financial institutions (IFIs), IGOs and INGOs, whose own interests vary over time. Placed in this context, policy is often reactive, reflecting in its current language—e.g. good governance, democratization, privatization, ecosystem sustainability, integrated water resources management, smart partnerships—the interests not of the Tswana elite, but powerful international actors, forces and factors.

The continuing preference for new supply, despite stated support for demand management, reflects the tension between international and national networks of power (Swatuk, 2002b). Rents from mining activity are substantial, enabling the Government of Botswana to 'afford' the cost of projects such as those described above. [6] Although mining creates little direct employment (roughly 13,500 jobs), the vast revenues generated make *all* other developmental activities possible. They enrich a narrow strata of the population (in government and industry) whose conception of wealth is a mix of modernist Western high mass consumption (the Toyota 4X4 and BMW as 'symbol') and traditional Tswana conservatism (cattle-as-stored-value). These political and business elite interests continue to view water as a discrete resource—as a factor of production in mining, industry and agriculture—and therefore as a linchpin in maintaining current socio-economic and socio-political hierarchies.

[6] In 2000 and 2001, Botswana's current account surpluses were P2.8 billion and P2.6 billion respectively. Foreign exchange reserve holdings had increased from P33.9 billion in 2000 to P41.2 billion in 2001, representing 39 months of import cover for goods and services (Gaolathe, 2002, p. 10).

5. Conclusion

In our view, the key to the future of water management in Botswana is to embrace the concept of sustainability across all major activities, in other words, to pursue integrated water resources management. Such policy would involve integrating water use with tourism, agriculture, cattle, mining, industrial and human needs. Current trends suggest that such a policy position is forthcoming. However, implementation rubs up against the hard stone of diamond wealth. Somewhat ironically, this wealth inhibits rather than fosters sustainable water resources management in one of the driest countries in Sub-Saharan Africa. Pula—as money, not rain [7]—has drawn all segments of society into unsustainable forms of water resource use, openly suggesting to them that technological solutions are never far away.

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[7] The Setswana word *pula*, meaning rain, was chosen as the name for the currency, indicating its importance in society.

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