

WEALTH ACCOUNTING AND VALUATION OF ECOSYSTEM SERVICES (WAVES) in BOTSWANA



PRIORITY POLICY OBJECTIVES AND WORKPLAN: AN UPDATE OF PROGRESS

MARCH 2013



1. WAVES in Botswana

The overall goal of the Global Partnership for Wealth Accounting and Valuation of Ecosystem Services (WAVES) is to support partner countries to achieve sustainable development by systematically integrating values for natural capital in their national accounts systems, and, through the national accounts, mainstream natural capital valuation in both macro-economic indicators that monitor development progress, and natural resource management. WAVES is being led by the World Bank in partnership with United Nations Development Program, the United Nations Environment Programme (UNEP) and other partners.

Botswana is one of five developing countries¹ where the WAVES Global Partnership is directly supporting implementation of natural capital accounting. Botswana has joined, partly because of its high dependence on natural capital, but also because Botswana was one of the first countries to pilot environmental and natural resource accounting in the 1990's and early 2000's.

The Government of Botswana has indicated a strong commitment to the WAVES Partnership and a Botswana Steering Committee for WAVES has been established, chaired by the Ministry of Finance and Development Policy (MFDP), Socio-Economic Policy Section. During the first year, the government of Botswana asked WAVES to collaborate closely with the UNDP-UNEP Poverty Environment Initiative (PEI)² because the similar objectives of the two programs create opportunities for synergies and enhanced mainstreaming of natural capital accounting in decision-making. Extensive multi-stakeholder consultation through three workshops and a feasibility study formed the basis for drafting options for a WAVES Botswana work plan. The Steering Committee formally approved the work plan in March 2012. In May 2013, the Ministry of Finance and Development Planning will have a project coordinator for WAVES Botswana, who will coordinate and oversee the implementation activities. The coordinator will work closely with two MFDP staff members.

2. Macro-economic and Environmental Context in Botswana

Between Independence in 1966 and the mid-1990s, Botswana was the fastest-growing economy in the world, with average annual GDP growth rates of over 10%. This prolonged growth took Botswana from being one of the poorest countries in the world in 1966 to middle-income status by the 1990s, with per capita income now around US\$7,600.

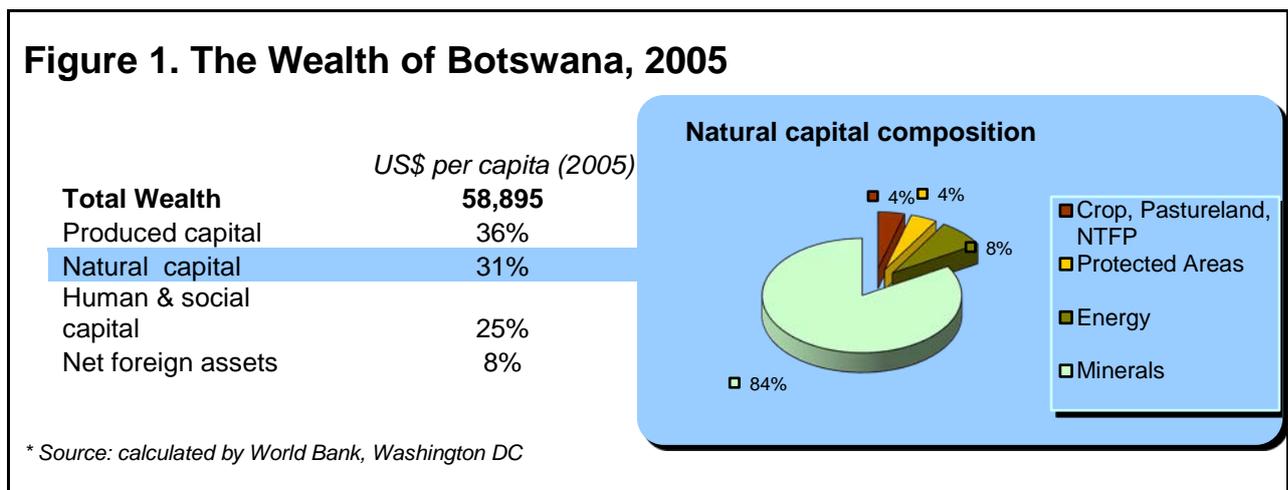
Natural capital—particularly diamond resources—has played the key role in Botswana's development. Initial estimates suggest that natural capital currently accounts for roughly 31% of Botswana's total wealth, dominated by minerals, mainly diamonds (Figure 1). Protected areas, including a unique ecosystem that has been designated as a World Heritage Site (Okavango Delta), form the basis of a valuable eco-tourism industry, and tourism has been targeted as a sector for growth and diversification in Botswana's 10th National Development Plan (NDP10). Agricultural land is much less important commercially, but provides livelihoods for a large number of the predominantly poor, rural population.

Rapid economic growth has been built upon the foundation of the diamond mining industry, with Botswana now being the largest producer of diamonds by value in the world and a large share of the revenues accruing to government, which is a partner with De Beers in mining operations. Diamond

¹ The implementing partner countries are Botswana, Colombia, Costa Rica, Madagascar and the Philippines. Other partner countries include Australia, Canada, Norway, Japan, Spain and UK.

mining is the largest single contributor to gross domestic product (GDP), and the mining sector as a whole accounts for 31% of economic output. The government is the second largest sector of the economy, after mining, and is the largest single employer. Government, however, depends on the mining sector for roughly 50% of its revenue. Other important (large or fast-growing) sectors include trade & tourism, transport & communications, and finance & business services.

Despite its outstanding record of economic growth, Botswana has been less successful at creating jobs. The rate of job creation, especially in the formal sector, has generally lagged behind the economic growth rate and new entries into the labour market. The 2010 unemployment rate was 18%³. The poverty rate, while high for a middle-income country, shows signs of improvement, but is still high. In 2002/3 the headcount poverty rate was 31%, while by 2009/10 this had fallen to 21%.



