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Development of a Stakeholder Accord on Water Conservation

INTEGRATED REPORT



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EXECUTIVE SUMMARY

Government, Business and Labour recognise that in the face of increasing water scarcity, water conservation is an important strategy towards the achievement of more equitable access to water for all users, and to support economic growth. These stakeholders therefore decided to embark upon the development and implementation of a Stakeholder Accord on Water Conservation (hereafter referred to as the Accord), a voluntary instrument through which they could work together to conserve water in South Africa.

Before developing the Accord, the stakeholders requested a review of the local water resource situation, a perspective on other national sustainability initiatives and a review of similar international initiatives. In addition, a view was sought as to which were the sectors most appropriate for inclusion in the Accord, notwithstanding the fact that the Accord would ultimately be open to all water users outside of the domestic sector. A final element of the project was the development of site-level water use baseline and target setting guidelines, tailored for the water use sectors identified for participation.

The National Water Resource Strategy (2004) was used as the primary source of information for the assessment of surface and groundwater resources and the determination of sectoral water use. Data was also sourced from the Water Authorisation Resource Management System (WARMS) database and from published reports of organisational water use. Municipal water use data, which would have been useful for the assessment of industrial and commercial users serviced by municipalities, proved impossible to obtain due to the lack of a single repository for such data. An analysis conducted by Stats SA, which partitioned 2000 data using ratios derived from an earlier 1995 study, was therefore used to gain insight into the quantities of water consumed by individual water use sectors and sub-sectors. Information on national legislation was obtained from the websites of the relevant government departments, as were data on national strategies. Data on other national initiatives were obtained through the websites of organisations such as the National Cleaner Production Centre and the Worldwide Fund for Nature, as well as print publications such as the Engineering News. Various published research works were also consulted, including material from journals and research papers. Information on international initiatives was obtained through a review of 12 individual initiatives from countries such as Australia, Canada and North America, as well as global multi-country agreements.

As regards the national water resource situation, it was found that South Africa's surface and groundwater resources are scarce and unevenly distributed, and that more than half of the country's 19 Water Management Areas are in deficit. Of particular concern was the fact that a deficit is expected in the Vaal River system by as early as 2013 unless the problems of illegal

water use in agriculture and avoidable water losses in all sectors are addressed. Given that the earliest possible implementation date for the second phase of the Lesotho Highlands Water Project is only in 2019, this increases the possibility of water restrictions in an area responsible for 60% of the national economy and home to 45% of the national population.

Water conservation was found to be an important factor supporting water-related rights enshrined in the Constitution, particularly in terms of its ability to support water provision in an environment of scarcity and the right of everyone to expect the environment to be protected. The National Environmental Management Act (Act No.107 of 1998) was found to support the equitable access to natural resources, one of which is water and the National Environmental Management Act (NEMA) directly supports conservation of these resources and their integrated management. The National Water Act (Act No. 36 of 1998) directly addresses water conservation and equitable access to water, and empowers the state to enforce water conservation measures as deemed necessary. The National Water Resource Strategy (NWRS) derives from the National Water Act (NWA) and introduces the concept of integrated water resource management (IWRM). The NWRS defines IWRM as “a process that promotes the co-ordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems”. The Water Services Act (Act No. 108 of 1997) deals with the rights of access to basic water supply and basic sanitation and has water conservation as a specific objective. Municipalities have a number of powers as regards water conservation and demand management, which may impact on water users, including the institution of conservation measures by users as a condition of supply.

A National Water Conservation and Demand Management Strategy encompassing the Industries, Mining and Power Generation (IMP), Agriculture and Water Services sectors was found to be in place under the auspices of the Department of Water Affairs. The strategy was found to have been distilled further into sector-level strategies, with each of these providing an overview of the individual sector concerned. A weakness of these strategies was found to be the absence of the tactics that would be employed by Government in driving water conservation in each sector. Since the National Water Conservation and Demand Management Strategy derives from the NWRS, and the NWRS is close to being reviewed, there will be opportunity to correct this weakness shortly. The concept of a Stakeholder Accord on Water Conservation was found to be aligned to other national sustainability initiatives such as the National Framework for Sustainable Development (NFSD) and the Millennium Development Goals, the requirement to half the number of people in need of drinking water and sanitation provision by 2014. The latter has already been achieved, and

hence Government's goal of full water and sanitation provision by 2014 is perhaps of more relevance, and would itself be supported by a successful implementation of the Accord.

It was found that water use efficiency studies have been conducted by the Department of Water Affairs in the Olifants, Inkomati, Upper, Middle and Lower Vaal, Limpopo, Crocodile West/Marico and Levuvhu/Letaba WMA's. These studies had shown wide-ranging differences in the level of implementation of conservation initiatives between and within sectors, but have been primarily focused on the domestic sector. The Water for Growth and Development Framework, Government's view on future water management options, places water conservation high on the agenda, along with diversification of the water mix, the mainstreaming of water in decision-making and changing water use behaviour, particularly in agriculture.

Government's Working for Water programme, aimed at clearing invasive alien plant species and protecting the ecology as well as the reduction of erosion and conservation of water, was initiated in 1995, and to date has cleared roughly one million hectares of alien plants. This initiative is linked to the Worldwide Fund for Nature's Water Neutrality Initiative, where water users make a contribution to clear alien vegetation as a means of offsetting their water use. The South African Breweries Ltd is the founding corporate sponsor of this initiative and has committed the Newlands and Ibhayi breweries to water neutrality.

The Department of Water Affairs was also found to have a Memorandum of Understanding with Eskom, South Africa's biggest industrial water user, through which the two parties agree to work together on water conservation. The MOU, which has an initial term of five years is funded mainly by Eskom. Water use targets are not explicit in the MOU, but Eskom was found to have targets in place for each power station. The MOU makes provision for the completion of a range of projects, each of which would be governed by substantive agreements.

The Energy Efficiency Accord (EEA) was reviewed on the basis that while it did not directly concern water conservation, it is a voluntary initiative involving multiple stakeholders that could hold lessons for the Accord. Participants in the EEA were found to have reduced their energy consumption by up to 38% and energy intensity by up to 23.5% since joining the EEA, and to have made significant investments in energy efficiency totalling R 9.9 billion. A review of the EEA conducted three years after its inception highlighted the following key opportunities for improvement:

- i. Sectoral dynamics i.e. the unique characteristics of each sector should be considered when developing the measurement and verification system adopted in order to reduce measurement complexities;

- ii. Energy efficiency targets for the Accord should be energy-intensity oriented rather than energy oriented, with intermediary timelines to accommodate company expansion and regular monitoring;
- iii. Commitments on clear periodic communication of best practices should be made by both business and Government to create more awareness;
- iv. Commitments should be made on the level of monitoring system required for effective measurement and verification of energy efficiency improvements based on agreed baseline and “business as usual” projections;
- v. A periodic common reporting system should be implemented;
- vi. Clear, verifiable and well-resourced commitments to skills and training development are needed in the revised Accord to ensure effective energy management;
- vii. An action-oriented Government commitment on support for incentives, technology development and transfer and CDM projects facilitation as well as regular progress review are imperative for a revised Accord and;
- viii. Commitments should be made on resources required for implementing and monitoring all the revised Accord’s commitments i.e. a more formalised institutional structure is required.

These issues were considered to be important in developing the Stakeholder Accord on Water Conservation.

At the site-level, common approaches adopted across water use sectors were found to include the use of metering and sub-metering, the consideration of water and energy saving projects in an integrated fashion, the recycling of both treated and untreated wastewater, the reduction of water consumption at point of use and the use of recycled raw materials.

In agriculture, primary water conservation approaches were found to include the maintenance and effective operation of conveyance infrastructure, the use of efficient irrigation systems, the selection of water-efficient crops, irrigation scheduling, mulching and conservation tilling.

In the commercial sector the use of water-efficient plumbing devices was found to be a key approach, along with water-efficient gardening. The use of efficient plumbing devices was found to occur more by default than by design, since most of these devices are imported from markets in which water efficiency is regulated. Grey-water recycling and black-water recycling are international approaches that are known in South Africa but are not extensively practiced.

In the forestry sector the key issue was found to be the impact of stream-flow reduction (SFR) of forestry operations. The practices used locally to manage these impacts entail the management of riparian zones, the clearing of alien invasive plants and weeds, improving fibre productivity, managing the age distribution of plantations and the matching of tree species to site conditions. The industry was found to comply with international environmental management standards in broad terms, and to be fourth in the world in terms of the number of forest management units holding Forestry Stewardship Council (FSC) certificates. The issue of stream-flow reduction carries with it a number of measurement challenges that make the forestry sector less amenable to inclusion in the Accord than sectors that directly apply water in their operations.

Generic water conservation practices employed in the Industries, Mining and Power Generation (IMP) sector in South Africa were found to include the use of alternative water sources such as rainwater and effluent, the recycling of wastewater, the minimisation of evaporation, the minimisation of seepage, the minimisation of moisture in solid waste materials, the minimisation of effluent discharge and point-of-use water consumption reduction.

The review of international initiatives focused on agreements that could provide input as a potential basis for the Accord. The approach was to analyse each initiative individually, and then to identify common themes, which could be used as an overall framework for the Accord. The initiatives reviewed were:

- i. The United Nations Global Compact, a global sustainability initiative in which member organisations commit to implementing and reporting on a number of environmental, social and economic issues;
- ii. The World Business Council for Sustainable Development, a CEO-led alliance of over 200 global organisations dealing with business and sustainable development;
- iii. The United Nations Global Compact CEO Water Mandate, a public-private initiative that supports members in developing, implementing and disclosing sustainable water management practices;
- iv. The Victorian Government's waterMap programme, a mandatory water conservation programme for non-residential water users in the Australian state of Victoria;
- v. The Water Footprint Network, a non-profit initiative that conducts research into water use footprinting, a philosophy that examines water use from a "value chain" and "life-cycle" perspective;

- vi. Sydney Water's "Every Drop Counts" programme, a voluntary programme that supports users through providing benchmarks, guidelines and audit documents, on-line water metering services and co-funding for water use audits;
- vii. The United States Environmental Protection Agency's Water Alliances for Voluntary Efficiency (WAVE) programme that supports participants by providing access to expertise and technology partners as well as access to the use of the "WAVE" logo for marketing purposes;
- viii. The Great Lakes St-Lawrence River Basin Sustainable Resources Agreement, a regional agreement between American states that seeks to protect and conserve the waters of the Great Lakes region;
- ix. The Alliance for Water Stewardship, a global freshwater stewardship certification programme;
- x. The Global Environmental Management Initiative, a programme driven by international corporations which focuses on the development of tools and strategies to promote best practice in sustainability, including water management;
- xi. The Global Reporting Initiative, a United Nations Environment Programme endorsed initiative to develop a generally accepted framework for reporting on any organisation's economic, environmental, and social performance and;
- xii. The Alberta Water Council, a multi-stakeholder Canadian initiative in the state of Alberta that oversees the implementation of Alberta's Water for Life strategy, of which one of the key outcomes is water conservation.

The review of national and international initiatives yielded a number of conclusions as regards the concept of an Accord. In addition, common or dominant themes were identified, each of which was then considered for possible application in the development of the Accord. In addition, the institutional arrangements associated with each initiative were reviewed in order to provide guidance as to the options available with respect to the Accord.

The national water situation and the status of the Vaal River System highlights the relevance of the Accord and the importance of its success, as well as the urgency with which water conservation needs to be implemented in South Africa. It is also clear that water conservation is enshrined in South African water and environmental law, and that the Accord should be aligned to this legislative framework, but should not supplant it. Water conservation was found also to be an important aspect of national strategies such as the NWRS and the Water for Growth and Development Framework. The fact that there are limited national initiatives involving Business further supports the need for an Accord. It is further noted that the

technological capabilities necessary for the implementation of water conservation exist in all water use sectors.

Common themes arising from both the national and international review that were deemed relevant for consideration included the following:

- i. Measurement and reporting of performance are important, with the onus placed on participants to report rather than on the initiative to monitor;
- ii. Intensity measures are more useful than absolute measures, since they link resource consumption to the level of economic activity, which may vary;
- iii. Water conservation opportunities are site-specific and differ within and between sectors;
- iv. Metering is an important aspect of water conservation implementation, which poses challenges in sectors like forestry, due to the difficulty of measuring SFR, as well as in agriculture, where water provisioning arrangements vary widely and the costs of metering can be prohibitive;
- v. In general terms, most initiatives provide support to participants in the form of support linkages, tools, guidelines and expertise, with participants in turn expected to commit to reporting requirements and implementation of conservation;
- vi. Senior management commitment is a common feature of most initiatives, which is important since resources would need to be committed in the course of implementation;
- vii. The imposition of targets is not common. Rather, individual users are expected to set their own targets and report on progress against these. This does not however detract from the setting of broad aspirational targets, as in the case of the Alberta Water Commission;
- viii. Most initiatives have a defined work programme, the nature of which would depend on where each initiative is in its life cycle;
- ix. Most initiatives have a website which enables potential participants to learn about the initiative, but also serves as a portal for the provision of information and tools to participants;
- x. Some initiatives give recognition to participants through allowing the use of a logo, or through a certification process. This can serve as an incentive to attract participation.

Based on all of the information reviewed, specific concepts were proposed for review by the Counter Part Group, and these concepts and principles were refined in order to arrive at the ultimate building blocks for an inclusive, workable and sustainable Accord document and an

institutional arrangement that could be used to manage this Accord on an ongoing basis. The proposed Stakeholder Accord on Water Conservation is contained in Appendix 1, and contains the principles upon which the Accord was founded and will be managed.

The key principles that will underpin this Accord are related to the following concepts:

- i. The Accord needs to be supportive of national legislation and not be in conflict with it;
- ii. Water conservation should be considered and implemented in the framework of integrated water resource management i.e. the implementation of water conservation initiatives should not lead to any environmental degradation or negatively impact key social imperatives such as job creation;
- iii. The voluntary commitments by participants will largely be informed by opportunities to effect water conservation improvements, which will differ from user to user;
- iv. Co-operation, openness and transparency between stakeholders and participants are key to meeting the objectives of the Accord.

The commitments of the various parties and a brief overview of the institutional arrangement proposed are also recorded in the proposed Stakeholder Accord on Water Conservation. The commitments by the parties, amongst others, are:

- i. The formulation of aspirational water intensity targets for the Accord;
- ii. Reporting progress on water conservation objectives and disseminating this information to the public;
- iii. Encourage participants to voluntarily baseline water use and set water intensity targets through support and providing an enabling environment for water conservation efforts;
- iv. Collaborate and co-operate in providing resources and taking action to implement the objectives of the Accord.

In order to implement the Accord, management frameworks were investigated for implementation. The institutional options examined were that of a Section 21 company, the use of an existing business structure such as the National Business Initiative (NBI), the use of a state-funded institution such as the National Cleaner Production Centre (NCPC) and the outsourcing of the operation of the Accord to a professional service provider. On the basis of costs, capacity, ease of implementation and mandate, the National Cleaner Production Centre was chosen as the preferred institutional option. Envisaged is an Accord Governing Body that is a subset of the existing Governing Council, with operational matters handled by a Secretariat comprising some existing NCPC resources. Sector Bodies such as the Chemical and Allied Industries' Association will be engaged to serve the specific needs of

water users in the various sectors and sub-sectors, which are expected to principally be in the areas of knowledge-sharing and data gathering.

It is proposed that the Accord itself be signed between the Minister of Water and Environmental Affairs and individual users, sector body representatives and Business representatives. While Labour provided input to the drafting of the Accord, it is not considered necessary for Labour to sign the document, since Government and Business principally make the commitments.

Individual users are expected to set their own targets using the baseline and target-setting guidelines provided as part of the development process. Reporting is not expected to proceed immediately, as systems would need to be established to achieve this. The key performance indicators (KPI's) have been agreed for the Commercial, Manufacturing and Mining sectors, and will encompass absolute water use per annum and water intensity. KPI's for agriculture will be agreed subject to the outcome of a metering study currently being conducted in the sector. A work programme that includes the development of supporting tools and guidelines, the establishment of a website and the development of business processes has been proposed for the Accord, but this will only be finalised once the Governing Body convenes and decides on priorities in terms of implementation.

Based on an analysis of available water use data, the sectors highlighted as attractive for initial inclusion in the Stakeholder Accord on Water Conservation are the Manufacturing, Mining, Commercial and Irrigated Agriculture sectors. The Forestry sector has been excluded from a stream-flow reduction perspective, but individual operators may still sign the Accord to gain support and make commitments as regards reduction in other water uses in the sector, which themselves are fairly considerable. Within manufacturing, important sub-sectors have been highlighted as comprising the pulp and paper, iron and steel, clear beer brewing, wet textiles, soft drinks, red meat abattoir, poultry and chemical processing industries. In mining, the most attractive sub-sectors were highlighted as being in gold and uranium, chrome, manganese and other metal ores, platinum group metals, iron ore and coal. More detail on individual sub-sectors, categorised by SIC code, may be found in Appendix 2. It must however be stressed that while these sectors most likely present the largest opportunity to make a significant impression on water conservation in South Africa, the Accord is open to all water users outside of the domestic sector. While Local Government structures have been excluded from this initial process, they maybe involved in specific projects or as Accord participants at some time in the future.

An important consideration for the Accord in implementation is the development of a detailed business plan that not only considers funding and costs but also looks at implementing the different organisational processes and the work plan for the Accord. Consideration should be

given to how users would be attracted to become participants and how to promote the Accord to stakeholders and the public beyond the participants.

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ABBREVIATIONS / ACRONYMS

| | |
|-------|--|
| APS | Afforestation permit system |
| BUSA | Business Unity South Africa |
| CDM | Clean Development Mechanism |
| CMA | Catchment Management Agency |
| CPG | Counter Part Group |
| CWP | Crop Water Productivity |
| DWA | The Department of Water Affairs |
| DWAF | The Department of Water Affairs and Forestry |
| EEA | Energy Efficiency Accord |
| EEDSM | Energy Efficiency and Demand-side Management |
| FAO | Food and Agriculture Organisation |
| FSC | Forest Stewardship Council |
| GRI | Global Reporting Initiative |
| IMP | Industries, Mining and Power Generation |
| IFRC | International Federation of Red Cross and Red Crescent Societies |
| KPI | Key Performance Indicator |
| LHWP2 | Lesotho Highlands Water Project (Phase 2) |

ABBREVIATIONS / ACRONYMS

| | |
|----------|--|
| MDG | Millennium Development Goals |
| MOU | Memorandum of Understanding |
| NATSURV | National Industrial Water and Wastewater Survey |
| NEDLAC | National Economic Development and Labour Council |
| NEMA | National Environmental Management Act |
| NFSD | National Framework for Sustainable Development |
| NWC/WDMS | National Water Conservation and Water Demand Management Strategy |
| NWA | The National Water Act |
| NWRS | The National Water Resource Strategy |
| SFR | Stream flow reduction |
| SFRA | Stream flow reduction activity |
| SIC | Sector Industry Classification |
| UN | United Nations |
| UNEP | United Nations Environment Programme |
| UNICEF | United Nations Children's Fund |
| USDA | United States Department of Agriculture |

ABBREVIATIONS / ACRONYMS

| | |
|--------|--|
| US EPA | United States Environmental Protection Agency |
| WAS | Water Administration System |
| WAVE | Water Alliances for Voluntary Efficiency |
| WBCSD | World Business Council for Sustainable Development |
| WfGD | Water for Growth and Development Framework |
| WMA | Water Management Area |
| WRC | Water Research Commission |
| WSA | Water Services Act |
| WWF | Worldwide Fund for Nature |
| WfW | Working for Water |
| ZLED | Zero Liquid Effluent Discharge |

GLOSSARY

| | |
|-------------------------|--|
| Acoustic velocity meter | A device that is makes uses of two fixed acoustic transducers to determine flow in a medium based on the difference in velocity of the sound |
| Aerial deposition | Contamination of surface waters and or land through passage of pollutants through the air. |
| Alien invasive species | A species that is not indigenous to a region or area and adversely affects the habitats they invade economically, environmental or ecologically. |
| Allocation | The distribution or allotment of water according to a plan or policy and normally refers to the approved quantity of water for use by a user. |
| Assurance of supply | The amount of water or yield for any given water resource that can be abstracted within a period without failure. This is normally indicated as <i>'the yield at a percent assurance of supply'</i> to provide an indication of the degree of failure with respect to supply of the water, for example 98% assurance level of supply infers a possible failure to supply full yield exists for 2 years out of every 100 years. |
| Augmentation | The supply of water from one water management area to another by means of physical infrastructure. |
| Baseline water use | Water consumption status at the beginning of a water conservation programme. Baseline measurements are used as a reference point to determine a site's water savings as it completes its water conservation plan. |
| Basin | A drainage basin is the extent of land where water from precipitation drains downhill into a body of water. The basin includes both the streams and rivers that convey the water as well as the land surfaces from which the water drains into these channels. |
| Best Practice | The repeatable technique, method, process or activity that is most |

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| | efficient and effective in accomplishing a task or delivering a particular outcome than any other technique, method, process or activity. |
| Biological treatment | The use of biological processes such as anaerobic digestion, composting or bio drying to treat waste materials such as municipal solid waste or sewage sludge. |
| Bleaching | The process of removing colour bodies from pulp through the application of bleaching chemicals, usually accompanied by extensive washing between successive bleaching steps. |
| Clarification | The process of making a liquid clear or pure by separating the solids from a liquid making use of the differences in the densities of the different media. |
| Clean development mechanism | An arrangement under the Kyoto Protocol that allows industrialized countries with a greenhouse gas reduction commitment to invest in projects that reduce emissions in developing countries as an alternative to more expensive reductions in their own countries. |
| Conveyance | The distribution of water (or sewerage) through a series of infrastructure such as pipes or canals to an end user |
| Crop Rotation | The practice of growing a series of different types of crops in the same area in sequential seasons for various benefits such prevention of excessive depletion of soil nutrients |
| Consumptive water use | Water use that occurs such that the water is not directly made available to other users after use e.g. evaporation. |
| Cooling towers | Structures used to cool water through directly contacting water with air. The air absorbs moisture, and this evaporative process removes energy from the water, cooling it in the process. |
| Cooling tower blow down | The process of purging concentrated cooling water from cooling towers in order to remove pollutants. Fresh water (make-up) is then added to achieve the cooling water volume required. Cooling |

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| | water becomes concentrated as a result of evaporation. |
| Desalination | The process of removing excess salt or minerals from water or a similar medium. |
| Dissolved air flotation | The process of clarifying wastewaters or other water by the removal of suspended solids such as oils or solids using dissolve air. |
| Discharge | The passage of water into surface water bodies such as rivers or streams. |
| Dry cooling systems | Cooling systems that indirectly contact water with air, warming the air and hence cooling the water. The water is in a closed system and no evaporation occurs. |
| Dublin Statement | The set of principles developed at the 1992 International Conference on Water and Environment in Dublin (Ireland), which has been used as a basis for water sector reform globally. |
| Energy Intensity | Energy use per unit of economic activity. In the case of the manufacturing sector, this is expressed as the amount of energy used per unit of production. |
| Evapo-transpiration | The combination of evaporation (from the canopy and soil) and transpiration (from stomata of plants). |
| Flue gas desulphurisation | The removal of sulphur dioxide from boiler flue gases, typically in a wet system, which contacts the flue gases with an alkaline solution. |
| Flume | An open man made water channel, in the form of gravity chute that leads water from a diversion dam or weir aside a natural flow. |
| Global Reporting Initiative | An international network based organization that has developed a framework for sustainability reporting that has been adopted internationally. The reporting system is commonly referred to by the same name. |
| Grey water | Water recycled from showers, sinks and washbasins. |

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| Illegal water use | The use of water without the relevant authorization. |
| Ion Exchange | The process whereby ions are exchanged between two electrolytes or between an electrolyte solution and a complex. |
| Lime Softening | A process of raising the pH of water by the addition of lime to change the calcium and magnesium compounds already in the solution to forms that will ensure that these species will precipitate out of water at the lowest concentrations |
| Lowest feasible water use | The minimum amount of water required to achieve a given outcome, as determined with consideration for the constraints of an individual organization. |
| Magnetic Flow-meter | A flow meter that has no moving parts and that measures the flow of an electrically conductive fluid by means of an induced voltage across a set of electrodes or conductors. |
| Membrane Filtration | The process to remove particles, solids and bacteria by passing water through a filter medium comprised of different membranes. |
| Pulp | The fibrous material, prepared using either mechanical or chemical processes or a combination of both, used to make paper. |
| Riparian Zone | The area between the land and a river or stream characterized by hydrophilic plants |
| Return flows | Water not consumed in a process but returned to its source or another body of ground or surface water. |
| Reverse Osmosis | A filtration process in which a solvent is forced from a region of high solute concentration through a membrane to a region of low solute by the application of a pressure higher than osmotic pressure. |
| Sand filtration | A process to remove particles, solids and bacteria by passing water through a filter medium comprised of varying grades of sand. |

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| Sector | A sub-division of the economy used for analysis and classification |
| Site | The geographic place where economic activity takes place |
| Scrubbing | Removal of contaminants, including particulate matter, from gases through the use of a solvent. |
| Seepage | The passage of water into the ground. Seepage losses may not be consumptive, as they could lead to groundwater recharge or could eventually discharge into surface waters, depending on local geology. |
| Slimes | Fine materials removed from ore during mineral processing as a suspension in water. |
| Smelter | A device that uses electrical energy or a carbon-based fuel to melt ore bodies. Smelting is typically accompanied by reduction of the ore (i.e. removal of oxygen) and removal of undesirable materials through slag formation (facilitated by the addition of fluxes). |
| Stream Flow reduction | The reduction in runoff associated with the uptake of water by commercial forests or crop uses, compared to the original natural vegetation. |
| Sub-sector | A sub division of a sector |
| Sub-metering | The process of installing measurement instruments in an area to understand the contribution of individual processes to the activity in a particular area on a site. |
| Sustainable development | The pattern of resource use that aims to meet human needs (environmental, economic and social) whilst preserving the environment so that the current needs can be met as well as those of future generations. |
| Tailings | Undesirable materials of larger size than slimes removed during beneficiation of mineral ores. |

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| Target | An objective or measure that has been set and agreed. |
| Vaal River System | The system that comprises of the Vaal River Water Management Area and the related water supply infrastructure that either supplies to the area or abstracts water from this area. |
| Water footprint | The water footprint of an entity or area is the total volume of water that is used to produce the goods and services consumed by the entity or area. |
| Water audit | An evaluation of the water uses in a specific area or entity. |
| Water use efficiency improvement | The process of reducing the amount of water used while still achieving all other goals of a process. For example the process of using less water for washing one's hands while still achieving the same level of hygiene. |
| Wash press | Equipment used to wash, screen and remove grit from a product |
| Water conservation | The minimization of loss or waste, the preservation and care of water resources and the efficient and effective use of water without impacting on the outcomes of an activity. |
| Water demand management | The adaptation and implementation of a strategy (policies and initiatives) by a water institution to influence the water demand and the usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability. |
| Water mix | The quantum of water of different qualities used as a proportion of the total water use on a site for an economic activity. |
| Water neutrality | The concept that proposes the offsetting of water uses by making an equivalent quantity of water available to the resource by undertaking projects to reduce water intake as well as improving run-off to a resource. |

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| Water resource quality | A measure of the chemical and biological constituents of water in a resource. |
| Water use efficiency | The accomplishment of a function, task, process, or result with the minimal amount of water feasible. Water efficiency aims to reduce the waste of water and not restrict the use thereof. |
| Water intensity | Water use per unit of economic activity. In the case of the manufacturing sector, this is expressed as the amount of water used per unit of production. |
| Weir | A low-head dam or overflow type dam used to raise the level of a river or stream. |
| Yield | The water from a water resource is the volume of water that can be abstracted at a certain rate over a specified period of time. |
| Zero liquid effluent discharge | The elimination of the discharge of effluent water or water containing process waste back into the environment, especially water resources such as rivers, streams and aquifers. |

1 INTRODUCTION

1.1 Overview

For sectors such as business services, manufacturing, mining, and agriculture, water is an essential input necessary to sustain and grow operations. Water is a primary raw material in many industries, and is in addition widely used as a solvent, coolant, cleaning medium and carrier. Water's role as a critical enabler of economic growth is therefore of primary concern to stakeholders in Business, Labour and Government, who recognise that South Africa's water resources are under threat on two main fronts:

- i. *Scarcity*, both nationally and in local environments, as a result of South Africa's low levels of rainfall, uneven rainfall patterns, absence of large navigable rivers and limited access to groundwater. Much economic activity is also concentrated in areas distant from water resources, and climate change is expected to increase the already large disparity between rainfall in the eastern and western parts of the country.
- ii. *Deteriorating water resource quality*, as a result of industrial activity, human settlements, agricultural runoff and leaching from natural geological formations. This important issue is the subject of a further study, and is not considered further in this report. It is however important to mention that water resource quality impacts on water conservation, and also that the steps taken in the implementation of water conservation may have an impact on water resource quality. While dealt with separately here, this study acknowledges that these issues are intimately linked.

It is recognised further that if the water management issue is left unresolved, it may impose constraints on business activities going forward.

In response to these key challenges, Business, Labour and Government have decided to embark on the development and implementation of a Stakeholder Accord on Water Conservation, which will be a mechanism through which these stakeholders can work together on the important issue of water conservation. The Stakeholder Accord on Water Conservation is envisaged to be a voluntary initiative open to non-domestic water users from all sectors.

The development of an inclusive, workable and sustainable agreement is a process that faces a number of inherent challenges. The first of these challenges is a paucity of data on the status of water conservation in the various water use sectors due to the lack of a singular, reliable, current, database of water use and water intensity information in South Africa. A further challenge is that each user is defined by unique characteristics, which makes a uniform approach that ignores these differences problematic. In addition, there are the obvious differences in the core objectives and mandates of the various stakeholder groups

involved. The Stakeholder Accord on Water Conservation therefore aims to ultimately achieve quantitative reductions in water intensity while taking cognisance of economic, social and environmental considerations.

The Stakeholder Accord on Water Conservation is envisaged as being principally between Government and Business, with Labour involved in the development process, but not as a signatory to the Accord. Government is to be led by the Department of Water Affairs, the custodian of South Africa's water resources, with the Minister for Water and Environmental Affairs as signatory on behalf of Government. Other Government departments, notably the Department of Trade and Industry, are also important stakeholders to be engaged in the course of implementation of the Accord.

The involvement of Business is envisaged to occur at three levels. The first is at the level of individual water users and organised groups of users that share infrastructure, such as Water User Associations in the case of the agricultural sector. The second level at which Business will be represented will be through sector bodies that represent the interests of water use sectors or sub-sectors. Examples of potential sector bodies would be the South African Iron and Steel Institute, which serves the iron and steel industry, or the Chemical and Allied Industries' Association, which serves the chemical industry. The other level at which business would be represented would be through national representative bodies such as Business Unity South Africa (BUSA), which are envisaged as strategic role-players in the affairs of the Accord. The proposed mechanisms through which these interactions would occur are outlined in the body of this report.

The role of Local Government was acknowledged as important by the stakeholders, on the basis that all users share a common water resource, and that many industries are served by municipal water service infrastructure. Water conservation initiatives in this sector were however considered outside of the scope of the Accord at this time.

1.2 Structure of the report

The following is an outline of the structure of this report:

- i. Chapter 1, which is this section of this report, provides the background to the study and an overview of the context, rationale and approach used.
- ii. Chapter 2 of the report outlines the methodology employed in developing the Stakeholder Accord on Water Conservation
- iii. Chapter 3 of the report outlines the national water resource situation in order to illustrate the relevance of the initiative and convey the urgency with which its

successful implementation is required. In addition, the national legislative framework is briefly reviewed, as well as initiatives undertaken by Government and Business to address water scarcity in South Africa.

- iv. Chapter 4 of the report reviews international initiatives that could be used to provide input to the Stakeholder Accord on Water Conservation.
- v. Chapter 5 of the report evaluates water use in the various sectors of interest (Manufacturing, Agriculture, Mining, Commercial and Forestry sectors) and proposes initial sub-sectors for inclusion in the Accord. Classification using Standard Industry Classification (SIC) codes is also carried out.
- vi. Chapter 6 of the report deals with the issue of water use baseline determination and target-setting at the site level, describes why it is necessary, proposes sector-specific key performance indicators (KPI's) and discusses principles of target-setting.
- vii. Chapter 7 of the report outlines principles to be adopted for the Stakeholder Accord on Water Conservation and describes how such an Accord would be managed. Options regarding the management structure and institutional arrangements possible are also explored.
- viii. Chapter 8 of the Accord details a proposed management framework and institutional arrangement for the Stakeholder Accord on Water Conservation.

The report contains 3 Appendices:

- i. Appendix 1 contains the proposed Stakeholder Accord on Water Conservation document itself, as it will be presented to signatories;
- ii. Appendix 2 contains the potential participating water use sub-sectors by SIC code;
- iii. Appendix 3 contains the sources used to derive the principles of the Accord.

2 METHODOLOGY

The development of a Stakeholder Accord on Water Conservation (the Accord) was carried out in the form of the following milestone reports:

- i. The Review of National and International Initiatives
- ii. The Determination of Accord Principles and Management Options
- iii. The Determination of Potential Participant Sectors
- iv. The Development of Site-level Baseline Determination and Target-setting guidelines

The approach used with each of these milestones was to submit reports to the Counter Part Group (CPG), which comprised stakeholder representatives from Government, Business and Labour, for review and comment prior to finalisation. These individual milestones were then integrated to produce this final report, which itself was reviewed by the CPG before finalisation.

The review of national initiatives was conducted through an examination of all national water and environmental legislation relevant to water conservation, including sectoral strategies and the National Water Resource Strategy (NWRS). Local case studies from various sectors were sourced in order to surface strategies that had been implemented at site level. Organisational initiatives involving water conservation were also reviewed, an example being the Eskom / DWAF Memorandum of Understanding (MOU).

International initiatives were selected based on similarities to the proposed Accord, in particular the involvement of multiple stakeholders. Some of these case studies dealt with issues broader than water conservation alone, but were nevertheless included for the review due to the usefulness of some of the principles employed. Each initiative was summarised individually and conclusions and recommendations were made regarding the potential for inclusion of identified concepts, principles and approaches in the Accord.

Based on the national and international review as well as input from internationally acknowledged documents such as the Dublin Statement, principles relevant to the Accord were selected and expanded upon for inclusion in the Accord. The roles of the various stakeholders were developed with a view to what these roles would entail within the context of the Accord, and a review of how the Accord could function in practice was conducted. This review included the synthesis of potential structural and institutional options, with an analysis of the advantages and disadvantages of each. The Stakeholder Accord on Water Conservation document itself was developed as part of this process and attached as an

appendix (Appendix 1). Individual stakeholder groups within the CPG were given the opportunity to comment on successive iterations of the Accord document until a version suitable for presentation at a workshop including broader stakeholder representation was developed. Changes proposed at the workshop were incorporated into the Accord, and it was circulated for comment before being finalised.

The Accord is envisaged as a voluntary instrument open to all water users, but it was considered useful to identify potential participants based on water use patterns. Water efficiency data was acknowledged as not being freely available, and it was decided to focus on absolute water use data. Data from municipalities proved difficult to acquire, and hence the data in the NWRS was used to categorise national water users. This data was augmented with information from Water Management Area (WMA) situation assessments, as analysed by Statistics South Africa (Stats SA, 2006) to disaggregate water use data. In addition, WARMS data was used to assess the amount of water used by individual abstractors, and this data was complemented with information from organisational financial and sustainability reports. Based on these sources of information and a qualitative review of water use practices in the various sub-sectors, the large water use sectors and sub-sectors were identified for potential inclusion in the Accord.

Site-level Baseline and Target-setting Guidelines were developed for the Irrigated Agriculture, Mining, Manufacturing and Commercial sectors using a generic format. Each sector was illustrated through practical, worked examples that outline the Key Performance Indicators (KPI's) to be used for each sector and how they are to be measured to determine a baseline. The approach employed for target-setting was to use the process of "water auditing" as a common framework for identifying water efficiency opportunities. The process of determining the viability of individual water efficiency opportunities was considered to be outside the scope of the guidelines due to the organisation-specific nature of resource allocation decision-making processes. Each guideline shows how, once individual opportunities are selected for implementation, they may be used to determine annual targets over a five-year horizon based on the timing of their implementation and the baseline determined.

3 NATIONAL WATER RESOURCES AND THEIR MANAGEMENT

3.1 Overview of the Extent and Use of National Water Resources

In order to contextualise water conservation and demand management in South Africa appropriately, it is necessary to briefly review the nature, extent and geographic spread of South Africa's surface and groundwater resources relative to the demands on these resources.

"Demand" in this instance refers to the amount of water allocated to users by the Department of Water Affairs. It is important to note that illegal water use is not included in these demands. "Supply" refers to available surface and groundwater resources along with return flows discharged by water users. The quality of these water supplies is clearly important, since if water quality does not meet user requirements the water may not be considered to be available for use.

The NWRS (DWAF, 2000), a consolidated source of information standardised to a common assurance of supply of 98%, shows that South Africa's surface and groundwater resources are unevenly distributed between South Africa's 19 WMA's. More than half of the 19 WMA's are shown to be in deficit, leading to a requirement for the transfer of large volumes of water between WMA's. Return flows are particularly significant in the Upper and Lower Vaal and the Crocodile West WMA's. Groundwater resources are seen to be limited, and are vital where they are accessed.

The gap between demand and supply as indicated by the NWRS is particularly severe in the north-eastern and south-western regions of the country. Given South Africa's level of economic growth in recent years, which has averaged some 4.2% (in 2000 prices) year on year from 2000 to end 2007 (Stats SA) it is fair to say that current demands are probably higher than those reflected in the last iteration of the NWRS. Illegal water use places additional pressure on limited water resources.

The Vaal River System, which supplies the major economic region of the country and supports key national industries such as power generation, chemical manufacturing and the coal-to-liquids industry, is projected to be severely stressed. Augmentation in the form of the second phase of the Lesotho Highlands Water Project (LHWP2) has recently been approved in principle, subject to an agreement being reached with Lesotho, and is being progressed. However, the earliest commissioning date for this augmentation is in 2019. The Department of Water Affairs and Forestry (DWAF) estimates that in the absence of successful WC/WDM

in all water use sectors, including municipal water supply infrastructure, and the elimination of illegal water use by agriculture, the Vaal River System could go into deficit as early as 2016. An article published in the Engineering News (March 2009) referred to expectations of a shortage in Gauteng by 2013 in the absence of intervention.

In the long term, even with full development of the Lesotho Highlands Water Project, South Africa's water resources will not be able to support the economic growth rates the country needs to sustain ongoing transformation and job creation of the scale required unless water conservation is implemented on a wide scale and water quality acceptable to the various water user groups is assured. The success of national water conservation initiatives, including the Stakeholder Accord on Water Conservation, is therefore important for all water users in South Africa.

3.2 National Water Conservation Initiatives

The Stakeholder Accord on Water Conservation will reflect the commitment of South African labour, government and businesses to reducing water consumption, and should incorporate the best of current national and international practices. National initiatives of both Government and the private sector have relevance since:

- The Accord will have to align to current Government regulations and policy and;
- The Accord can be used as a vehicle to both support current private and government sector initiatives as well as to influence the actions of Government and the private sector in order to facilitate meaningful water conservation.

The following types of water conservation initiatives were reviewed:

- Current legislation, specifically where reference is made to water conservation and demand management;
- Current water use sector strategies developed and implemented by the Department of Water Affairs;
- Known water-related agreements involving government and/or business;
- The Energy Efficiency Accord (EEA) between Government and South African corporations and associations and;
- Water conservation strategies adopted by South African organisations, where case study material exists in the public domain.

The potential impacts these initiatives could have on the Stakeholder Accord on Water Conservation were then assessed and summarised.

3.2.1 A review of Applicable National Legislation and Strategies

The primary laws governing water use in South Africa are the following:

- The Constitution of South Africa (No. 108 of 1996)
- The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
- The National Water Act (NWA)(Act No. 36 of 1998)
 - The National Water Resource Strategy, which is established by the NWA (Sept 2004)
- The Water Services Act (Act No. 108 of 1997)

3.2.1.1 The Constitution of South Africa

The Constitution outlines the rights of the citizens of the Republic, one of which according to S27 (1) b is the right of access to sufficient water. Furthermore in S27 (2), the Constitution specifies that the state must take “reasonable legislative and other measures” to progressively grant this right. S28 (1) of the Constitution grants every child the right to basic nutrition, which would include the provision of safe drinking water. The Constitution also specifies in S24 (b) that everyone can expect the environment to be protected and for measures to be taken to:

- (i) prevent pollution and ecological degradation and;
- (ii) promote conservation.

To this end water conservation has been legislated in various pieces of legislation in order to grant access to water.

3.2.1.2 The National Environmental Management Act

The NEMA addresses the need to guarantee everyone access to a safe and healthy environment, through a reasonable legislative framework that enables:

- Prevention of pollution and ecological degradation;
- Promotion of conservation and;

- Ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Water is an integral part of these objectives, firstly as a key natural resource that must be conserved, but also as a resource that is essential for the preservation of both aquatic and non-aquatic ecosystems. Water also interacts with other environmental objectives around pollution prevention – for example, in the metallurgical industry water is used to scrub furnace and smelter gases, the aim being to remove particulate matter and reduce emissions to air. In terms of NEMA, water is a component of the environment, along with land and air.

NEMA stresses the need to approach environmental matters in an integrated fashion, considering links between various elements of the environment, and implementing the “best practicable environmental option”. Hence the conservation of water should not be carried out in such a manner that other environmental goals are unduly compromised, and by the same token, actions taken to protect the environment should not unduly compromise water conservation goals. Equitable access to natural resources is enshrined in the Act, and consistent themes are the need to protect the vulnerable and disadvantaged and the participation of all stakeholders.

3.2.1.3 The National Water Act (NWA)

The NWA relates to all facets of the protection, use, development, conservation, management and control of South Africa’s water resources. The purpose of the Act is defined amongst others in S1 (2) as to:

- (a) Promote equitable access to water;
- (b) Promote the efficient, sustainable and beneficial use of water in the public interest;
- (c) Facilitate social and economic development, and;
- (d) Provide for growing demand for water use.

The Act outlines the formation of 19 Water Management Areas, each of which will ultimately be managed by a Catchment Management Agency (CMA). The CMA’s will manage water conservation and other aspects of water resource management through implementation of catchment management strategies. In times of prevailing or expected water shortage, CMA’s are entitled to require specific water conservation measures to be taken by users. CMA’s are

still in the process of being established and in the interim the Department of Water Affairs will act as the de-facto CMA where CMA's have not been established.

In terms of the NWA, water use licence conditions may include the specification of water conservation requirements. Before the issuing of a licence, responsible authorities are to assess the impact of the licence on, among other factors, water conservation. The NWA also makes specific provision for the drafting of regulations governing water conservation.

3.2.1.4 The National Water Resource Strategy (NWRS)

The NWRS is established in terms of the NWA, and is founded on the following principles:

- Equitable access to water;
- Sustainable water use, which implies consideration for the needs of users in the context of the total resources available, including a focus on water quality and;
- Efficient and effective water use, realising an optimal position in terms of social as well as economic goals.

All of these principles relate strongly to water conservation. For example, improved conservation can enable a fixed resource to be allocated to more users, increasing equitable access. Water conservation enables increased sustainability, since the risks of failure of a limited resource can be reduced by using less of that resource for the same amount of benefit. Water conservation can also support economic goals through making more water available for economic growth than would be available should resources be wasted.

The NWRS makes specific reference to the National Water Conservation Strategy and the sector strategies for the Water Services, Agricultural and Industry, Mining and Power Generation (IMP) sectors.

The NWRS also discusses other aspects of water conservation, such as:

- Control of invasive alien vegetation;
- Stream flow reduction (SFR) activities;
- The use of pricing to encourage conservation and;
- The need to integrate water conservation options into infrastructure development plans.

Water conservation is additionally important in terms of South Africa's relationships with neighbouring states. Besides the stated intent of the NWA in S1(2) (i) to meet international

obligations, trans-border agreements contain requirements as regards flow and quality of water, and water conservation assists in allowing flow obligations to be met.

An important concept of the NWRS, which is applicable to water conservation, is that of integrated water resource management (IWRM). The NWRS defines IWRM as “a process, which promotes the co-ordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems”. What this means for individual water users and water use sectors in the context of water conservation is firstly that conservation supports IWRM, but also that conservation initiatives should be undertaken with due consideration for their social, economic and environmental implications.

3.2.1.5 The Water Services Act (WSA)

The Water Services Act, 1997 (Act No. 108 of 1997) deals with the rights of access to basic water supply and basic sanitation. It outlines the roles of Water Service Authorities, Water Services Providers, Water Services Intermediaries and Water Boards. Water conservation is a specific objective of the Water Services Act and features prominently in the list of functions of each of these role-players. While the domestic sector is the largest group of water users covered by the WSA, many industrial and commercial undertakings are provided with water from municipalities. These municipalities have a number of powers as regards water conservation and demand management, which may impact on water users, including the institution of conservation measures by users as a condition of supply.

The Water Services Act also allows the Minister of Water and Environmental Affairs to provide norms and standards as to the use of tariffs to promote water conservation. This clearly has economic implications for users.

3.2.1.6 The National Water Conservation and Demand Management Strategy (NWC/WDMS)

The Department of Water Affairs has produced a national strategy aimed at improving water use efficiency in the Industries, Mining and Power Generation (IMP), Agriculture and Water Services sectors, while recognising that the alleviation of stream flow reduction and the removal of invasive alien vegetation are further strategies important to national water conservation.

The NWC/WDMS recognises the central role that water conservation and demand management (WC/WDM) plays in achieving the 3 key goals of water resource management,

which are equity, efficiency and sustainability. WC/WDM is also positioned within the framework of integrated water resource management (IWRM), discussed earlier, but further defined in the NWRS as “balancing the needs of our people for water, jobs and economic growth in manner that also allows us to protect and, where necessary, rehabilitate our aquatic ecosystems.’ This must address ‘the need to eradicate poverty and remove inequity in South Africa.”

In essence, the NWC/WDMS has strong linkages to the NWRS, and is in fact a component of the NWRS, which will be reviewed whenever the NWRS is reviewed. It is ultimately distilled into 8 key objectives:

- *Objective 1:* To facilitate and ensure the role of WC/WDM in achieving sustainable, efficient and affordable management of water resources and water services;
- *Objective 2:* To contribute to the protection of the environment, ecology and water resources;
- *Objective 3:* To create a culture of WC/WDM within all water management and water services institutions;
- *Objective 4:* To create a culture of WC/WDM for all consumers and users;
- *Objective 5:* To support water management and water services institutions to implement WC/WDM;
- *Objective 6:* To promote the allocation of adequate capacity and resources by water institutions for WC/WDM;
- *Objective 7:* To enable water management and water services institutions to adopt integrated planning and;
- *Objective 8:* To promote international co-operation and participate with other Southern African countries, particularly basin-sharing countries, in developing joint WC/WDM strategies.

The achievement of these objectives is partially carried out through implementation of water use sector strategies, but also through a national oversight role played by the Department of Water Affairs to ensure adequate integration between water use sectors. Water use sector strategies that have the most direct impact on the Accord stakeholders would be the WC/WDM Strategy for the Agricultural sector, the WC/WDM Strategy for the Forestry sector and the WC/WDM strategy for the IMP sector. The WC/WDM strategy for the Water Services sector focuses on institutions rather than end users. The success of WC/WDM in this sector is however still of importance to the Accord, as project stakeholders are competing with all other users for a limited resource. The success of water conservation in

this sector will also drive the price of water supplied to commercial and industrial users who are supplied by Water Services Institutions.

In essence, the water use sector WC/WDM strategies each provide an overview of the sector concerned (Water Services, Forestry, IMP and Agricultural sectors) and highlight challenges in each sector. A shortcoming of these strategies is that they do not outline what Government will do in practical terms to drive water conservation in each sector. The Accord presents an opportunity for constructive engagement between Government and other stakeholders in this regard. This is of particular relevance at this juncture, with review of the NWRS and hence the NWC/WDMS strategy being imminent.

3.2.2 Government and Private Sector Initiatives

3.2.2.1 Water Use Efficiency Situation Assessments and Business Plans

The Department of Water Affairs has performed a number of water conservation and demand management studies over the last few years, comprising studies in the Olifants, Inkomati, Upper, Middle and Lower Vaal, Limpopo, Crocodile West/Marico and Levuvhu/Letaba WMA's. These studies have focused on the domestic sector, with some work in the IMP and agricultural sectors, and have been in the form of water use sector "business plans" which, for the large individual users targeted in each sector, have:

- Identified water conservation opportunities;
- Quantified potential water savings;
- Established the costs of implementing water conservation measures and;
- Identified which opportunities could feasibly be implemented.

While these studies have been useful in terms of assessing opportunities, it has been recognised that implementation has been lacking up to now. The Department of Water Affairs has therefore changed the assessment philosophy to one of implementation, where concrete savings are being targeted in the various sectors. The first WMA in which this new approach is being piloted is the Crocodile West-Marico WMA. The concept is to identify opportunities and then propose these to users for implementation, drawing on resources available from other initiatives as far as possible for funding, in the case of the Local Government sector. In the case of the private sector, licence conditions and tariff structures are being investigated as vehicles for driving conservation, taking cognisance of the principles of IWRM.

3.2.2.2 The Water for Growth and Development Framework (WfGD)

The Water for Growth and Development Framework (WfGD) is the government's view on how water will be managed in South Africa to ensure that the needs of users in terms of both quantity and quality are sustainably met. The framework operates through extensive stakeholder engagement, examining the quantity and quality of water resources in local environments relative to the requirements of water users. The framework recognises that while surface water, groundwater and return flows comprise the major current sources of water, options such as desalination of seawater, water conservation and demand management, increased exploitation and treatment of groundwater reserves and effluent treatment need to be introduced more widely. This is part of a conscious strategy to broaden the country's "water mix". The maintenance of municipal infrastructure is further recognised as a focus area which, if comprehensively addressed, would lead to improvements in water resource quality through reduced contamination as well as improved water use efficiency through reduced water distribution losses.

The high level approaches of the WfGD Framework that are relevant to water conservation, and hence the Stakeholder Accord on Water Conservation are the following:

- i. Mainstreaming of water i.e. placing water centrally in decision-making and planning among water users. The Department of Water Affairs has committed to the strengthening of Government's regulatory role and the provision of support and guidance to stakeholders;
- ii. Diversification of the water mix, which may impact on conservation since water quality has an impact on water use efficiency;
- iii. Promotion of water conservation and demand management;
- iv. Changing water use behaviour in order to influence conservation. Here the WfGD Framework specifically mentions agriculture, and Government's view that the low price of water in this sector may be leading to poor water use efficiency.

3.2.2.3 The Eskom/DWAF MOU on Water Conservation

Eskom and DWAF signed a memorandum of understanding in March of 2008, aimed at promoting increased levels of water use efficiency in the power generation sector through improved cooperation between DWAF and Eskom as regards:

- Management, operations and maintenance activities related to water conservation in the power generation sector;

- Effective, efficient and sustainable water use and sharing and adoption of best practice in the power generation sector (including research);
- Input to regulation of the power generation sector;
- Exchange of information as regards strategies and policies in terms of water conservation and climate change and;
- Exploration of opportunities to leverage synergies between DWAF's national WC/WDM programme and Eskom's Energy Efficiency and Demand Side Management (EEDSM) programme.

The MOU has an initial term of 5 years, during which time specific projects aimed at advancing the objectives of the MOU will be carried out. Management of individual projects will be through the vehicle of Substantive Agreements, which will lay out the terms and conditions of each project in alignment with the terms of the MOU.

The types of projects the MOU will facilitate may include:

- Establishing water conservation potential in the power generation sector;
- Improving power station water management systems in conjunction with facility upgrades;
- Strategic water use efficiency plans for individual power stations;
- Development of standards, policies, strategies, guidelines and benchmarks and;
- Awareness campaigns

Eskom and DWAF are assigned specific responsibilities in terms of the MOU, the overall management of which will be carried out by a Joint Steering Committee. Task teams comprising Eskom and DWAF personnel have been constituted to undertake specific packages of work in support of the goals of the MOU.

The MOU currently does not contain water use targets, and the intention is to agree these during the course of implementation. Each Eskom power station does however have an annual water use target that is expressed in the form of a water intensity figure.

3.2.2.4 The Working for Water (WfW) Programme

Administered by the Department of Water Affairs, the WfW programme removes invasive plant species from watercourses and catchments, thereby conserving water, preventing soil erosion and protecting ecological functioning. The programme was established in 1995, and uses mechanical, chemical, biological and integrated management methods to achieve its

goals. To date some one million hectares of invasive alien plants have been cleared, providing jobs and training to approximately 20,000 local people.

3.2.2.5 The World Wide Fund for Nature (WWF) Water Neutrality Initiative

This initiative, established in 2008, is an agreement between WWF South Africa and Government's Working for Water programme with the aim of securing private sector commitment in reducing water demand and investing in security of supply. The South African Breweries Ltd. is the founding corporate sponsor of the initiative, and has committed two South African breweries, the Newlands and Ibhayi Breweries, to water neutrality.

The programme encompasses a 3-step process (Review, Reduce, and Replenish) to be followed by participants. The "Review" step is about assessing the implementing organisation's water deficit. The "Reduce" step is about the reduction of the organisation's water use, while the "Replenish" step is about achieving water neutrality by investing in programmes that make additional water available.

At this stage these investments are actually donations, with the money being used to remove alien vegetation through the Working for Water Programme. The details of the initiative are outlined in Table 1 below.

Table 1: The Three-step Implementation Process for Water Neutrality

| PROCESS STEP | EXPECTATIONS FROM PARTICIPANTS |
|------------------|---|
| REVIEW | <ul style="list-style-type: none"> • Completion of a detailed water audit to accurately determine water use ("water deficit") • Results to be made publicly known in the interests of transparency and dialogue |
| REDUCE | <ul style="list-style-type: none"> • Development and implementation an ambitious, but realistic, time-bound water reduction and efficiency strategy, in partnership with WWF South Africa |
| REPLENISH | <ul style="list-style-type: none"> • Invest in projects that will make "new" water available in equal quantity to the water deficit. |

Source: WWF Water Neutral Scheme brochure, 2008

Annual payments are calculated based on investment period and total offset required, using average costs for the clearing of vegetation and the average benefits in terms of reduced stream-flow reduction. A "Water Neutral Calculator" is made available on the WWF website

for calculation of the total and annual costs of achieving neutrality, as well as the number of hectares of alien vegetation that would be cleared and the number of employment days created by this clearing process.

An overview of the MOU between Eskom and the Department of Water Affairs and the WWF Water Neutrality initiative is outlined in Table 2.

Table 2: Overview of Selected National Initiatives

| INITIATIVE | AFFILIATION | TARGETS | REPORTING | SUPPORT PROVIDED | INSTITUTIONAL ARRANGEMENTS | FUNDING |
|--|---|--|--|--|---|--|
| Eskom MOU | Mandatory as part of Eskom-DWAF Water Supply Agreements | Internal Eskom water conservation targets and commitments basis for targets and performance measurement | Annual reporting on progress on various initiatives; Supplemented by reporting as per the licence conditions of the power stations; | Department of Water and Environmental Affairs would provide technical support where feasible; Department of Water and Environmental Affairs would assist with joint research initiatives on water conservation; | Steering Committee with representatives from different Department of Water and Environmental Affairs directorates and Eskom Divisions; Work streams established for marketing, policy and technical engagements and implementation of initiatives. | Largely Eskom |
| WWF Water Neutral Scheme in South Africa | Voluntary | Quantitatively balance water account by reducing water use and investment in projects; Implement targets to reduce water use that are time - bound. | Publicly report water 'deficit' from water review/audit. | Water Neutral Calculator to establish the costs of clearing alien vegetation to achieve neutrality. | Professor Kader Asmal is patron of the scheme; Run through the office of the WWF Sanlam Living Waters Partnership. | Sponsorships; Investments in water off-sets are channelled into the Working for Water campaign. |

3.2.2.6 The National Framework for Sustainable Development (NFSD)

The National Framework for Sustainable Development was developed as the basis for a national strategy for sustainable development, which will ultimately be supported by a national action plan. It is grounded in the principles of resource use efficiency and intergenerational equity, and recognises the links between economic, social and environmental systems. The NFSD was developed through extensive stakeholder engagement, including the involvement of Business through the NBI.

Five strategic priority areas were identified in terms of the NFSD, these being:

- i. Enhancing systems for integrated planning and implementation;
- ii. Sustaining our ecosystems and using resources sustainably;
- iii. Investing in sustainable economic development and infrastructure;
- iv. Creating sustainable human settlements and;
- v. Responding appropriately to emerging human development, economic and environmental challenges

Water conservation and demand management is clearly an important aspect of each of these areas, either directly in terms of sustainable resource use, or indirectly as an enabler of some of the other priority areas. The framework directly addresses water-related issues on a number of fronts, and refers extensively to the United Nations Millennium Development Goals, adopted in 2000, which recognise the relationship between poverty reduction, growth and sustainable development. Explicit in these is the goal to “halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.”

While water conservation goals are not explicit in the Millennium Development Goals, it is clear that given South Africa’s limited water resources, conservation supports the achievement of increased drinking water provision in water-stressed areas. Where water treatment is employed to allow increased recycling in support of water conservation and pollutants are disposed of in hazardous waste facilities, conservation would also support the safety of water resources. South Africa has committed to achieving the targets set out in the Millennium Development Goals. The Department of Water and Environmental Affairs has placed on record, through the WfGD framework, that the Millennium Development Goals of halving the number of people with access to drinking water and sanitation provision were achieved in 2005 and 2008 respectively, and has set a target of the achievement of full water and sanitation provision for all by 2014.

The baseline for South Africa’s commitments as regards the Millennium Development Goals is outlined in Table 3 below.

Table 3: Water and Sanitation Provision in South Africa between 1995 and 2000

| BASIC SERVICE | % OF POOR HOUSEHOLDS | | % OF NON-POOR HOUSEHOLDS | |
|---------------------|----------------------|------|--------------------------|------|
| | 1995 | 2000 | 1995 | 2000 |
| Piped Water | 59.3 | 77.2 | 88.7 | 94 |
| Sanitation Facility | 74.6 | 71.7 | 93.7 | 91.3 |

Source: *The Presidency, circa 2006*

3.2.2.7 The Energy Efficiency Accord (EEA)

The Energy Efficiency Accord was adopted in 2005, and is a voluntary agreement between Government and South African companies and business associations aimed at assisting in the implementation of the National Energy Efficiency Strategy. The EEA has an energy savings target of 12% by 2015, with a target of 15% specified for the Industrial, Mining and Commercial Sectors. The business of the EEA is convened through an Energy Efficiency Technical Committee, which meets regularly to share best practices and exchange ideas of common interest as regards energy efficiency. The National Business Initiative carries out management and secretariat functions. Routine collection of the performance data of participants has not been practised in the first 3 years of the existence of the EEA, and intentions are that periodic reporting be introduced.

A 2008 survey that assessed the status and achievements of the EEA, showed that significant energy savings (up to 38%) as well as improvements in energy intensity (up to 23.5%) had been made by EEA signatories since the EEA was instituted. Signatories were also found to have made large investments in energy efficiency, totalling R9.9 billion from the time the Accord had been signed until the survey, a period of roughly 3 years.

The challenges encountered were summarised and the following recommendations were made in preparation for revision of the EEA:

- i. Gains made in energy efficiency should be considered in the revised EEA and the EEA should be aligned with other Government policies and initiatives;
- ii. Sector dynamics i.e. the unique characteristics of each sector should be considered when developing the measurement and verification system adopted in order to reduce measurement complexities;

- iii. Energy efficiency targets for the EEA should be energy-intensity oriented rather than energy oriented, with intermediary timelines to accommodate company expansion and regular monitoring;
- iv. Commitments on clear periodic communication of best practices should be made by both Business and Government to create more awareness;
- v. Commitments should be made on the level of monitoring system required for effective measurement and verification of energy efficiency improvements based on agreed baseline and “business as usual” projections;
- vi. A periodic common reporting system should be implemented;
- vii. Clear, verifiable and well-resourced commitments to skills and training development are needed in the revised EEA to ensure effective energy management;
- viii. An action-oriented Government commitment on support for incentives, technology development and transfer and Clean Development Mechanism (CDM) project facilitation as well as regular progress review are imperative for a revised EEA and;
- ix. Commitments should be made on resources required for implementing and monitoring all the revised EEA’s commitments i.e. a more formalised institutional structure is required.

3.2.3 Proven Generic Enterprise-level Water Conservation Approaches in South Africa

3.2.3.1 Metering and sub-metering

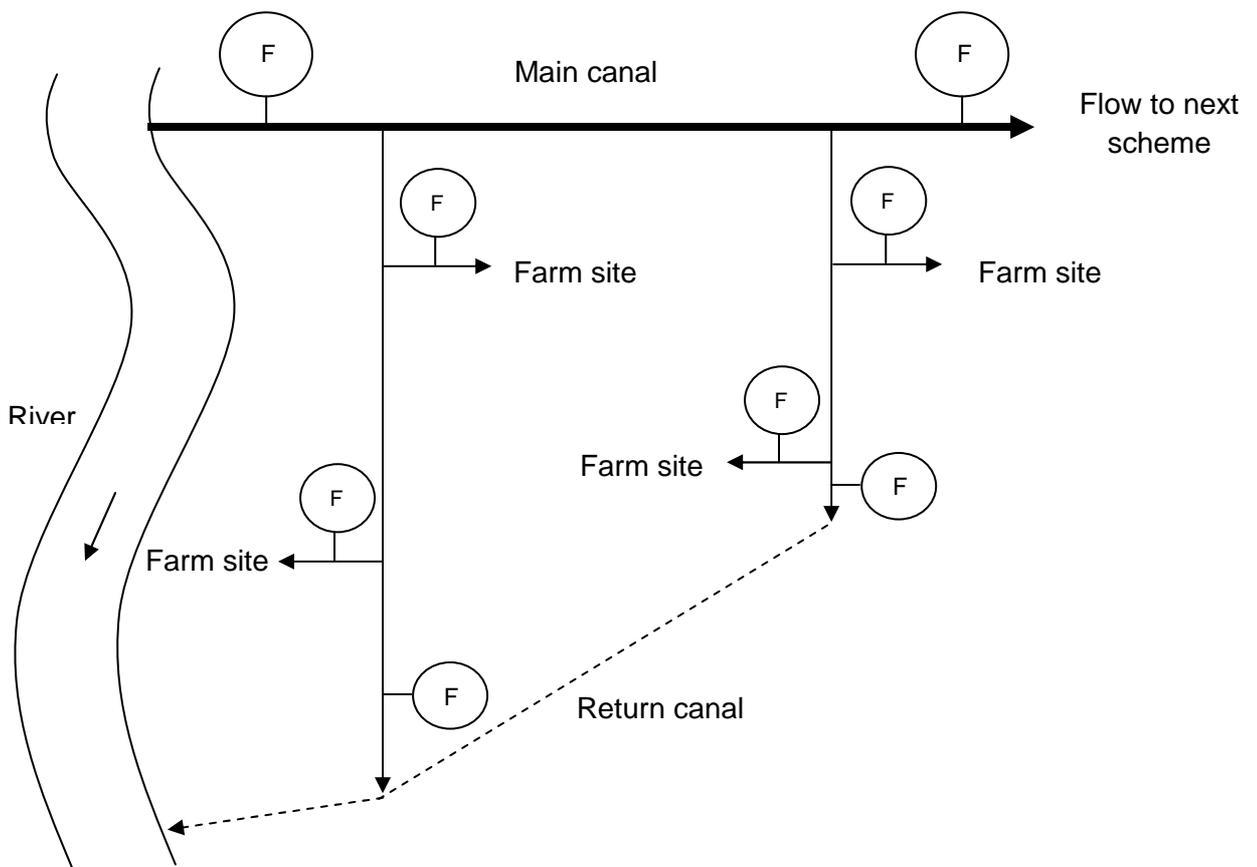
The metering of water volumes and the measurement of related variables is an important aspect of water conservation initiatives, regardless of the sector involved. Of itself, metering will not result in savings, but metering is probably the most important enabler of water use efficiency improvement. Data is required to quantify water use efficiency as well as to manage the *drivers* of water use efficiency. The more comprehensive a metering network is, the easier it is to troubleshoot water use efficiency problems and to manage water use efficiency on an ongoing basis.

At the site-level, compilation of a water balance is an important step in the identification of water efficiency improvement opportunities, and this cannot be done without adequate, accurate and precise metering. Many of the projects carried out by Waste Minimisation Clubs across South Africa show that metering enables significant reductions in water use. As an example, MF22, an electroplating company in Kwazulu-Natal, increased the number of water meters on its site from 1 to 8, enabling better water use monitoring.

Projects enabled by this improved monitoring resulted in water use reductions of 70% for municipal water and 50% for borehole water. The South African Breweries Ltd is an example of an organisation that uses sub-metering extensively as a conservation tool, and has installed 75 water meters at the Newlands Brewery alone over the last three years (WWF, 2008).

Water measurement in agriculture has a few unique features arising from the manner in which water from a common source is shared between individual users. Figure 1 below outlines a typical water supply scheme, with the ideal metering network installed as per the United States Ministry of the Interior Bureau of Reclamation’s guidelines. It is clear that in order to determine the amount of water supplied to individual users, metering is required at a number of points. At individual farm sites additional sub-metering may also be required in order to assess losses from on-farm dams, irrigation systems and the like, increasing the total investment required in metering. The costs of this metering are often hard to justify given that the potential savings associated with metering are not easily calculated.

Figure 1: Example of an Agricultural Water Supply Scheme



Source: Adapted from US Department of the Interior, Bureau of Reclamation

In cases where the length of the return canal is considerable, it may be preferable to install a further meter close to where the return canal discharges back into the river in order to more accurately quantify conveyance losses.

Selection of water metering devices in agriculture entails consideration of the characteristics of the water being metered, the technical suitability of the meters available, the costs of each option and the potential benefits.

Table 4 below outlines examples of metering options and their suitability for selected applications. Site conditions are an important consideration when selecting measuring devices since individual devices are designed to work under specific circumstances. It is therefore difficult to standardise metering requirements in the agricultural sector.

Table 4: Examples of Metering Options in Agriculture

| CONVEYANCE SYSTEM | CONVEYANCE | POTENTIAL METERING DEVICE / TECHNIQUE |
|---|---|---|
| Open Channel Conveyance System | Rivers | Broad crested weirs |
| | | Long-throated flumes |
| | | Slope-area Method |
| | Intermediate-sized and small streams | Current metering/control section |
| | | Broad-crested weirs |
| | | Long-throated flumes |
| | Spillways | Broad crested weirs |
| | | Short crested weirs |
| | Large canals | Broad-crested weirs |
| | | Short-throated flumes |
| | | Acoustic velocity meters |
| | Small canals (including open channel conduit flow) | Rated flow control structures (check gates, radial gates, sluice gates, overshot gates) |
| | | Acoustic velocity meters |
| Short-throated flumes | | |
| Closed Conduit Conveyance System | Large pipelines | Venturi meters |
| | | Rated control gates (orifice) |
| | | Acoustic velocity meters (transit time) |
| | Small and intermediate-sized pipelines | Venturi meter |
| | | Magnetic meter |
| | | Elbow meter |
| | | Pitot meter |

Source: Adapted from US Department of the Interior, Bureau of Reclamation (2001)

While metering can indeed be expensive, it has to be said that implementing water efficiency improvements in the agricultural sector in the absence of accurate, repeatable metering would be difficult.

One approach to dealing with this challenge could be to focus on groups of users who share a common water scheme as opposed to individual farms. This approach could mean that a macro water balance for the group could more feasibly be undertaken, and it would still be possible to conduct measurement of water use efficiency for the group, and measure improvements, provided that other data as regards field area and the mass of harvested crops required to calculate water use efficiency is made available by individual farms. The primary advantage of this approach would be that fewer meters would be required. However, not all irrigators share water schemes, and some water users abstract water directly for their own use. In other instances, conveyance infrastructure may be owned and operated by a third party, making it difficult to hold users accountable for conveyance losses. It is clear that in the agricultural sector, definition of the “site”, as will be required in order to measure site-level performance, is a process that depends on individual, local conditions.

3.2.3.2 Simultaneous conservation of water and energy

Projects targeting water savings invariably save energy, and energy conservation projects often also save water. Hence some South African organisations have been tackling water and energy conservation through singular projects. At the national level, reducing water consumption reduces water transfer energy requirements, and electrical energy savings lead to savings in water consumption through reduced water use at power stations. On average, Eskom’s national power station fleet uses between 1.3 – 1.4 litres of water for every kWh of energy supplied to the national grid (Eskom, 2006). Relationships between water and energy apply in local environments as well, for example at irrigation schemes reductions in water requirements often translate into reduced pumping costs.

The links between water and energy extend beyond electrical energy to include thermal energy. Here reducing the amount of waste heat generated by processes in the manufacturing, chemical production and petrochemical industries leads to reduced cooling tower evaporation. There are examples of this throughout chemical manufacturing as well as in other sectors such as the pulp and paper industry. The RB720 expansion project implemented at Mondi Richards Bay is an example of a project in which energy-saving technologies were pursued, with considerable water savings realised as an integral part of the project. Energy consumption was reduced by 44%, while water savings totalled 18% (WBCSD case study, 2006).

3.2.3.3 Wastewater recycling

This is a common strategy in South African industry e.g. the pulp and paper, iron and steel, mining and power generation industries, and grey water recycling systems for the commercial and home environment are also available in the South African market. The principle is to reduce freshwater intake by using water which would otherwise be discharged, either by treating the water first, or, where possible, using it without treatment. Recycled water may be used within and across sectors, with an example being Mondi's Merebank paper mill and the SAPREF refinery in Kwazulu-Natal, both of which use treated municipal effluent in their processes.

3.2.3.4 Point-of-use Water Conservation Options

Here the principle is to use water-efficient devices to reduce water consumption without compromising the objectives one wishes to achieve through use of the device. In the commercial environment this means use of water-efficient taps, toilets and the like. In agriculture this could mean mulching and water-efficient irrigation equipment, while in the industrial environment specific water-efficient processing equipment may be required.

3.2.3.5 Use of Recycled Raw Materials

The use of recycled raw materials in water-intensive industries tends to reduce water use, since virgin materials have to be exposed to the full conversion process while recycled materials do not. Recycled materials can be introduced further on in the manufacturing process, leading to skipping of some process steps. In addition, the use of recycled materials often results in less extensive processing requirements, reducing water consumption at the point of use.

South African industries, which use waste material as a portion of their total raw material input, include the pulp and paper industry, which uses recycled paper and board, and the iron and steel industry, which uses scrap metal to supplement iron ore inputs. Paper recycling rates in South Africa are roughly 50%, which is considerable. Recycling rates in some European countries are however significantly higher e.g. Germany recycles 75% of paper used (Naledi, 2005), suggesting that there is scope to increase paper and board recycling in South Africa. ArcelorMittal South Africa, the country's largest steel producer, currently uses up to 20% scrap steel in the organisation's crude steel production processes. With scrap steel reported to save up to 95% in terms of energy requirements, water is invariably saved due to reduced evaporation.

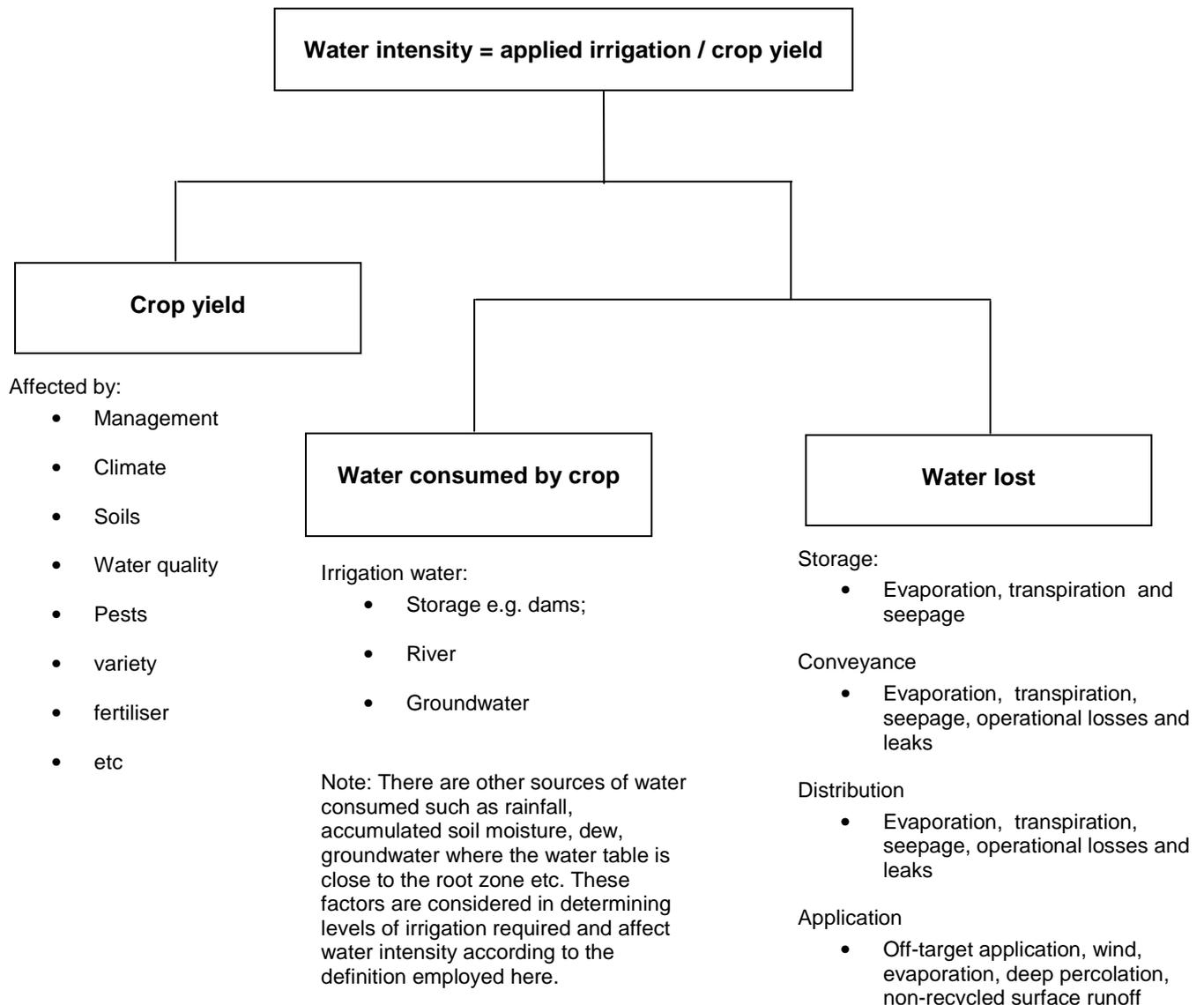
Recycling tends to generate employment, particularly at the “collection” end of the value chain, and is a clear example of how water conservation intersects with increased job creation and is intimately linked with other facets of environmental governance. There are limits as to how much recycled material may be used, imposed firstly by the effectiveness and extent of the supply chains in place and also the impacts these materials could have on final product quality. Water conservation is typically not the biggest driver of recycling as this is rather governed by process economics.

3.2.4 Sector-level Approaches

3.2.4.1 The Agricultural Sector

Irrigated agriculture represents the largest water use sector in South Africa. The drivers of water intensity in irrigated agriculture are outlined in Figure 2 below:

Figure 2: Drivers of Water Use in Irrigated Agriculture



Source: Adapted from Purcell and Currey

The following represent the practices that have been shown to promote water conservation locally:

3.2.4.1.1 Maintenance and management of conveyance infrastructure

Conveyance infrastructure is typically shared by a number of users in the agricultural sector. Distribution of water in these schemes is an important driver of water use efficiency, and this is achieved through the correct operation of gates and valves (i.e. canal water management), control of aquatic vegetation and effective asset maintenance. Conveyance losses would include losses from small shallow farm dams, which would comprise losses due to evaporation and seepage as well as due to the growth of aquatic plants.

In the absence of good overall management, water can be lost if not properly distributed. Years of research have produced the WAS (Water Administration System), a tool for irrigation scheme water management comprising 5 discrete but interlinked modules. The WAS includes a module for the management of water releases in canal systems. It is estimated that implementation of this module alone can yield savings of between 10 and 20%, highlighting the importance of matching water demand in canal systems to supply.

In addition, canals have to be kept clean or water can overflow and be lost. Vegetation in canals can also increase transpiration losses. The integrity of the canal walls is important to minimise leakage losses. It is estimated that 20-30% of water supplied to irrigated agriculture is lost in conveyance systems, with older systems periodically losing up to as much as 70% (Water Wheel, 2008).

It is thus important to have a holistic canal maintenance system in place in order to ensure that water resources in canal systems are conserved. In South Africa, what has been found is that such a system will typically mean a collaborative effort between farmers to ensure that the full length of the canal scheme receives attention. Oversight of this collaborative effort is best carried out by a formal structure in which all users of the scheme participate.

3.2.4.1.2 Crop selection

Different crops will use different amounts of water, with the yield of most crops following a curvilinear relationship between yield and applied irrigation. Clearly the crops that are most suitable in terms of water conservation are those which yield the highest profit for farmers per unit mass of water applied, taking irrigation's role as a risk management tool

into account. In any local environment, dryland farming would be the best option in terms of minimising the impacts on water resources. Hence drought resistant crops, some of which may possibly be produced using dryland techniques, are desirable from a water use efficiency perspective provided they can be produced at a favourable profit relative to other crops. The selection of crops, when seeking to optimise water use, should not be carried out without due consideration for soil characteristics. The crop water productivity values of selected crops are outlined in Table 5 below:

Table 5: Crop Water Productivity Ranges for Selected Crops

| CROP | CWP RANGE (kg/m ³) |
|------------|--------------------------------|
| Beans | 0.30 – 0.60 |
| Groundnuts | 0.60 – 0.80 |
| Millet | 0.16 – 0.66 |
| Sorghum | 0.60 – 1.00 |
| Maize | 0.80 – 1.60 |

Source: CEEPA, 2006

According to this data, maize and sorghum would require less water per mass of crop harvested than millet for example. Water is not the only driver of crop yield, and hence each crop has a fairly wide CWP range, as indicated.

3.2.4.1.3 Irrigation systems

Irrigation systems are important drivers of water conservation in the agricultural sector. Again, there are no universally applicable rules for selecting an irrigation system, since individual technologies must be matched with basic natural resources such as soil type, slope characteristics and climate. The types of irrigation systems used are as follows:

- Surface irrigation e.g. flood or furrow irrigation systems, which are on the decline in South Africa;
- Various types of overhead sprinkler type irrigation systems, such as centre pivot systems and;
- Localised irrigation systems, where water is distributed in a piped system and delivered to individual plants. An example would be drip irrigation.

Table 6 outlines the distribution of the various types of irrigation systems in South African agriculture, and the notional efficiency of each system.

Table 6: Irrigation Techniques Employed in South Africa

| IRRIGATION TECHNIQUE | NATIONAL PREVALENCE* | NOTIONAL DESIGN WATER USE EFFICIENCY LEVEL ** |
|----------------------|----------------------|---|
| Surface Irrigation | 33% | 55 - 65% |
| Sprinkler systems | 55% | 75 - 85% |
| Localised Irrigation | 12% | 85 - 95% |

Source: Food and Agriculture Organisation (FAO), 2000, Encyclopaedia of Earth, 2008***

Surface irrigation systems which exhibit application efficiency levels (i.e. the percentage of water delivered to the field that is made available for use by the crop) of up to 90% have however been reported, again reflecting the fact that each irrigation system is in practice optimised based on unique local conditions and characteristics. The implications in terms of benchmarking and target development are that neither of these is universal.

3.2.4.1.4 Irrigation scheduling

Irrigation scheduling refers to the timing and volume of actual irrigation applications i.e. when is the crop irrigated and for how long? By making the appropriate changes to schedules, water use efficiency can be improved. The attractiveness of optimising irrigation scheduling is that it does not require any capital expenditure. For example, the Mokolo Irrigation Board has successfully implemented this. Irrigation scheduling can have dramatic impacts on water use efficiency, an example being the California Irrigation Management Information System, which has reduced water use by 13% and increased yields by 8% through assisting growers with scheduling (Wong *et al*, 1999).

3.2.4.1.5 Mulching

Mulching is the process of applying a covering to the soil and can result in reduced evaporation of soil moisture as well as improved soil conservation i.e. inhibition of erosion. Evaporation levels are more effectively reduced by mulching on fine soils with high moisture retention characteristics than on soils that dry or drain more easily. Crop

residues e.g. sugar cane cuttings may be used as mulch, and there is also a range of synthetic mulch products available on the market.

3.2.4.1.6 *No-till Options*

Preparation of seedbeds by tilling is a conventional practice that can lead to soil compaction and hence reduced water infiltration. Increased levels of runoff and reduced levels of water storage in the root zone are consequences of tilling which lead to reduced levels of water use efficiency.

Conservation tilling and no-till farming are options which leave increased amounts of residues on the soil surface, reduce soil erosion and compaction and ultimately lead to increased levels of water use efficiency. No-till options are not widely practiced in South Africa, in part due to the risks of pests surviving over-winter on crop residues, particularly where crop rotation is not practiced (Fowler, 1999). Solutions for these concerns and other constraints could lead to increased adoption, with benefits for water conservation in agriculture.

3.2.4.2 The Commercial Sector

Large-scale water use efficiency initiatives in the commercial sector have not gained significant traction in South Africa to date. In terms of plumbing suppliers who can provide water efficient devices, the Water Research Commission (WRC) has established a project team (Water Efficiency South Africa) which identifies suppliers and collates information on the devices that can be supplied. The key water-saving devices employed internationally are available in South Africa, including items such as water-efficient plumbing, waterless urinals and grey water recycling systems. According to research conducted for the WRC, the uptake of these items into the South African market is more a function of their availability by default, since the countries of manufacture employ water-efficient standards, than a conscious decision to buy water-efficient products (Still, Erskine *et al* 2008).

Water Efficiency SA has compiled a list of proposed plumbing standards, the aim of which would be to negotiate implementation between Government and the plumbing fraternity, ultimately using the South African National Building Regulations as an implementation vehicle. In the interim, these recommendations serve as a valuable best-practice guideline for commercial water users. Water Efficiency SA is also proposing a labelling system for plumbing fixtures (as is already implemented in countries such as Australia and the U.S.),

which would rate each fixture in terms of, among other environmental indicators, water use efficiency.

The activities that users would need to carry out to raise levels of water use efficiency in the South African commercial sector are hence already known, and the necessary equipment is available locally. Table 7 outlines the potential benefits of efficient plumbing devices.

Table 7: Examples of Potential Water Savings from Efficient Plumbing Fittings

| PLUMBING DEVICE | POTENTIAL SAVING WITH EACH USE* |
|---|---|
| