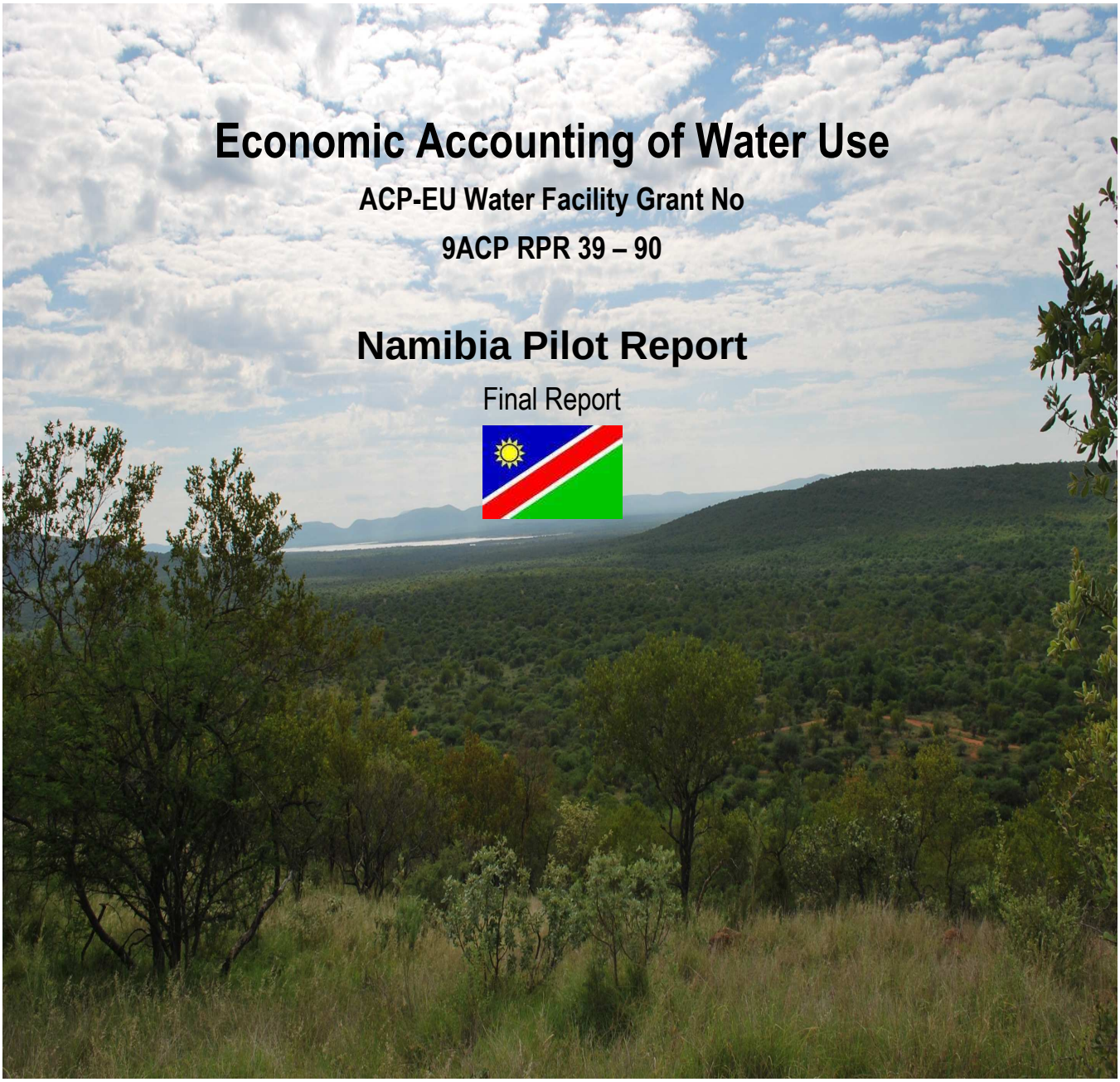
European Development Fund



Economic Accounting of Water Use

ACP-EU Water Facility Grant No

9ACP RPR 39 – 90

Namibia Pilot Report

Final Report

September 2010

Commissioned by: Federal Ministry for Economic Cooperation and Development

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Global Water Partnership Southern Africa

SADC Economic Accounting of Water Use Project

Namibia Pilot Report

Produced by the project consultant Egis Bceom International

This pilot was financed 75% by the European Union and 25% by the Global Water Partnership-Southern Africa

SOUTHERN AFRICAN DEVELOPMENT COMMUNITY

EUROPEAN DEVELOPMENT FUND

ECONOMIC ACCOUNTING OF WATER USE PROJECT

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Namibia

PILOT REPORT

FINAL

Prepared For SADC

by

Dr Gift Manase

Egis Beceom International

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Executive Summary

The overarching objective of the pilot in Namibia was to see if the proposed methodologies for economic accounting for water are applicable given the institutional arrangements and data availability situation in the country and use the lessons learnt to further improve the methodologies. The results show that economic accounting for water is relevant to the policy priorities of Namibia. Actually the country has institutionalised water accounting and has been producing water accounts since 1995.

Analysis of these data clearly shows the importance of Agriculture in Namibia. Agriculture uses 71% of water and accounts for 31% of employment and 12% of GDP (see fig 1). Results of the pilot have also demonstrated how valuation methodologies can be used to calculate the costs of poor water supply and sanitation - Namibia is losing US$86.73 million or 1.2% of GDP every year due to sickness, absenteeism, and low productivity associated with diarrhoea caused by poor water supply and sanitation (see Table 1).

In terms of institutional arrangements, Namibia has the DWA as the institution responsible for the construction of water accounts. However, awareness rising at higher level and capacity building of new staff in the Department is required.

In terms of data availability, results of the pilot show that Namibia has substantial data and with further analysis and processing the country can easily compile water asset and physical supply and use accounts using the methodologies proposed by the consultant. Windhoek City has substantial information on wastewater and could make a good case study of wastewater and pollutants accounts.

The main conclusion is that Namibia has substantial data which can be used to compile water accounts. The major constraint is that this data is not in a format that can readily be used for the compilation of water accounts. The approach adopted by the DWA to develop questionnaires that ask for data that can readily be used for the compilation of water accounts is therefore highly commendable. The consultant worked with the department to produce questionnaire for agriculture and mining.

The following are the key lessons learnt during the pilot:-

- Economic accounting for water is a new topic to many water professionals (including economists) therefore awareness raising and advocacy should precede any EAW project. A succinct introduction of the concept of EAW in simple terms is critical (e.g. economic accounting for water allows for the measurement of the contribution of water to the economy and the impact of economic activities on water resources through abstraction, wastewater and pollution). Indicators that are generated from EAW such as water productivity, water use intensity etc. should be linked to the problems facing the stakeholders
- Economic accounting for water should be driven by the government otherwise donor driven pilots are not sustainable and results rarely influence policy
- The country may have to take a step-by-step approach to implementing EAW starting with developing appropriate data collection tools as is the approach in Namibia
- Exchange visit that allow countries to learn from each other are both a source of inspiration and learning platform

The following are the main recommendations of this report:-

- The consultant will have to adjust data that is required in the asset account to reflect the importance of ephemeral rivers
- SADC should assist the DWA through awareness raising at high level and capacity building of staff responsible for economic accounting of water in Namibia
- A case study should be commissioned to pilot wastewater and pollutant accounts in Namibia

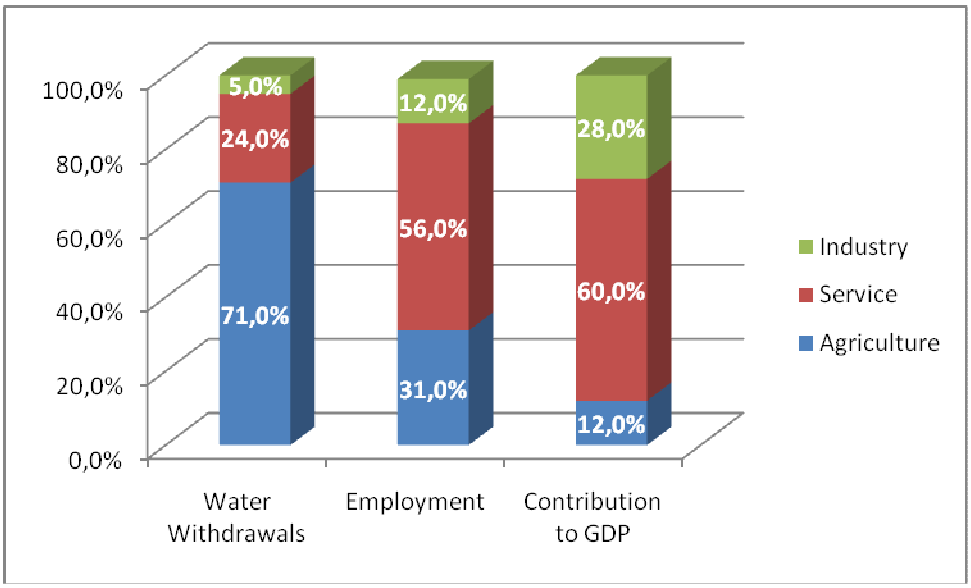

Figure 1 Water Use and Contribution to employment and GDP

Table 1 The direct and indirect costs poor water supply and sanitation in SADC

	SADC		Pilot Countries							
			Malawi		Mauritius		Namibia		Zambia	
	Water	**Sanitation**	**Water**	**Sanitation**	**Water**	**Sanitation**	**Water**	**Sanitation**	**Water**	**Sanitation**
Population without access to improved service (2005)	98165000	153910000	3528000	6239480	8000	109290	241000	1383030	4959000	6186430
Cost of poor water supply and sanitation per capita (US$)	26.59	58.08	26.59	58.08	26.59	58.08	26.59	58.08	26.59	58.08
Total Losses (Million US$)	**2610.21**	**8939.09**	**93.81**	**362.39**	**0.21**	**6.35**	**6.41**	**80.33**	**131.86**	**359.31**
Grand Total (Million US$)	**11549.30**		**456.20**		**6.56**		**86.73**		**491.17**	
% of GDP	**3.26%**		**16.64%**		**0.10%**		**1.20%**		**6.84%**	

Source: Author's calculated from WHO 2010 data

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Acronyms

CSO	Central Statistical Office
EAW	Economic Accounts for Water
EAWU	Economic Accounting for Water Use
GDP	Gross Domestic Product
GWP-SA	Global Water Partnership Southern Africa
IWRM	Integrated Water Resources Management
MDGs	Millennium Development Goals
MS	Member State
NTT	National Task Team
PSC	Project Steering Committee
PSUT	Physical Supply and Use Table
RBO	River Basin Organisation
SADC	Southern African Development Community
SEEA	System of Integrated Environmental and Economic Accounting
SEEAW	System of Integrated Environmental and Economic Accounting for Water
SNA	System of National Accounts
UNSD	United Nations Statistics Division
WB	World Bank

1. Introduction

Namibia's long term development policy 'Vision 2030' recognises lack of readily available freshwater in the interior of the country as the *"most important limiting factor for development"* (NPC, 2004). The Vision 2030 has a vision on water which states that "Namibia's freshwater resources are kept free of pollution and are used to support social well-being, support economic development, and to maintain natural habitats". Namibia's Third National Development Plan also recognises the importance of water and has specific targets on access to portable water as well as specific targets for the water subsector to effectively support economic development (NPC, 2008).

Namibia is one of the three countries in SADC that has compiled Water Accounts (WA). Construction of water accounts in Namibia began in 1995 under the Natural Resource Accounting Program (MAWF, 2006). This program was initiated by the Ministry of Environment and Tourism in cooperation with the Department of Water Affairs (DWA) in the Ministry of Agriculture, Water and Forestry (MAWF). The first accounts were produced for 1993 and included both stocks and flow accounts, although data was limited (MAWF, 2006). The main aim of these initial accounts was to demonstrate that it was possible to compile water accounts and that water accounts could provide useful indicators for policy-makers (MAWF, 2006). However, these initial accounts were limited by lack of data and relied much on estimates. Since then there have been a number of development that have made it easy to construct water accounts and have resulted in increased demand for water accounts by policy makers. The Water Resources Management Act (Act 24 of 2004) clearly calls for economic accounting for water as a way of enhancing an economic approach to water management.

1.1 Water Resources

Namibia is the driest country in SADC subjected to frequent droughts and without perennial rivers within its borders (Lange, 1997). Ground water is the most important source of water accounting for 38% of annual freshwater use in 2000. The remaining 61% is fairly evenly split between ephemeral and perennial surface water sources. Recycled water accounts for less than 1% of Namibia's annual water use, but is an important source of water in some urban areas such as Windhoek city where between 13 and 30% of water supply is recycled water (MAWF, 2006). The recently commissioned desalination plant is expected to provide significant amount of water to the coastal part of Namibia. Sea water is also an important source in Namibia with large amounts ($68Mm^3$) used annually in diamond mining.

1.2 Water and the economy

As alluded to above, water is the most important limiting factor for development in Namibia (NPC, 2004). The Northern perennial and seasonal rivers of Namibia provide livelihoods to approximately half of the country's population. It is not surprising therefore that Namibia's Vision 2030 has a vision on water which states that "Namibia's freshwater resources are kept free of pollution and are used to support social well-being, support economic development, and to maintain natural habitats". Namibia's Third National Development Plan also recognises the importance of water and has specific targets on access to portable water as well as specific targets for the water subsector to effectively support economic development (NPC, 2008). Namibia commissioned a Water Demand Management study (van der Merwe et al. 2001) based on case studies of selected sectors and an economic assessment of water demand management as an alternative source of water supply. The results clearly indicated to the need link water use with national water policy through water accounts (Lange and Hassan, 2006).

1.3 About this report

Namibia is the driest country in SADC subjected to frequent droughts and without perennial rivers within its borders (Lange, 1997). The country has long since recognised the need for an economic approach to management of water resources and has institutionalised economic accounting for water. Vision 2030, the long-term development plan for Namibia clearly calls for water accounts to guide policy on future water use and to protect the resource and the country has been producing water accounts since 1995. However, the water accounts are not closely linked to the National Economy (System of National Accounts) and methods differ in some respects to those recommended by the United Nations Statistics Division and those applied in South Africa and Botswana. This report explores the applicability of the standardised methodologies developed by the consultant in Namibia. The report has six main sections. After this introduction, the following section (section 2) gives an overview of the SADC project on Economic Accounting for Water Use. This is followed in section 3 by an introduction to economic accounting for water - its importance, principles and definitions. Section 4 presents the objectives and methodology of the pilot in Malawi. Section 5 presents the results of the pilot. The report concludes in Section 6 with lessons, conclusions and recommendations.

2. Overview of the SADC Project on "Economic Accounting of Water Use"

2.1 Rationale

Water has always played, and continues to play a critical role in sustainable economic growth and development. It is an input in almost all production processes and a prerequisite for reducing poverty. Yet its value and importance is often not fully appreciated by policy makers, economic planners and the general public. However, with increasing water scarcity due to population increase, urbanisation and associated changes in life style, growing demand from economic sectors, rainfall variability, low investment in storage infrastructure, and deteriorating water quality, SADC Member States are increasingly recognising the importance of water in economic and social development and the need to value the resource at its true economic value. Efforts are being made to better link water and national economies as illustrated by the inclusion of Millennium Development Goal (MDG) targets on water supply in national strategies; the integration of water in National Poverty Alleviation Strategies (PRSs) in Malawi, Mozambique, Tanzania and Zambia; and the launch of a National Framework on "Water for Growth and Development" in South Africa. Under the guidance of the Global Water Partnership Southern Africa (GWP-SA) and the Development Bank of Southern Africa (DBSA), SADC Member States are also developing IWRM implementation plans and Water Demand Management (WDM) strategies, respectively. At the River Basin level, efforts are being expended to apply economic tools to inform water allocation and benefit sharing strategies.

However, for these efforts to be efficient and effective they need to be based, in part, on comprehensive frameworks that link water to the economy such as the system of environmental and economic accounting for water. In addition, the IWRM plans, WDM and benefit sharing strategies need to be based on a solid understating of the economic value of water and apply prudent tools such as economic accounting of water and tools for trans-boundary benefit sharing. At the moment the data on water resource and water use are collected independently and used by different institutions and are rarely integrated into national economic accounts (Lange and Hassan, 2006). The dynamics of water, growth and poverty is not yet fully understood in the region (notably among staff in the Ministries of Finance and Economic Planning); consequently the role of water in spurring and supporting economic and social development is not given the attention it deserves and investment in water infrastructure, institutions and services is low. The economic value of water, the role water plays in economic growth and social development, and the direct and indirect costs related to inaction need to be imparted to policy makers so that water is elevated in policy at all levels; district, national, basin and SADC.

2.2 Project Context

In 1995, a Natural Resource Accounting (NRA) Program was initiated in East and Southern Africa to assess the economic value of natural resources and their use for economic activities, and a major focus has been on constructing water accounts. Since then attempts have been made to compile and use water resources accounts for many policy and management purposes. The first formal effort to construct water resource accounts was initiated under the Natural Resource Accounting in Southern Africa (NRASA project) in 2000, which produced comprehensive national physical and monetary water accounts for 1991/1992-1998/1999.

The NRASA project, implemented through the University of Pretoria and New York State University, was funded by the United State Agency for International Development Region Centre for Southern Africa (RCSA) and focused on Botswana, Namibia and South Africa. This project supported Phase II of natural resource accounting activities in the region during 1998-2001, following a pilot phase that covered only Namibia (funded by the Swedish International Development Agency (SIDA)).

The SADC Economic Accounting of Water Use Project is part of the Regional Strategic Action Plan (RSAP) on Integrated Water Resources Management and Development. It is being implemented under the framework of the Regional Water Policy (RWP) and Regional Water Strategy (RWS), which guiding documents are aimed at facilitating the implementation of the Regional Indicative Strategic Development Plan (RISDP), the blue print of the SADC's development initiatives. The project is essentially a component of project number RWR 4 (Support for Strategic and Integrated Water Resources Planning), as classified in the revised RSAP which was approved by the Integrated Committee of Ministers (ICM) in 2005.

The project is financed by the ACP-EU Water Facility. The European Commission (EC) undertook to finance a maximum of 75% of the estimated total eligible costs. The British and German Governments (through GTZ) agreed to provide 25% contribution, to specifically fund activities of a capacity building nature, regional stakeholder workshops and Project Steering Committee (PSC) meetings. This is in the context of GTZ's role in the SADC water sector and its work with the SADC Water Division under the "Transboundary Water Management in SADC Programme", which is aimed at strengthening the human and institutional capacities for sustainable management of water resources in accordance with the Regional Strategic Action Plan (RSAP) in the SADC region and its transboundary river basins.

The project consists of several components some of which will include all SADC Member States while others will be piloted in a selected few Member States and river basins. EGIS Bceom International was awarded the contract to implement this project over a period of 11 months (November 2009 – September 2010). The main task of EGIS Bceom was to develop and pilot standardized methodologies for the construction of water use accounts, undertake capacity building of Member States' staff and develop training programmes/materials for use by water resources management institutions. The project was implemented under the strategic guidance of the PSC, and supervised by the Water Division on behalf of the SADC Secretariat.

2.3 Project Objectives

2.3.1 Overall Objective

The project's strategic objective is to promote the appropriate valuing of the water resource and its use in SADC Member States, building the necessary capacity to undertake the activity and, help promote optimal water use and allocation, and strategic investments in the water sector.

2.3.2 Purpose

To develop and pilot standardised methodologies for compiling water accounts and to develop training materials and conduct workshops to build the capacity of MS and RB institutions.

2.4 Results

The project will yield the following two main priority results:

Result 1: Standardised methodologies for constructing water use accounts developed; and

Result 2: Increased capacity to implement economic accounting among national water resources management institutions.

3. Introduction to Economic Accounting for Water

Water plays a critical role in economic growth, social development and ensuring environmental sustainability. Increasing competition for fresh water among different users and uses coupled with climate change and variability puts unprecedented pressure on water resources. The situation is further aggravated by deteriorating water quality. Since water is critical for the economy there is need to integrate hydrological and economic information. Only by integrating information on the economy and hydrology can integrated policies be designed in an informed and integrated manner. Policy makers taking decisions on water need to be aware of the likely consequences for the economy and vice versa (UNSD, 2006).

Economic Accounting for Water (EAW) describes the interaction between water resources and the economy. The objective of EAW is to standardize concepts and methods in water accounting. "*It provides a conceptual framework for organising economic and hydrological information permitting a consistent analysis of the contribution of water to the economy and the impact of the economy on water resources"* (UNSD, 2006). EAW is a satellite account of the System of National Accounts (SNA) which is the statistical standard used for the compilation of national economic statistics such as Gross Domestic Product (GDP). Therefore, EAW has similar structure to the SNA and share common definitions and classifications. EAW is outstanding in that it directly link water data to the economic accounts through a shared structure, set of definitions and classifications. Thus EAW is a tool for integrating water-economic analysis and overcomes the tendency to analyse economic and water issues independently. Furthermore, EAW covers all the important water-economic interactions, a feature that makes it ideal for addressing cross-sectoral issues such as integrated water resources management. It is not possible to promote IWRM from the narrow perspective of managing water resources; rather a broader approach that encompasses economic, social and ecosystem aspects is needed. Since water accounts are constructed as satellite accounts for National Accounts, they are linked to a full range of economic activities with a comprehensive classification of water resources.

Economic Accounting for Water presents the following information:-

i. Stocks and flows of water resources within the environment
ii. Pressures of the economy on the environment in terms of water abstraction and effluent added to wastewater and released to the environment
iii. The supply of water and its use as an input in the production process and by households
iv. The reuse of water in the economy
v. The costs of collection, purification, distribution and treatment of water, as well as the service charges paid by the users
vi. The financing of these costs, that is, who is paying for the water supply and sanitation services
vii. The payments of permits for access to abstract water or to use it as sink for discharge of wastewater
viii. The hydraulic stock in place, as well as investments in hydraulic infrastructure during the accounting period

EAW also presents quality accounts, which describe water resources in terms of their quality. However, quality accounts together with economic valuation of water resources are still experimental and no standardised guidelines have been developed yet (UNSD, 2006).

EAW is an important tool for policy makers as it provides them with:-

i. Indicators and descriptive statistics to monitor the interaction between the environment and the economy, and progress towards meeting environmental goals
ii. A database for strategic planning and policy analysis to identify more sustainable development paths and the appropriate policy instruments for achieving them.

EAW can be compiled at any level of spatial disaggregation - a river basin, catchment or city. However, it is important to note that economic accounts are generally not compiled at the river basin level thus making the link between hydrological and economic information difficult.

EAW has the following six categories of water accounts:

- Physical supply and use accounts (water resource data on water supply and discharge)
- Wastewater and Pollutant Accounts (records of pollution discharged to water by an economic unit)
- Hybrid and economic accounts (physical and monetary data on water supply and use)
- Asset accounts (stock of water resources at the opening and close of the accounting period)
- Quality Accounts (stock of water in terms of its quality)
- Valuation of water resources

3.1 The Framework for Economic Accounting for Water

EAW provides an integrated information system to study the interaction between the environment and the economy. The Framework for the System of Environmental - Economic Account for Water developed by the UNSD is presented diagrammatically in Figure 3.1. It shows the flow of water from the environment to the economy, within the economy and from the economy back to the environment (brown arrows in Fig. 3.1). The upper part of Fig. 3 shows **inland water resources** of a country or river basin which include rivers, lakes, groundwater, soil water, and artificial reservoirs and natural flows between them. These resources form the water assets. The main natural inputs of water for these resources are precipitation and inflows from other territories and from other resources within the territory. The main natural flows that decrease stock of water are evapotranspiration, outflows to other water resources within the territory and to other territories. Human activities decrease and increase the water stock through abstraction and returns.

The lower half of Figure 3.1 shows the economy which is one of the many users of water. The economy of a territory consists of households and the various economic sectors (agriculture, mining, manufacturing, etc.). These water users abstract water for production and consumption purposes and put in place the infrastructure to store, treat, distribute and discharge water back to the environment.

The inland water resource system and the economy of a given country, catchment or river basin can exchange water with those of other territories through **imports/exports** of water (exchange between economies, South Africa and Lesotho for e.g.) and though inflows from upstream territories and out flows to downstream territories (exchanges of water between inland water systems). Figure 3.1 also show exchanges with the sea and the atmosphere which are considered outside the inland water system.

After using water, the economy returns it to the environment through return flows either to inland water bodies or directly to the sea. Usually, return flows have a negative impact on water quality as the quality of water in return flow is often lower than that of abstracted water.

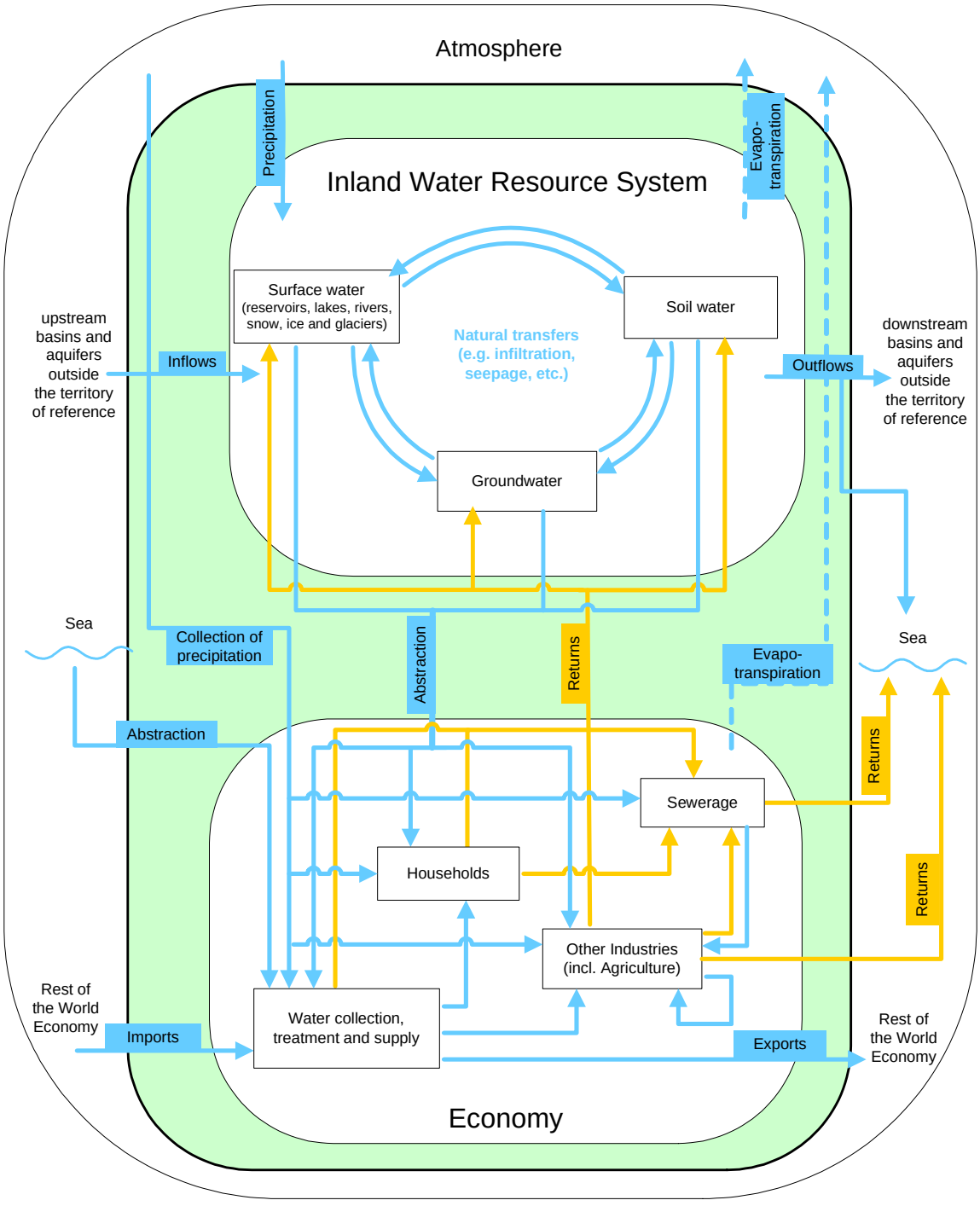
Figure 3.1 shows the flow of the inland water resource system and the economy and the water flows captured by water accounts. For simplicity, Figure 3.1 does not capture all exchanges within the economy which are included in economic accounts of water. Additional information which is not illustrated in the diagram but captured in water accounts include:-

- Monetary transactions related to water exchanges including: (a) costs of collection, treatment and supply of water and costs of sanitation services; (b) fees and taxes paid for water and sanitation services; (c) payments for access to the resource (e.g. water permits) as well as for discharging wastewater; and (d) the financing of these services (i.e. the sectors bearing the costs of services);
- Costs for environmental protection and resource management. They describe the economy's efforts to prevent environmental degradation or eliminate part, or all, of the effects after pollution. They include actual expenses incurred (current and capital) by industries, households and the government as well as the financing of these expenditures;
- Investment in infrastructure. They describe (a) the costs of new investment; (b) the depreciation of old investment; (c) the costs of maintaining the water-related infrastructure; and (d) the financing of these investments;
- The discharge of pollutants into the environment. They allow for the identification of pressure on the environment by the various economic agents, namely industries, households and the government.

Each economic unit either abstracts water directly from the environment or receives it from other industries. Once water enters the economic unit, it is used, returned back to the environment or supplied to other industries for use (reused water), or supplied to a treatment facility (sewerage in Figure 3.1). In addition, during use or transportation, water can be lost through leakages or processes of evaporation and evapotranspiration.

During use, some water may be retained in the product produced by the industry or evapotranspirated. In these cases, water is *"consumed"* by the industry. The word consumption in this context refers to water that is not returned to the environment and is different from water *use* which denotes water that is received by an industry or household.

Figure 3.1 Main flows within the environment and the economy



3.2 Types of Water Accounts

Economic Accounting for Water consists of flow accounts, asset accounts and valuation of water which are described briefly below.

3.2.1 Flow Accounts

Flow accounts describe the movement of water between the environment and the economy as well as within the economy. They provide information on the contribution of water to the economy and the pressure exerted by the economy on water resources in terms of abstraction and pollution.

3.2.1.1 Physical supply and use Account (SUT)

The physical supply table describe the flows of water within the economy (e.g. from water utility to households) and flows from the economy to the environment (discharge of sewage to water bodies). The physical use table describes flows of water from the environment to the economy (water abstraction by water utility) and flows within the economy (e.g. water received from another industry).

3.2.1.2 Wastewater and pollutant Accounts

Wastewater and pollutant accounts provide information by industry, households and government on the amount of pollutants added to wastewater which is either discharged into the environment (with or without treatment) or discharged into a sewage network.

3.2.1.3 Hybrid Accounts

Hybrid accounts present, in a consistent manner, physical and monetary information on the supply and use of water by juxtaposing the standard (monetary) National account supply and use tables with the corresponding physical tables. The monetary part of the hybrid supply and use table explicitly identifies water-related products and industries. These accounts provide a comprehensive picture of the economics of water and can be used to derive indicators such as the productivity of water in the various economic sectors.

Monetary accounts for government expenditure on water-related activities as well as hybrid accounts for the collection, treatment and supply of water as well as sewerage provide information on government expenditures related to water supply and sanitation, the contribution of water-related activities to the economy, and the financing of the water sector.

One outcome of the compilation of economic accounts for water is the construction of the financing table, which allows for the identification of the units which bear the costs of production of water supply and sanitation services and of those which receive transfers from other economic units, government and donors (UNSD, 2006).

3.3. Asset Accounts

Asset accounts measure stock of water resources at the beginning and end of the accounting period as well as changes in stock that occurs during that period. Asset accounts for water can be divided into two components: produced asset which are man-made infrastructure for storage and distribution of water and natural water resources.

3.3.1 Produced Assets

These include infrastructure put in place to abstract, distribute, treat and discharge water. Produced asset for water are already included in the national accounts as fixed assets; hence they are implicitly included as part of the core national accounts. However, this information is generally highly aggregated and at national level – special surveys may be necessary to separately identify those fixed assets that related to water.

Changes in the value of these stock of assets during the accounting period are explained by changes due to transactions in the item in question (acquisitions or disposals of non-financial assets; consumption of fixed capital), changes in the volume of the asset that are not due to transactions (e.g. discoveries of assets or recognition of their value; the unanticipated destruction of assets; changes in classification etc.), and changes in price. Accounts for produced assets for water are very crucial since they provide information on the level of investment in water infrastructure and thus the ability of the country to mobilise and treat water.

3.3.2 Natural Water Resources

The describe the volume of water in its various asset categories, at the beginning and end of the accounting period and all the changes therein due to natural causes (precipitation, evapotranspiration, inflows, outflows etc.) and human activities (i.e. abstraction and discharge). The asset boundary for water resources includes, in principle, all inland water bodies (rivers, lakes, artificial reservoirs, glaciers, snow and ice) groundwater and soil water. In practice it is difficult to compile asset accounts for all these categories.

3.3.3 Quality Accounts

These measures asset in terms of their quality. They describe stocks of water at the beginning and end of an accounting period according to their quality.

3.4 Valuation of water

In SADC water is usually not traded in the market or its economic value is distorted due to subsidies. Valuation of water presents economic techniques for determining the value of water beyond the tariffs paid by households or for irrigation water. Various techniques for valuing water are presented in section 5.

3.4.1 Water Accounting at River basin (spatial and temporal references)

Economic accounting for water can provide data for water management at many geographic levels, from the local catchment, to national, to the river basin levels. The choice of the spatial reference for the compilation of water accounts ultimately depends on the data needed by users (e.g. decision-makers, analysts and researchers) and the resources available to data producers.

Water resources are not evenly distributed in time and space. Within SADC variability can be seen in the difference between arid regions of Namibia where almost no precipitation falls and humid regions of DRC Congo where several metres of rain can fall yearly. Even at a smaller spatial scale, there can be a great variability in the availability of water: within the same river basin there can be areas subject to water scarcity while others are subject to flooding. The temporal distribution of water resources depends on the characteristics of the water cycle. There is in fact a rain cycle for which periods of high rainfall alternate with dry periods, for example, on a yearly basis, dry summer months are followed by wet winter months. The frequency of the water cycle varies with climatic regions and the inter-annual variability can be significant.

Since water accounts consist of integrating hydrological information with economic information which is compiled according to the SNA and uses as spatial reference the country or administrative regions, and as a temporal reference the accounting year and in some cases smaller temporal references (such as quarterly accounts), some issues in the reconciliation of the temporal and spatial reference of the two sets of data arise.

In general, priority should be given to the spatial and temporal reference of the conventional economic accounts. The main reason being that it is easier to adapt the reference of hydrologic information to that of the conventional economic accounts, as hydrological data are often available at a more disaggregated spatial and temporal level than economic data. As a second principle, in order to allow for meaningful comparisons through time, the spatial and temporal references of the accounts should not be changed.

3.4.1.1 Spatial References

The choice of the spatial reference for the compilation of the accounts ultimately depends on the objectives of the analysis. The compilation of national water accounts is important for designing and evaluating macro-economic water policy. However, to reflect better spatial differences in the water use, supply, pressure on water resources and to make decision on water allocation between different users, it is often more appropriate to use a finer spatial reference.

The water accounting framework can in principle be compiled at any level of geographical disaggregation of a territory. The options are usually to compile the accounts either at the level of administrative regions, river basins or accounting catchments.

An **administrative region** is a geographic area designated by the provincial government for administrative purposes. Administrative regions are usually responsible for certain economic policies within their jurisdiction and regional economic accounts are usually compiled for administrative regions.

A **river basin** is a naturally defined region which is drained by a river or stream. It is internationally recognized that the river basin is the most appropriate unit of reference for Integrated Water Resource Management: Agenda 21 (UNCED) and the SADC Protocol on Shared watercourses call for the adoption of water management plans at river basin level. Water management can in fact be more effectively pursued at the river basin level since all water resources, including groundwater, within a river basin are inextricably linked to each other both in terms of quantity and quality. In this way, managers are able to gain a more complete understanding of overall conditions in an area and the factors which affect those conditions. For example, emissions from a sewage treatment plant might be reduced significantly, and yet the local river and groundwater may still suffer if other factors in the river basin, such as polluted runoff from upstream emissions, go unaddressed.

As there are often large spatial differences in terms of availability and use of water resources between different river basins of a country, especially in “water stressed” countries, the use of national averages is not always sufficient for sound policy decisions at the local level. Policy analyses for each main national “basin area” (a homogeneous basin area formed by the association of contiguous river basins) are generally required. In addition, the compilation of the accounts by local basin data providers for their water management needs is generally essential to sustain their involvement in the water accounting process. River basin organisations have been established in SADC.

While the compilation of physical water accounts at river basin can be easily done (as river basin organisations generally collect physical data at river basin level), the compilation of monetary water accounts at river basin requires extra work to reconcile the spatial reference of economic information (such as output, value added etc.) which is only available at administrative region. Some countries have experimented in developing accounts at river basin level based on regional economic accounts.

Depending on the characteristics of the administrative regions and river basins in a country, it may be useful to define regions for the compilation of water accounts for which both economic and physical data are more easily available. Such regions, which are referred to as **accounting catchments**, would be composed by river basins or sub-basins and large enough so that economic information is available. An accounting catchment could consist, for example, of an administrative region and be composed by several river basins or it could be composed by several administrative regions to cover a whole river basin.

4. Piloting Economic Accounting for Water in Namibia

The draft methodologies for economic accounting for water which were developed by the consultant, Egis Bceom International were presented at the first regional workshop organised by SADC which took place on 24-25 February, 2010, Gaborone, Botswana. Input and guidance received during this workshop was used to further improve the methodologies. After this, the methodologies were then piloted in four Member States and two River Basins as follows:-

Member States included in the pilots

- Malawi
- Mauritius
- Namibia
- Zambia

River Basins included in the pilots

- Maputo
- Orange-Senqu

4.1 Objectives of the Pilot

The overarching objective of the pilot in Namibia was to see if the proposed methodologies for economic accounting for water are applicable given the institutional arrangements and data availability situation in the country and use the lessons learnt to further improve the methodologies.

4.1.1 Specific Objectives

The specific objectives of the pilot in Namibia were slightly different from other pilot countries. Namibia has been constructing water accounts since 1995 and the country had initiated a national process to collect data moving sector by sector starting with the mining sector. The SADC project was therefore streamlined with this national process and the specific objectives in Namibia were to:-

- Raise awareness on economic accounting for water among national stakeholders
- Work with the DWA to develop appropriate data collection instruments
- Use data from previous water accounts to test the applicability of the methodology developed by the consultant

4.2 Activities

The pilot in Namibia included the following main activities:-

- Consultations with the Project Steering Committee Member for Namibia, Ms Florence Sibanda, Deputy Director, Ministry of Agriculture, Water and Forestry
- Country visits by the consultant to hold meetings with the PSC national representative and Stakeholders, raise awareness as well as to collect data

4.2.1 Consultation with the PSC

The consultant engaged with the PSC national representative through both email and phone calls in order to get an overview of the institutional arrangements in the water sector and to identify possible sources of data required for the compilation of water accounts. The PSC representative emphasised the need for the SADC project to be streamlined with the on-going national initiative on economic accounting for water. Namibia is improving its water accounts by collecting data focusing one sector at a time starting with the mining sector. Therefore it was felt the approach applied in other countries i.e. formation of National Task Team and recruitment of data collectors through the SADC –GWP partnership, was not appropriate. The consultant worked with the DWA to support the national initiative.

4.2.2 Country visits

The consultant visited Namibia in February and March, 2010. During this visit the consultant met the PSC national representative and other stakeholders that included the DWA, Windhoek City Council, Windhoek Bulk Water Services, Namwater, Chamber of Mines; and irrigation and law and administration departments of DWA. The consultant also collected economic and policy documents, DWA publication and data from Windhoek City Council.

4.3 Findings from the Pilot

This section presents results of the pilot based mainly on information collected by the consultant and input received during discussions with the PSC.

4.4 Relevancy of the developed methodologies

4.4.1 Relevancy to Policy priorities

The methodologies developed by the consultant for economic accounting for water are generally relevant to the policy priorities of Namibia. Actually Namibia has institutionalised economic accounting for water under the DWA. Namibia's Water Resources Management Act (2004) calls for the need to treat water as an economic good and to recognise the economic value of the resources (Principle 3(h)). Vision 2030, the long-term development plan for Namibia clearly calls for water accounts to guide policy on future water use and to protect the resource.

4.4.2 Institutional Arrangements for the adoption of economic accounting for water

The DWA is specifically responsible for the construction water accounts in Namibia and has produced water accounts for 1997-98 through 2001-2002, which are currently being updated through 2003-2004. However, awareness raising on the importance of water accounts is required at higher levels to ensure that staff responsible for the compilation of water get the necessary support. There is also a great need for capacity building to equip the new staff responsible for water accounts with the necessary skills.

4.5 Data requirements for economic accounting for water

Economic accounting for water is relatively data intensive and requires disaggregated data. This section assesses whether or not the methodologies developed by the consultant suit the data availability situation in Namibia. The data requirements for each of the five accounts are presented in turn in the following sections and contrasted with information currently collected in Namibia.

4.5.1 Water Asset Accounts

Namibia is the driest country in SADC and is very important to quantify its water resources (stocks) and to use them efficiently, in a sustainable manner, and utilise them more strategically to support economic growth and poverty alleviation. Given the mounting water supply costs, it is equally important for the country to know the stock and state of its water infrastructure for storage, treatment and distribution of water. A water asset account describes the stocks of water resources at the beginning and end of an accounting period and the changes in stocks that have occurred during that period.

Water resource assets are defined as water found in fresh and brackish surface and groundwater bodies within the national territory that provide direct use benefits, now or in the future (option benefits), through the provision of raw material, and may be subject to quantitative depletion through human use. In economic accounting for water, water resources consist of the following categories:

EA.131 Surface water

EA.1311 Artificial reservoirs

EA.1312 Lakes

EA.1313 Rivers and streams (including ephemeral rivers)

EA.132 Groundwater

EA.133 Soil water

Ephemeral rivers are very important in Namibia and the consultant has included this specific category in the standardised methodologies for economic accounting in SADC. A water asset account describes the stocks of water resources listed above and their changes during a period of time. A water asset account presents the following:-

- Opening and closing stocks which are the stocks level at the beginning and end of the period of time;
- Increases in stocks which include those due to human activities (i.e. returns) and natural causes (e.g. inflows, precipitation); and
- Decreases in stocks which include those due to human activities (i.e. abstraction) and natural causes (e.g. evaporation/evapotranspiration, outflows etc.).

An example of a water asset account is presented in Table 6.1 In terms of data availability, Namibia has most of the data that is required to compile a water asset account. The major constrain at the moment is that the data is not in the form that can be readily used to complete Table 4.1. Figure 4.1 shows the format in which data from Namibia is currently presented. The advantage is that the methodology proposed by the consultant and that used by Namibia are both based on the SEEAW. Namibia tried to use a simplify form of SEEAW but in the process the link to the National Accounts was weakened. However, with further analysis data from Namibia can be used to complete the tables proposed by the consultant.

Table 4.1 Asset accounts

Millions cubic metres

	EA.131 Surface water				EA.132 Groundwater	EA.133 Rain-fed Agric	Total
	EA.1311 Artificial Reservoirs	EA.1312 Lakes	EA.1313 Rivers	Ephemeral			
1. Opening Stocks							
Increases in stocks							
2. Returns from the economy							
3. Precipitation							
4. Inflows							
4.a. from upstream territories							
4.b. from other resources in the territory							
Decreases in stocks							
5. Abstraction							
6. Evaporation/Actual evapotranspiration							
7. Outflows							
7.a to downstream territories							
7.b to the sea							
7.c to other resources in the territory							
8. Other changes in volume							
9. Closing Stocks							

Table 4.1: Volume of Water Stored in Dams (Mm^3 as at the First Week in April)

	Content															
Dam	Apr-88	Apr-89	Apr-90	Apr-91	Apr-92	Apr-93	Apr-94	Apr-95	Apr-96	Apr-97	Apr-98	Apr-99	Apr-00	Apr-01	Apr-02	Apr-03
Dreihuk	1.63	0.66	0.06		0.23	0.00	2.74	0.63	0.63	1.71	0.44	0.42	2.75	0.64	0.21	0.00
Friedenau	5.67	4.85	6.74	6.56	5.60	5.90	4.97	3.71	4.43	5.88	4.56	5.60	6.93	5.21	5.28	4.56
Hardap	237.00	232.4 5	144.51	115.90	58.17	83.04	98.35	68.67	82.94	288.60	199.77	179.18	281.27	185.53	261.51	162.06
Naute	85.92	78.44	74.12	78.01	64.80	74.86	72.30	51.23	49.79	90.17	80.30	60.15	84.74	75.15	81.42	55.71
Oanob			2.76	7.25	4.19	26.94	18.80	14.02	10.86	34.29	29.99	26.41	37.31	26.41	25.38	18.05
Olushandja				10.63	14.30	13.24	13.64	14.88	8.56	22.67	24.67	22.67	24.67	23.65	21.54	26.37
Omdel						0.39				11.67	2.49	0.00	17.64	4.38	0.00	0.00
Omatako	23.10	24.82	24.57	34.81	3.88	17.03	42.57	4.78		40.41	5.79	3.00	44.15	4.61	1.15	1.16
Otjivero Main	7.87	6.45	5.25	2.96	2.50	0.24	0.50	0.00	0.16	8.77	7.10	5.72	5.13	5.35	3.12	1.19
Otjivero Silt	6.76	3.60	0.27	2.26	0.00	0.17	0.02	0.00	0.05	4.65	0.49	1.41	3.21	0.14	0.17	0.06
Swakoppoort	67.47	66.37	57.18	44.04	32.50	36.52	31.63	22.43	13.36	48.97	36.92	24.92	44.16	33.10	38.65	24.21
Von Bach	36.67	44.20	25.24	17.44	15.14	10.50	20.22	17.45	5.58	24.63	30.07	20.72	27.17	34.32	25.97	14.27
Avis	0.16	0.02	0.01		0.00	0.01	0.09	0.04	0.09	1.79	1.30	0.98	1.54	0.91	0.69	0.27
Bondels					0.00	0.01	0.71	0.00	0.25	0.39	0.00	0.09	0.11	0.05	0.00	0.00
Daan Viljoen	0.23	0.26	0.19	0.30	0.00	0.22	0.13	0.00	0.00	0.36	0.00	0.00	0.23	0.02	0.19	0.01
Goreangab	3.88	2.49	3.32	2.00	2.70	2.77	4.14	2.51	3.84	4.10	1.29	3.11	3.75	3.37	3.58	1.69
Omatjenne			0.05		0.00	0.20	0.00	0.00		2.24	0.00	0.00	2.59	0.00	0.00	0.00
Tilda Viljoen	0.45	0.65	0.25	1.11	0.27	0.99	0.60	0.00	0.17	1.22	0.96	0.38	0.55	0.32	0.44	0.25
TOTAL	476.8	465.3	344.5	323.3	204.3	273.0	311.4	200.3	180.7	592.5	426.1	354.7	587.9	403.2	469.3	309.9

Table 3.6 Annual run-off of perennial rivers in Namibia, 1980–2001 (million m^3)

	Kavango	Kunene	Orange	Zambezi	Kwando	Total
1980	3 513	1 561	3 583	40 153	1 732	50 542
1981	5 164	1 980	3 308	36 290	923	47 665
1982	4 651	2 868	1 125	26 048	837	35 529
1983	6 699	7 565	1 592	22 532	870	39 257
1984	6 975	7 307	932	24 528	880	40 622
1985	4 409	8 094	2 200	26 666	913	42 281
1986	5 049	4 338	2 731	35 559	929	48 607
1987	3 881	3 684	21 885	26 419	787	56 657
1988	6 225	5 333	10 897	38 550	1 026	62 030
1989	4 335	3 624	2 415	40 048	1 064	51 485
1990	4 654	5 474	3 534	25 706	795	40 163
1991	5 376	6 362	2 800	24 775	661	39 974
1992	4 066	3 340	2 529	17 845	785	28 565
1993	3 349	2 201	1 445	38 406	844	46 245
1994	2 403	4 686	647	17 844	585	26 165
1995	3 405	2 974	8 201	15 492	473	30 546
1996	2 928	2 156	10 480	15 142	523	31 228
1997	4 036	3 584	5 650	30 301	480	44 050
1998	4 351	4 770	1 800	38 229	517	49 668
1999	5 378	5 424	7 006	32 126	650	50 584
2000	4 383	6 666	4 654	37 430	*	53 132
2001	5 954	7 521	14 180	NA	*	
Long-term average	5 201	5 005	5 659	38 038	814	53 904

Figure 4.1 Presentation of Namibia's water accounts

4.5.2 Physical water supply and use tables

Physical water supply and use tables (SUT) describe water flows, in physical units, within the economy and between the environment and the economy. These accounts follow water from its initial abstraction from the environment by the economy, its supply and use within the economy, to its final discharge back to the environment, all expressed in quantitative terms.

(a) *Flows from the environment to the economy*

Flows from the environment to the economy involve the abstraction/removal of water from the environment by economic units in the country for production and consumption activities. In particular, water is abstracted from the inland water resource system (rivers, dams and ground water).

Water is abstracted either to be used by the same economic unit which abstracts it (in which case, we refer to it as *abstraction for own use*) or to be supplied, possibly after some treatment, to other economic units (*abstraction for distribution*). The industry which abstracts, treats and supplies water as a principal activity is classified under class 36 of ISIC Rev. 4, *Water collection, treatment and supply*. In Malawi, water boards and CU are classified under this category. There may be, however, other industries such as mines which abstract and supply water as a secondary activity.

(b) Flows within the economy

Flows within the economy involve water exchanges between economic units. These exchanges are usually carried out through mains (pipes), but other means of transporting water are not excluded.

(c) Flows from the economy back into the environment

Flows from the economy back to the environment consist of discharges of water by the economy into the environment (residual flows). Thus the supplier is the economic agent responsible for the discharge (industries, households and rest of the world) and the destination (user) of these flows is the environment.

Flows from the economy to the environment are described in accounting terms in the supply table as a supply of an economic unit to the environment. Each entry represents the amount of water generated by an economic unit and discharged into the environment (*returns* or *return flows*).

Tables 4.2 and 4.3 below show the Physical Supply and Use Table. The breakdown of the economic activities, classified according to ISIC Rev.4, distinguishes the following groups:

- ISIC 1-3 which includes Agriculture, Forestry and Fishing;
- ISIC 5-33, 41-43 which includes: Mining and quarrying, Manufacturing and Construction;
- ISIC 35 - Electricity, gas, steam and air conditioning supply;
- ISIC 36 - Water collection, treatment and supply;
- ISIC 37 - Sewerage;
- ISIC 38, 39, 45-99, which corresponds to the Service industries.

Table 4.2 Physical use table

Million m3

		Industries (by ISIC categories)										Households	Rest of the world	Total
		1-3 Agriculture				5-33, 41-43	35	36	37	38,39, 45-99	Total			
		Irrigation	Livestock	Forestry	Fisheries									
From the environment	**1. Total abstraction** (=1.a+1.b=1.i+1.ii)													
	1.a. Abstraction for own use													
	1.b. Abstraction for distribution													
	1.i. From water resources:													
	1.i.1 Surface water													
	1.i.2 Groundwater													
	1.i.3 Rain-Fed Agriculture													
	1.ii. From other sources													
	1.ii.1 Collection of precipitation													
	1.ii.2 Abstraction from the sea													
Within the economy	**2. Use of water received from other economic units**													
3. Total use of water (=1 + 2)														

Table 4.3 Physical supply table

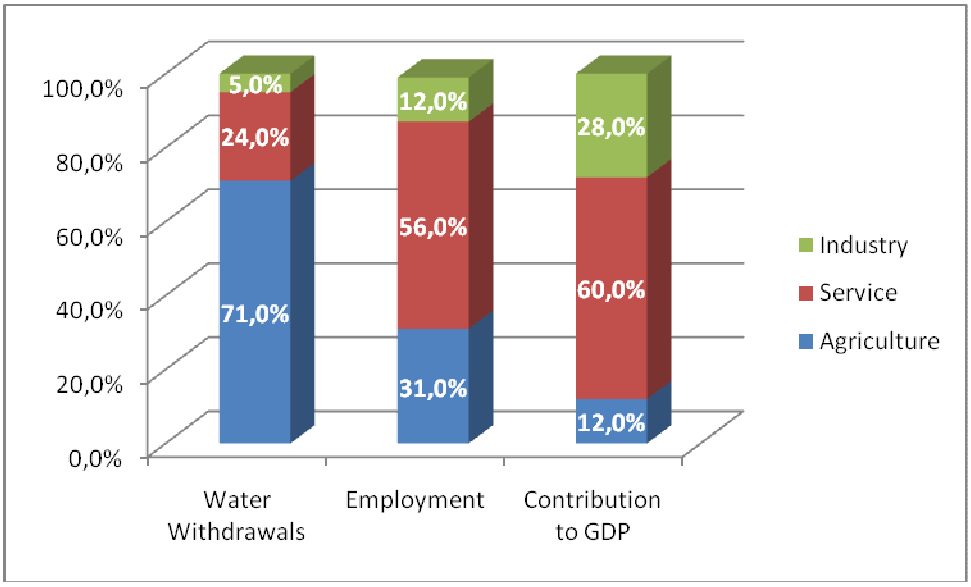
Million m3

		Industries (by ISIC categories)										Households	Rest of the world	Total
		1-3 Agriculture				5-33, 41-43	35	36	37	38,39, 45-99	Total			
		Irrigation	Livestock	Forestry	Fisheries									
Within the economy	**4. Supply of water to other economic units**													
	of which:													
	4.a. Reused water													
	4.b. Wastewater to sewerage													
To the environment	**5. Total returns** (=5.a+5.b)													
	Losses in distribution due to leakages													
	5.a. To water resources													
	5.a.1. Surface water													
	5.a.2. Groundwater													
	5.a.3. Soil water													
	5.b. To other sources (e.g. sea water)													
6.Total supply of water (=4+5)														
Consumption (=3-6)														
of which														
7a. Losses in distribution														

From the documents collected by the consultant and discussion with the PSC most of the information on water abstraction and supply can be obtained from the DWA, Windhoek City, and Namwater. However, further analysis will be required to complete the supply and use tables developed by the consultant. The major weakness with data from Namibia is that it does not link directly water abstraction by source and by economic unit. For example, we would like to know the amount of water Abstracted by Namwater from dams, ground water, and rivers.

In order to analyse water use by sector in Namibia, the year 2000 was used as the base year for the pilot due to information availability and also to allow for comparison with other pilot countries. Analysis of these data clearly shows the importance of Agriculture in Namibia. Agriculture uses 71% of water and accounts for 31% of employment and 12% of GDP (see fig 4.2).

Figure 4.2 Water and contribution to the economy and employment (2000)



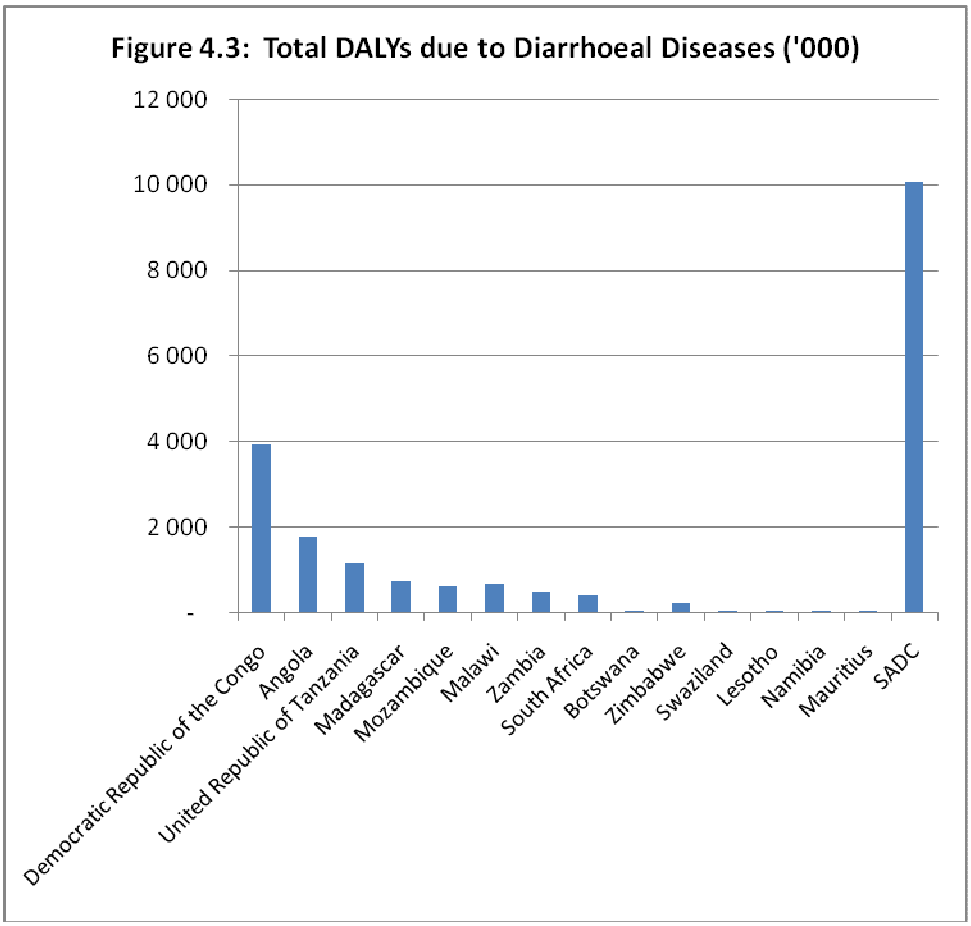
4.5.3 Other water accounts

Information for the compilation of the other three accounts hybrid; wastewater and pollutant; and water quality is generally not readily available. For hybrid and economic accounts information on value added for each sector is readily available from the Central Bureau of Statistics and Ministry of Finance. However, data on stock of water and sewerage infrastructure and gross fixed capital formation is generally not readily available.

There is potential for piloting comprehensive wastewater and pollutant accounts in Namibia. During the meeting with Windhoek City Council Bulk Water Serves (BWS) it emerged that they collect disaggregated information on wastewater generated by the different industries. However, substantial processing of the data will be required before it can be used for wastewater and pollutant accounts. This could be a good case study to demonstrate wastewater and pollutant accounts in SADC.

4.5.4 Determining the true economic value of water

Namibia has done a lot to ensure that tariffs reflect the true economic value of water and is one of the leading countries in SADC in terms of application of economic principles in the management of water. Water is sanitation coverage is relatively high compared to other SADC countries and the country losses only 6000 Disability Adjusted Life Years (DALYs)[1] due to diarrhoeal diseases related to poor water supply and sanitation. The DALYs for Namibia and other SADC Member States are presented in Figure 4.3.



Statistics on access to safe drinking water together with the concept of Disability Adjusted Life Years (DALYs) can be used to estimate the cost of time spent fetching water and the costs of outbreaks of water-borne diseases. 241000 Namibians do not have access to safe drinking water while about 1.4 million do not have access to sanitation. Low access is still considered a social problem and is seen as a result, rather than a cause, of economic growth in most SADC countries. Few governments and households identify poor access to safe drinking water as an impediment to economic growth. Indeed, without information on the link between water supply and economic development, it is hardly surprising that water supply is sidelined and investment in the sector is low.

[1] The Disability Adjusted Life Year or DALY is a health gap measure that extends the concept of potential years of life lost due to premature death (PYLL) to include equivalent years of 'healthy' life lost by virtue of being in states of poor health or disability (1). The DALY combines in one measure the time lived with disability and the time lost due to premature mortality. One DALY can be thought of as one lost year of 'healthy' life and the burden of disease as a measurement of the gap between current health status and an ideal situation where everyone lives into old age free of disease and disability.

The Millennium Project Taskforce (WHO, 2000) recognised the crucial links between water and sanitation and other aspects of development and states that “increasing access to domestic water supply and sanitation services and improving water resources management are catalytic entry points for efforts to help developing countries fight poverty and hunger, safeguard human health, reduce child mortality, promote gender equality, and manage and protect natural resources. In addition, sufficient water for washing and safe, private sanitation facilities are central to the basic right of every human being for personal dignity and self-respect”.

The WHO has developed a methodology that quantifies in economic terms the costs of poor water supply and sanitation. Table 4.5 shows the benefits of improved water supply. Namibia falls in AFR-E region of the WHO and the estimated costs per capita of poor water supply and sanitation are US$26.59 and US$58.08 respectively. Given that in 2005, 241000 and 1383030 Namibians did not have access to water and sanitation, respectively, then a simple calculation shows that the country is losing about US$6.4 million due to poor water supply and US$80.33 due to poor sanitation. This gives a total of US$86.73 million or 1.2% of GDP per year that is lost due to poor water supply and sanitation (See table 4.6).

Table 4.5 Values of Economic Benefits

Benefit by Sector	Variable	Data Source	Data value (+ range)
Health Sector			
Direct expenditures avoided, due to less illness from Diarrhoeal diseases	Unit cost per treatment No. of cases	WHO	US$4.3-US$9.7 per visit
Patients			
Direct costs avoided	e.g. Transport	WHO estimate	US$0.50 per visit
Income gain	days off work/episode	Expert opinion	2 days (1-4)
Absenteeism avoided	absent days/episode	Expert opinion	3 (1-5)
Productive parent days lost	Days sick	Expert opinion	5 (3-7)
Value of lost life	Opportunity cost of time	World Bank Data	Min wage (GNP per capita -Value added in manufacturing)
	Discounted productive years lost (0-4 yrs)	WASH study	16.2 (9.5-29.1)
	Discounted productive years lost (5-14yrs)	WASH study	21.9 years (15.2-33.8)
	Discounted productive years (15+ yrs)	WASH study	19 years (16.3 - 22.7)
	Opportunity cost of time	World Bank Data	Min wage (GNP per capita -Value added in manufacturing)
Households			
Convenience - time savings	water collection time saved per HH/dy for better external access	Expert opinion	0.5hrs (0.25-1.0)
	Water collection time saved per HH/dy for piped water inside	Expert opinion	1.5hrs (1.0-2.0)
	Sanitation access time saved	Expert opinion	0.5hrs (0.25-o.75)
	Opportunity cost of time	World Bank Data	Min wage (GNP per capita -Value added in manufacturing)

Table 4.6 The direct and indirect costs poor water supply and sanitation in SADC

	SADC		Pilot Countries							
			Malawi		Mauritius		Namibia		Zambia	
	Water	**Sanitation**	**Water**	**Sanitation**	**Water**	**Sanitation**	**Water**	**Sanitation**	**Water**	**Sanitation**
Population without access to improved service (2005)	98165000	153910000	3528000	6239480	8000	109290	241000	1383030	4959000	6186430
Cost of poor water supply and sanitation per capita (US$)	26.59	58.08	26.59	58.08	26.59	58.08	26.59	58.08	26.59	58.08
Total Losses (Million US$)	**2610.21**	**8939.09**	**93.81**	**362.39**	**0.21**	**6.35**	**6.41**	**80.33**	**131.86**	**359.31**
Grand Total (Million US$)	**11549.30**		**456.20**		**6.56**		**86.73**		**491.17**	
% of GDP	**3.26%**		**16.64%**		**0.10%**		**1.20%**		**6.84%**	

Source: Author's calculated from WHO 2010 data

5. Conclusion and Recommendations

The overarching objective of the pilot in Namibia was to see if the proposed methodologies for economic accounting for water are applicable given the institutional arrangements and data availability situation in the country and use the lessons learnt to further improve the methodologies. The results show that economic accounting for water is relevant to the policy priorities of Namibia. Actually the country has institutionalised water accounting and has been producing water accounts since 1995.

Results of the pilot have demonstrated how valuation methodologies can be used to calculate the costs of poor water supply and sanitation - Namibia is losing US$86.73 million or 1.2% of GDP every year due to sickness, absenteeism, and low productivity associated with diarrhoea caused by poor water supply and sanitation.

In terms of institutional arrangements, Namibia has the DWA as the institution responsible for the construction of water accounts. However, awareness raising at higher level and capacity building of new staff in the Department is required.

In terms of data availability, results of the pilot show that Namibia has substantial data and with further analysis and process the country can easily compile water asset and physical supply and use accounts using the methodologies proposed by the consultant. Windhoek City has substantial information on wastewater and could make a good case study of wastewater and pollutants accounts.

The main conclusion is that Namibia has substantial data which can be used to compile water accounts. The major constraint is that this data is not in a format that can readily be used for the compilation of water accounts. The approach adopted by the DWA to develop questionnaires that ask for data that can readily be used for the compilation of water accounts is therefore highly commendable. The consultant worked with the department to produce questionnaire for agriculture and mining.

The following are the key lessons learnt during the pilot:-

- Economic accounting for water is a new topic to many water professionals (including economists) therefore awareness raising and advocacy should precede any EAW project. A succinct introduction of the concept of EAW in simple terms is critical (e.g. economic accounting for water allows for the measurement of the contribution of water to the economy and the impact of economic activities on water resources through abstraction, wastewater and pollution). Indicators that are generated from EAW such as water productivity, water use intensity etc. should be linked to the problems facing the stakeholders
- Economic accounting for water should be driven by the government otherwise donor driven pilots are not sustainable and results rarely influence policy
- Country may have to take a step-by-step approach to implementing EAW starting with developing appropriate data collection tools as is the approach in Namibia
- Exchange visit that allow countries to learn from each other are both a source of inspiration and learning platform

The following are the main recommendations of this report:-

- Data that is required in the asset account will have to be adjusted to reflect the importance of ephemeral rivers
- SADC should assist the DWA through awareness raising at high level and capacity building of staff responsible for economic accounting of water in Namibia
- A case study should be commissioned to pilot wastewater and pollutant accounts in Namibia

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