The government of Botswana has always been keenly aware that in the long term it must use revenues from diamonds, a non-renewable resource, to diversify the economy. In recent years, the need for economic diversification to develop new sources of economic growth has become acute. The overarching development objectives, highlighted as in both the long-term Vision 2016 strategy, and in the medium term NDP10, stress economic diversification, job creation and poverty eradication. Several natural-capital based sectors have been targeted for a major role in achieving growth with diversification:

- new mining activities, especially development of Botswana’s vast coal reserves to alleviate regional energy shortages as well as for possible export,
- expanded ecotourism with an emphasis on greater participation by local communities and benefits to the Botswana economy
- expanding commercial agriculture through irrigation
- more efficient use of scarce water resources, which underpin all economic activities

Optimizing use of Botswana’s natural capital is key to achieving its long-term development objectives. Vision 2016 states:

“The natural resources of Botswana are one of its greatest assets. The strategy for protecting these resources must be based upon sound domestically based research. This should include the extent of mineral and water resources, the possible implications of increases in manufacturing, urbanization, tourist volumes or long-term changes in climate, and the effect

³ Results of the Botswana Core Welfare indicators Survey, 2009/10 (Statistics Botswana, 2011). Other official surveys, however, give higher unemployment rates of between 25% and 30%.

of the use of water resources both within Botswana and in neighbouring countries...The results of the research must then be translated into effective measures that will protect the resource base and environment in a sustainable way so that they can be enjoyed by the citizens of the future” (p46).

Minerals and Energy. In addition to diamonds, Botswana possesses other mineral deposits, particularly coal. Several plans have been developed to mine more coal for generation of electricity, alleviating acute shortages in the southern African region, and possibly for export. Mining coal for export would require vast investments in new regional rail lines and expanded port facilities-investments that would take decades to recoup. Furthermore, coal requires large amounts of water to utilize and it is not clear that sufficient water resources are available, or that the best use of this scarce resource is for large-scale coal mining.

Land and Ecosystems: Botswana’s rural land is used for agriculture (both subsistence and commercial) or under some form of protection & management for wildlife conservation, which supports an important and growing tourism industry and some subsistence use.

Botswana has rich and varied ecosystems that support large numbers of wildlife and form the backbone of the rapidly growing tourism industry. Protected areas designated for wildlife and biodiversity conservation constitute 19% of the land area and wildlife management areas (sustainable use and conservation) another 17%. No clear figures are available for the contribution of tourism to the economy, but two recent estimates give a range of 3-4% for direct contribution and roughly double that for total impact.

The agricultural potential of land is generally low due to semi-arid conditions and low soil fertility. Given both soil and water constraints, land is mainly utilized for livestock production; crops can only be grown commercially under irrigation. Agricultural land, particularly in communal areas, is generally underutilised due to lack of investments and low input production strategies. Large areas of land have been subject to environmental degradation.

Water Resources. Water resources are very limited and are expected to constrain future economic growth if not used efficiently. In Botswana rainfall is low, highly erratic and unevenly distributed. Surface and ground water resources are scarce. Several dams are currently under construction but further new large supply schemes are linked to international rivers and utilisation is subject to agreements with other riparian countries, where demand for water is also increasing fast. Climate change is expected to exacerbate the situation, leading to more droughts (and floods), increased stress on water resources and reduced primary land productivity. Integrated water resource management and careful assessment of tradeoffs are critical for future economic development.

3. Preparation Phase of WAVES-Botswana programme

An initial consultation with the Government of Botswana in July 2011 led to a formal exchange of letters between the World Bank and the Ministry of Finance and Development Policy in September bringing Botswana into WAVES as one of the partner countries.

The key outcome of Phase 1 WAVES activities has been the development of the Work plan for the implementation in Phase 2, 2012 to 2015. The Phase 2 Work plan has been prepared in collaboration with the Botswana PEI-WAVES Steering Committee and other stakeholders, with technical support from the World Bank. In line with the WAVES program of activities for the Preparation phase, a ‘scoping out’ study was commissioned in September 2011 to compile a list of potential policy priorities and entry points for environmental accounting, review data availability and gaps, and

institutional capacity. A broad range of possible priority policy objectives and activities was discussed at a National Stakeholders Workshop in November 2011, and a set of initial priorities identified. Through further consultations, options for a work plan for the 4-year Implementation Phase of WAVES in Botswana were developed and presented to a large multi-stakeholder workshop in the context of Rio+20 and Green Economy, January 2012. A proposed Phase 2 Work plan was compiled as a result of these consultations. The Work plan was approved at the meeting of the PEI-WAVES Steering Committee in March 2012.

Subsequently, WAVES Botswana was presented at the May 2012 meeting of the Botswana Economic Advisory Council, a small group of ministers and senior private sector advisors chaired by the President of Botswana. It was decided at that meeting that WAVES-Botswana should entirely focus on water accounting in the first year. A working group on water accounts was formed by the Department of Water Affairs (DWA), to update the previous water accounts, supported by a technical consultant in Botswana. DWA presented the initial update of water accounts to 2010-2011 at the November 2012 BEAC meeting. BEAC gave its approval to the rest of the WAVES work plan and asked that WAVE Botswana provide regular updates to be included in the briefing package for its biannual meetings.

The following section (4) describes the rationale for the policy objectives and activities contained in the Work plan. Section 5 briefly explains the water accounting work that has been undertaken to-date.

4. Policy Priorities in WAVES Phase 2 Work plan

Optimizing natural resource use is key to achieving growth with diversification and poverty reduction, but the necessary economic information to transform these strategies into actions—specific policies, investments, and other actions is often incomplete or missing. WAVES will provide technical support for environmental accounting in order to fill that information gap and improve economic decision-making in 2 ways:

1. Supporting a new way of assessing economic growth—beyond GDP—that takes Natural Capital into account in order to better assess prospects for long term development
2. Compiling information that can be integrated with the national accounts to optimize use of Botswana’s Natural Capital in the following priority sectors
 - Energy & minerals
 - Land/Ecosystems & tourism
 - Water

The work plan is shown in more detail in annex 1. Below, the policy objectives of WAVES Botswana are summarised. As indicated above, Government prioritised policy objective 3 for the first year of WAVES (2012/13).

Policy Objective 1 - Macro-economic Indicators for better monitoring sustainable development

New macro-economic indicators that integrate natural resource values and that are complementary to existing macroeconomic indicators, are developed to monitor sustainable development—Adjusted Net National Income Adjusted Net Savings and Comprehensive Wealth.

The proposed WAVES Phase 2 activities in Botswana related to this policy objective are:

- *Compiling new macro-economic indicators – Adjusted Net Savings, Adjusted Net National Income and Comprehensive wealth – initially based on World Bank estimates, but gradually incorporating Botswana estimates as data are collected under Components 2-4 of WAVES*
- *Incorporating expanded mineral accounts, energy accounts, land accounts (agriculture and ecosystems) and water accounts compiled under components 2-4 of WAVES.*

Policy Objective 2. Optimizing use of natural capital-- Mining & Energy Sector

Information on the value of sub-soil assets is generated to contribute to medium to long-term policy dialogue on rent recovery, distribution and reinvestment, and to provide the appropriate basis for long-term investment decisions, especially with regard to energy sources.

Information to support decisions regarding the optimal energy path for Botswana.

The proposed WAVES Phase 2 activities in Botswana related to this policy objective are:

- *Develop mineral accounts and assess their prospects for contributing to growth and diversification*
- *Develop energy accounts for the use and supply of energy and the economic costs and benefits of alternative energy paths, taking into account the implications for water and the environment*

Policy Objective 3. Optimizing use of natural capital – Managing Botswana’s scarce water resources

Information to support implementation of the National Water Master Plan and associated water sector reforms, the National Master Plan for Wastewater and Sanitation and the IWRM plan

The proposed WAVES Phase 2 activities in Botswana related to this policy objective are:

- *Development of national and district physical and monetary water accounts, including wastewater and transboundary water resources*
- *analysis of options for improved water efficiency, access to water resources by poor households, and other policy issues associated with water sector reforms*

Policy Objective 4. Optimizing use of natural capital – Management of land & ecosystems

Ecosystem accounting: valuation ecosystems to support optimal management of different land use zones (e.g. Protected Areas, Wildlife management Areas, communal areas, Forest areas)

Tourism: what is the role of tourism for economic growth and diversification? What are strategies for increasing benefits from tourism that accrue to Botswana

The proposed WAVES Phase 2 activities in Botswana related to this policy objective are:

- *Development of ecosystem accounts, physical and monetary, that incorporate values for tourism, agriculture, subsistence use, and other ecosystem services (notably, carbon storage, timber, hydrological services, erosion control and other services) starting with priority (protected) areas and extending to other rural land areas*
- *Development of tourism satellite accounts for both national and spatially-specific tourism values*

5 Water accounting activities (Sept 2012 – March 2013)

The preparation of national-level water use accounts for 2010-2011 started in September and will be completed in June 2013. The Water Accounting (WA) activities of WAVES were divided into two phases:

- a. Phase 1 (September – November 2012): preliminary account construction and analysis and reporting to BEAC;
- b. Phase 2 (December 2012 – June 2013): elaboration of the WA and emphasis on filling the gaps and capacity building at DWA, developing a roadmap for mainstreaming water accounting and updating BEAC on WAVES Botswana activities.

DWA views WA as a major instrument of its new mandate of integrated water resources management. WA are also listed as a key activity in the new Botswana IWRM-WE Plan. The approach for phase 1 has been to:

1. Develop detailed flow accounts for recent years (2010-11 and 2011-12), which will serve as the basis for future accounts, taking into account the on-going water reforms programme. WUC customer data will ultimately be the core of the flow accounts together with water from self-providers;
2. Trend analysis of up-dated existing accounts. Data were collected from water service providers and self providers⁴ for the period 2003-2009 to allow a trend analysis linked to the existing accounts.

Following the presentation to BEAC in November 2012, a detailed work plan for the second phase was prepared by DWA, WUC and CAR. The emphasis of phase 2 shifts towards capacity building and institutionalisation of the accounts at DWA. A road map for institutionalisation will be one of the outputs of phase 2. The road map will set clear targets, deliverables and milestones for institutionalisation during the remainder of the Botswana WAVES partnership project (2012-2015). The work plan for phase 2 is attached as appendix 1. It seeks to hold monthly DWA seminars to build capacity and understanding of WA within DWA, training workshops, updated accounts (2012-3) and improved WA in the areas of irrigation, stock accounts, regionalisation of water use flows linked to ground and surface water sources and costs and revenues of water supply and management. In response, a wide range of poverty eradication initiatives and programmes has been developed including backyard gardening, labour intensive programmes and socio-agricultural support programmes. Water resource concerns need to be fully incorporated into the design and implementation of these programmes, and WA can assist in this respect.

The trend analysis was meant to bridge the gap between the existing (1994 - 2003) and new accounts (2010/11 and 2011/2). The long time series provides long term trends in water flows and use. The main findings are:

- a. Water consumption has increased to around 200 Mm³ per annum (Figure 1). However, the increase has been modest due to increases in productivity (value added/m³) and a decrease in overall per capita water consumption (Figure 2).
- b. Water is most productively used (in terms of value added and formal employment) in the transport, trade, tourism and other service sectors. From a water resource perspective, the economic diversification drive needs to target service industries, transport and tourism with

⁴ Self providers provide their own water, based on water abstraction permits from the Water Apportionment Board. They are mostly mines, livestock farmers and irrigation farmers.

low water use (Figure 3 below). Development of the irrigation sector needs to carefully consider the opportunity costs of water use and encourage water efficient irrigation technologies;

- c. WUC has been successful in recovering operating costs over the last decade largely due to low supply costs compared to revenues. Since 2009 however, operating costs have rapidly grown and exceed revenues in 2011/2. This situation is unsustainable if it persists; the reasons for the decline in performance need further analysis with WUC and DWA in 2013.

Figure 1: Long term trend of fresh water use in Botswana (000 m³)

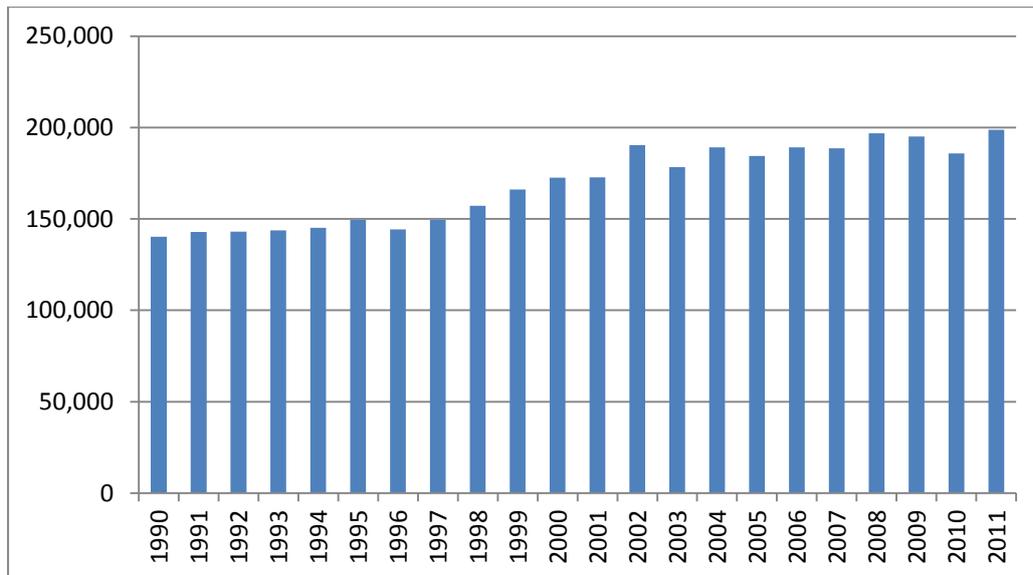
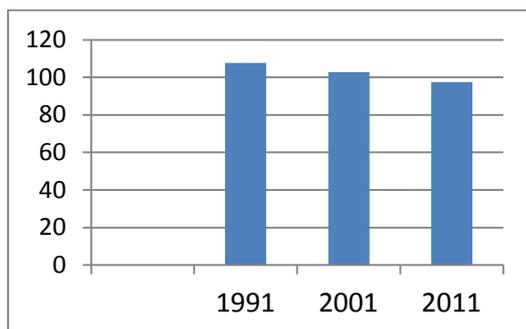


Figure 2: Productivity indicators

Declining per capita water use (1991- 2011)



Increasing value added (m³/const. 2006 Botswana Pula)

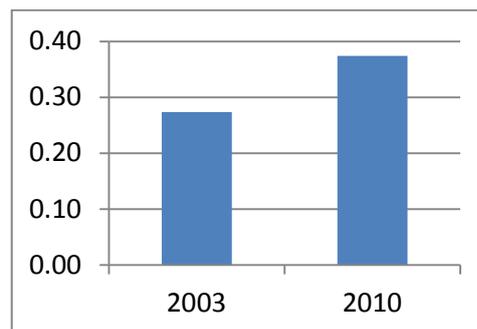


Figure 3: Value added per cubic meter by sector (constant BWP 2006)

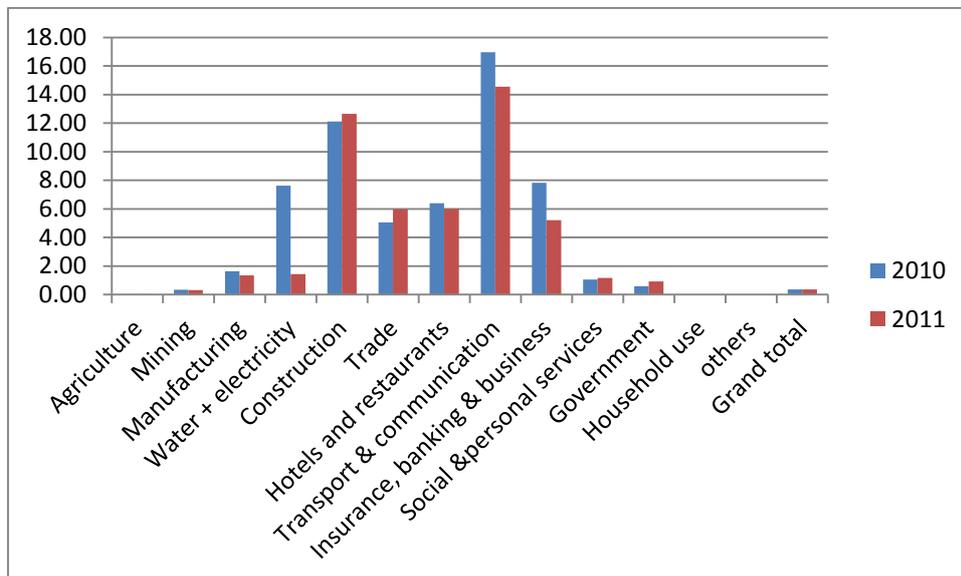
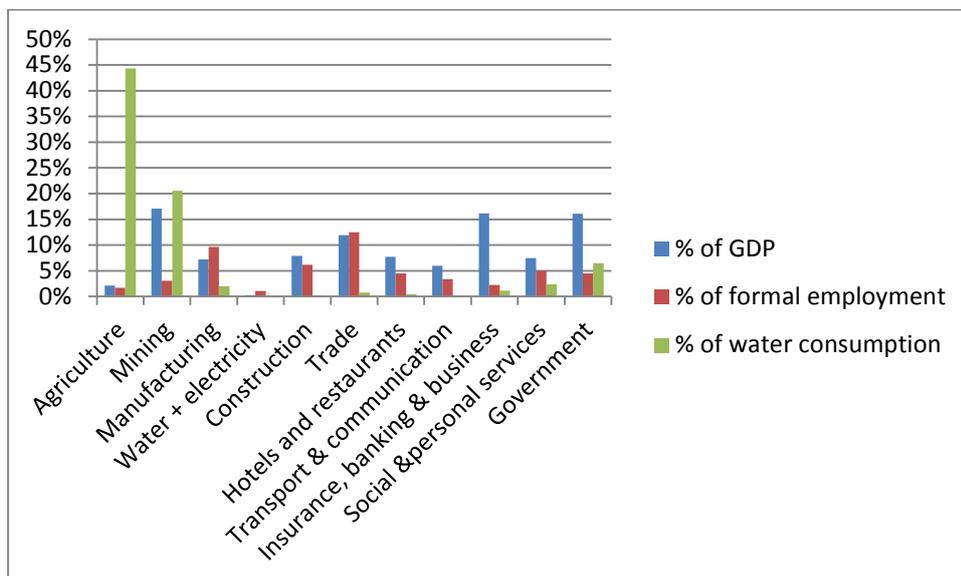


Figure 4: Relative share in GDP, formal employment and water use (2011-2).



The preliminary water accounts have generated several indicators for water as natural capital:

- ✓ Water use efficiency indicators: value added per m³ and employment per m³. The indicators suggest that the value added per unit of water has increased in time;
- ✓ Demand & storage indicators:
 - Per capita water resource use. The per capita use has remained fairly constant despite welfare increased and economic growth;

- Per capita reservoir water storage capacity and annual reservoir resources available
The storage capacity of surface water has more than doubled with the new dams; the sustainable yields of aquifers are not exactly known;
- ✓ Technical and financial performance of water service providers:
 - O& M unit costs and revenues, financial sustainability of water service providers.
 - Water losses; water loss figures are estimated to be around 20 to 22% but significant differences exist between distribution networks. If the poorest performers improve, overall water losses can be reduced to the target of 15%;

Furthermore with better data, agricultural water use can be linked to food and beef production. The current results suggest that Botswana has done well by decreasing per capita water use and increasing value added per m³. The performance of irrigation on food production and security needs to be assessed prior to further development of irrigation.

6 Botswana WAVES Phase 2 Work plan and Budget

The Phase 2 Workplan has been structured around five technical and two cross-cutting components as shown in Annex 1. The total estimated budget for the Phase 2 Workplan is US\$1.7 million.

7 Institutional Arrangements for Implementation of WAVES Phase 2 Workplan

Oversight of the Phase 2 Work plan implementation will be provided by the Botswana WAVES Steering Committee. The Steering Committee will provide high-level supervision and strategic guidance on Phase 2 activities. The World Bank will provide technical support and coordination services to Phase 2 activity implementation.

For the water accounts, a working group has been established chaired by the DPS-MMEWR, with participation of Ministry of Agriculture, Statistics Botswana, Department of Mines and the NSO. Technical working groups with staff from DWA, WUC and Ministry of Agriculture have been established for irrigation, regionalisation of water use and stock accounts. Training activities will promote the understanding of and capability to implement WA. Collaboration has been established with SADC Water to harmonise and coordinate each other's WA activities.

8 Next Steps

The current focus of WAVES activities in Botswana is threefold: (i) contributing to the road map emanating from the African Sustainability Summit and the Rio + 20 Summit; (ii) work on WA activities and development of a road map for full institutionalisation of WA by 2015; (iii) development of priorities for other capital accounting work under the GoB-WB WAVES partnership. Annex 1 shows the original work plan, which will be used as the basis for the identification of further WAVES priorities.

Annex 1: WAVES Phase 2 Activities in Botswana: Summary of Proposed Workplan and Preliminary Budget Estimate.

Policy Objective 1 - Macro-economic Indicators for better monitoring sustainable development

New macro-economic indicators that integrate natural resource values and that are complementary to existing macroeconomic indicators, are developed to monitor sustainable development—Adjusted Net National Income Adjusted Net Savings and Comprehensive Wealth

GDP measures annual income but can't tell us about the prospects for long-term income because it says nothing about the capital assets that underpin national income. For example, while the income from extracting minerals is recorded in national accounts, the simultaneous depletion of minerals is not. Perhaps more importantly, essential ecosystem services provided by ecosystems, such as provision of clean water, are not explicitly recognized in national accounts at all. This can result in quite misleading economic signals about economic growth.

Long term development is a process of accumulation and sound management of a portfolio of assets—manufactured capital, natural capital, and human and social capital. As Nobel Laureate Joseph Stiglitz noted, a private company is judged by both its income and balance sheet, but most countries only compile an income statement (GDP) and know very little about the national balance sheet. Wealth Accounting is a measure of all the assets that support human well-being, intended for use alongside income measures like GDP— GDP indicates if the economy is growing from one year to the next, and Wealth Accounts indicate if that income is sustainable.

The incorporation of mineral resources into the wealth accounting framework is very important in Botswana for several reasons. First, minerals account for a high proportion (30-40%) of GDP. Second, the diamond component of the mining sector is expected to experience a decline in production levels within the next 15-20 years, thus giving sustainability issues a high priority. Third, economic rent constitutes a high proportion of gross output in the diamond industry, thereby making issues around the capturing of rent and the uses to which mineral revenues are put by government particularly important. Botswana has been highly successful in rent capturing in the past and needs to continue this success in future. Even if fiscal systems are quite efficient at capturing rent, and if government is committed to devoting mineral revenues to investment other assets to offset, it is important that such investments are devoted to economically productive assets, if the income generation capacity of the economy is to be sustained once diamond production drops. Finally, even though diamond production is scheduled to drop sharply within a generation, there is the possibility of developing large-scale coal mining in Botswana. This raises resource sustainability issues that are similar in principle, but also a much broader range of environmental sustainability issues.

While mineral accounts have been produced in the past, there has been no attempt to expand and regularly up-date these mineral accounts. There have been attempts by MFDP to incorporate sustainability considerations into public finance decisions over a prolonged period, although this appears to have fallen into disuse in recent years. The macroeconomic indicators compiled under WAVES would initially rely on World Bank estimates, such as those presented in Figure 1. With the compilation of natural capital accounts for Botswana under Components 2-4 of WAVES, the indicators will be revised to incorporate these more accurate and policy relevant accounts.

These new macroeconomic indicators are expected to provide policy input into

- Mid-Term Review of National Development Pan 10
- 2nd Performance Review of Vision 2016
- Design of National Development Pan 11

The proposed WAVES Phase 2 activities in Botswana related to this policy objective are:

- *Compiling new macro-economic indicators – Adjusted Net Savings, Adjusted Net National Income and Comprehensive wealth – initially based on World Bank estimates, but gradually incorporating Botswana estimates as data are collected under Components 2-4 of WAVES*
- *Incorporating expanded mineral accounts, energy accounts, land accounts (agriculture and ecosystems) and water accounts compiled under components 2-4 of WAVES*

Policy Objective 2. Optimizing use of natural capital-- Mining & Energy Sector

Information on the value of sub-soil assets is generated to contribute to medium to long-term policy dialogue on rent recovery, distribution and reinvestment, and to provide the appropriate basis for long-term investment decisions, especially with regard to energy sources.

Information to support decisions regarding the optimal energy path for Botswana.

An important component of Botswana's strategy for growth and diversification is to significantly expand its mining sector beyond diamonds. This raises the issue of extractives-led growth and accounting for depletion discussed under Component 1, as well as issues related to taxation of mining activities to ensure an equitable distribution of revenue between the nation and private investors.

Botswana has a range of minerals like copper, nickel and gold, but the most significant mining issue (after diamonds) is how Botswana's very large coal resources should be managed. In the past, coal has been used for domestic electricity supply, so management of mineral resources is also closely related to Botswana's energy challenges.

Among the most pressing energy issues for Botswana, identified in NDP10, are addressing electricity shortages and reducing dependence on electricity imports. Botswana has rapidly increased its coal-fired electricity capacity, but the provision of electricity requires very large and long-term investment decisions, which have commercial, economic aspects and environmental aspects. Some major decisions have to be taken as to future sources of energy provision, both for domestic consumption and potential exports. Key issues relate to the exploitation of coal resources, coal bed methane (shale gas), solar power, and future use of fuel wood, which is still a major energy source for the rural population. All three have major environmental impacts, with the result that the socio-economic returns to energy investments may be quite different to the financial returns – in other words the public and private returns may be quite different. Given that magnitude and importance of such investment decisions, it is crucial that they are made on the basis of full, appropriate information, including any environmental externalities.

WAVES will ensure that such information on the current use of energy, and the full costs and benefits of alternative energy sources is adequately documented and analysed. This information is expected to provide policy input into

- Mid-Term Review of National Development Plan 10, Energy Policy Objectives
 - reducing dependence on imported energy and increasing domestic generation from coal and solar energy;

- promotion of new and renewable energy sources;
- ensuring that costs reflect externalities such as environmental damage;
- increase the use of biofuels and reduce the use of fuelwood; and
- energy conservation and demand management.
- Report on Economic Diversification Drive Initiative
- Design of National Development Pan 11, Energy Policy

The proposed WAVES Phase 2 activities in Botswana related to this policy objective are:

- Develop mineral accounts and assess their prospects for contributing to growth and diversification
- Develop energy accounts for the use and supply of energy and the economic costs and benefits of alternative energy paths, taking into account the implications for water and the environment

The proposed WAVES Phase 2 activities in Botswana related to this policy objective are:

- Develop mineral accounts and assess their prospects for contributing to growth and diversification
- Develop energy accounts for the use and supply of energy and the economic costs and benefits of alternative energy paths, taking into account the implications for water and the environment

Policy Objective 3. Optimizing use of natural capital – Managing Botswana’s scarce water resources

Information to support implementation of the National Water Master Plan and associated water sector reforms, the National Master Plan for Wastewater and Sanitation and the IWRM plan

As discussed in section 2, Botswana faces severe water constraints that, if not properly managed, threaten to hold back economic growth and development. At least two of the major strategies for economic diversification—expanded mining, especially of coal, and irrigated agriculture—are water intensive, and it is not clear that there is sufficient water in the right places to support all these activities, as well as a growing population. Furthermore, some of the major potential sources of water come from sensitive ecosystems, like the Okavango Delta, which support a high-value tourism industry, also targeted as a key sector for diversified economic growth. Botswana has also introduced significant water sector reforms, privatizing water supply under full-cost recovery with uncertain impacts on access to water by the poor.

Recognizing that careful water management is essential to support growth and diversification, the main new mandate of the Department of Water Affairs is integrated water resources management (IWRM). Economic assessment of water use and supply, and improved water efficiency are major goals of IWRM, and water accounting can provide a tool to support these goals. That includes coordination of sectoral activities, careful assessment of the economic tradeoffs among competing users, and incentives for water efficiency is needed to ensure that water is used most efficiently to support economic growth.

Botswana has piloted water accounting in the past, but lack of capacity has prevented institutionalisation. Under the water sector reforms, an economic unit within the Department of Water Affairs has been mandated which, when fully staffed, can support water accounting. WAVES can assist in the development of that capacity.

WAVES contribute to:

- Support to the new DWA mandate under the National Water Resources Management Reform
- Input to the new draft Water Policy
- Input to the discussion about the National Water Tariff
- Mid-Term Review of National Development Plan 10, Water Policy Objectives
- Design of National Development Plan 11, Water Policy

The proposed WAVES Phase 2 activities in Botswana related to this policy objective are:

- *Development of national and district physical and monetary water accounts, including wastewater and transboundary water resources*
- *analysis of options for improved water efficiency, access to water resources by poor households, and other policy issues associated with water sector reforms*

Policy Objective 4. Optimizing use of natural capital – Management of land & ecosystems

Ecosystem accounting: valuation ecosystems to support optimal management of different land use zones (e.g. Protected Areas, Wildlife management Areas, communal areas, Forest areas)

Tourism: what is the role of tourism for economic growth and diversification? What are strategies for increasing benefits from tourism that accrue to Botswana

Botswana has four major ecosystems that are under various forms of protection and form the basis of its high-value tourism industry. Previous studies of one of these areas, the Okavango Delta, showed that tourism was the major source of income, but that the Okavango also supported other activities including some commercial agriculture and subsistence use as well as other ecosystem services such as carbon storage and groundwater recharge. A recent study of the Makgadikgadi wetland showed a similar range of services, with lower tourism value because the tourism potential has not yet been fully developed.

The loss of ecosystem services affects the potential for economic growth and diversification as well as poverty eradication efforts. It is therefore important that the values of the most important ecosystems are estimated and understood in decisions about management.

Tourism has grown over the years to become a major contributor to GDP as well as an important source of employment, and tourism has been targeted as a sector with potential for expansion to support economic growth and diversification. However, tourism's perceived contribution to local livelihoods has been limited, and most of the rural population is still employed in (mainly subsistence) agriculture, which provides a social safety net. Yet, agricultural land productivity is low and has been stagnant for decades while other land uses, notably tourism, have a higher productivity and growth potential if properly developed. There is great potential to expand the tourism sector by increasing natural areas managed for tourism. But to contribute to Botswana's development objectives, local participation in, and economic benefits from, tourism must also be increased.

Optimizing land use is critical for future economic growth and rural development, but the information to assess the economic potential for multiple land use, the distribution of benefits to different stakeholders, and how best to balance tradeoffs among different uses is currently lacking. Land and ecosystem accounts will contribute the tools to make such assessments. Tourism accounts will play an important role in this work because they are currently inadequate and poorly linked to macro-economic data. Compiling tourism satellite accounts will not only contribute to better land and ecosystem management, but will also contribute to monitoring Botswana's growth with diversification strategy, and improve data for **the** national accounts and the balance of payments.

WAVES will begin by constructing accounts for ecosystems where some valuation has already been carried out, and support economic valuation and accounting for additional ecosystems, notably the Chobe region and surrounding land area. The Land and ecosystem accounting activities will eventually be extended to all rural land.

The proposed WAVES Phase 2 activities in Botswana related to this policy objective are:

- Development of ecosystem accounts, physical and monetary, that incorporate values for tourism, agriculture, subsistence use, and other ecosystem services (notably, carbon storage, timber, hydrological services, erosion control and other services) starting with priority (protected) areas and extending to other rural land areas*
- Development of tourism satellite accounts for both national and spatially-specific tourism values*

Details of activities and the associated budget are shown below.

Timeframe	Activities		Preliminary Budget Estimate (USD)
<p>Objective 1 –Macro-economic indicators: Is Botswana on a growth path that is sustainable, is growth really long-term growth? Construct indicators "Beyond GDP"-- Adjusted Net National Income (ANNI), Adjusted Net Savings (ANS), comprehensive Wealth,-initially building on estimates by the World Bank Contributes to MDR of NDP 10, EDD, Poverty Alleviation Strategy, NDP11, and Vision 2016.</p>			
Short term (Year 1: 2012/13)	<ul style="list-style-type: none"> Improvement of World Bank estimates for macro-economic indicators (ANS, ANNI & comprehensive wealth) based on i) more accurate values for some mineral & energy asset accounts, and ii) incorporation of estimates for partial land accounts using existing valuation studies for Okavango and Makgadikgadi 	Lead agency: MFDP, MMEWA & Statistics Botswana; Other contributors: Chamber of Mines; UB, SB, BIDPA, etc.	200,000
Medium term (Years 2 & 3: 2013/14 – 2014/15)	<ul style="list-style-type: none"> Continued improvement of macro-economic indicators based on expansion of mineral and energy accounts, and inputs from Components 3 and 4 for land accounts (more information ecosystems and agricultural land). 	Lead agency: MFDP, MMEWA & Statistics Botswana; Other contributors: Chamber of Mines; UB, SB, BIDPA, etc.	
Long term (Year 4+: 2015/6+)	<ul style="list-style-type: none"> Continued revision of macro-economic indicators (based on Year 4 results) including water sector accounts 	Lead agency: MFDP, MMEWA & Statistics Botswana; Other contributors: Chamber of Mines; UB, SB, BIDPA, etc.	
<p>Objective 2 – Mining, Energy, Economic Growth and Diversification Construct mineral accounts to ensure comprehensive inputs to macro-economic indicators. Construct energy accounts to assess optimal energy mix for Botswana. What is the best use of Botswana’s coal-is it a strategy for diversification? Renewable energy policy contributes to MTR-NDP10, NDP11, EDD, other-energy strategy, Coal Roadmap, etc.</p>			
Short term (Year 1: 2012/13)	<ul style="list-style-type: none"> Collect and document mineral resources data Develop mineral accounts framework Collect and document baseline energy resources data Develop Energy accounts Framework 	Lead agencies: Dept of Energy Affairs; Mineral Affairs Division; Chamber of Mines Other contributors: BPC, SB, BOTEC/RIPCO, UB. MFDP	152,000
Medium term (Years 2 & 3: 2013/14 – 2014/15)	<ul style="list-style-type: none"> Identify and analyse long term pricing and (env) economic issues of different energy sources, as an input to decisions on energy sourcing, conservation and optimisation. Ensure that full range of mineral accounts data is provided to enable production of revised and expanded macro-economic indicators. 	Lead agencies: Dept of Energy Affairs; Mineral Affairs Division; Chamber of Mines Other contributors: BPC, SB, BOTEC/RIPCO, UB. MFDP	

Timeframe	Activities		Preliminary Budget Estimate (USD)
<i>Long term (Year 4+: 2015/6+)</i>	<ul style="list-style-type: none"> Continued data collection and improvement of Mineral Accounts Continued data collection and improvement of Energy Accounts 	Lead agencies: Dept of Energy Affairs; Mineral Affairs Division; Chamber of Mines Other contributors: BPC, SB, BOTEC/RIPCO, UB, MFDP	
Objective 3 - Managing water resources to support long term growth, diversification and poverty eradication <i>Construct Water Accounts to support full integration of water resource management concerns in development planning</i> <i>Contribute to NWMP Review implementation, National Water Tariff discussion, poverty eradication strategies, IWRM-WE Strategy implementation, Water sector reforms, EDD and MTR and NDP11 process</i>			
<i>Short term (Year 1: 2012/13)</i>	<ul style="list-style-type: none"> Identify IWRM priorities and DWA needs Develop a Water Accounts framework (revision of existing water accounts, reflecting the SEEAW and water sector reforms) 	Lead agency: DWA Other contributors: WUC, DEA, SB, MMEWA, KCS, GWP-Botswana, UB	180 000
<i>Medium term (Years 2 & 3: 2013/14 – 2014/15)</i>	<ul style="list-style-type: none"> Begin data collection, water account construction and policy analysis to provide inputs to Water Sector Reform, NWMP Review, and other policy initiatives 	Lead agency: DWA Other contributors: WUC, DEA, SB, MMEWA, KCS, GWP-Botswana, UB	
<i>Long term (Year 4+: 2015/6+)</i>	<ul style="list-style-type: none"> Expanded and improved Water Accounts based on revised policy and IWRM priorities and data 	Lead agency: DWA Other contributors: WUC, DEA, SB, MMEWA, KCS, GWP-Botswana, UB	
Objective 4 – Ecosystem/land accounts--how can proper management of ecosystems contribute to long term growth, diversification and poverty alleviation? <i>Contribution to EDD, NDP11, poverty eradication efforts, tourism & agricultural diversification & growth</i>			
<i>Short term (Year 1: 2012/13)</i>	<ul style="list-style-type: none"> Review previous ecosystem studies (Okavango and Makgadikgadi) to assess data gaps Design input to BioChobe study for economic valuation and ecosystem accounting Review frameworks for comprehensive land and ecosystem accounting Review previous tourism satellite accounts and design framework for expanded tourism surveys 	Lead agency: Dep. Of Tourism, DEA, DTRP Other contributors: BoB, DFRR, UB, KCS, tourism organizations, SB, MFDP	636 000
<i>Medium term (Years 2 & 3: 2013/14 – 2014/15)</i>	<ul style="list-style-type: none"> Carry out valuation of ecosystem services in the Chobe area National tourism surveys—contribute to ongoing surveys and conduct supplementary WAVES survey (tourist expenditures and tourist enterprises) 	Lead agency: Dep. Of Tourism, DEA, DTRP Other contributors: BoB, DFRR, UB,	

Timeframe	Activities		Preliminary Budget Estimate (USD)
	<ul style="list-style-type: none"> Design comprehensive framework for land and ecosystem accounts, biophysical and monetary, beyond the four major ecosystems 	KCS, tourism organizations, SB, MFDP	
<i>Long term (Year 4+: 2015/6+)</i>	<ul style="list-style-type: none"> Develop comprehensive, national land and ecosystem accounts, biophysical and monetary (incorporating values from ecosystem studies and additional land) 	Lead agency: Dep. Of Tourism, DEA, DTRP Other contributors: BoB, DFRR, UB, KCS, tourism organizations, SB, MFDP	
<i>Cross-cutting Activity 1: General Capacity Building</i>			
<i>Years 1 – 4</i>	<ul style="list-style-type: none"> Technical training for Statistics Botswana, MFDP, line ministries, partner private sectors groups like Chamber of Mines and Water Utilities Corporation and other groups in data collection and accounts development and maintenance Awareness raising throughout Government and civil society General training on interpretation and use of WAVES outcomes – central and decentralized levels 	Lead agency: DEA or MFDP-PEI	200 000 (spec. capacity building under separate objectives)
<i>Cross-cutting Activity 2: Project Management</i>			
<i>Years 1 – 4</i>	<ul style="list-style-type: none"> Technical coordination and management 		320,000
TOTAL			1,688,000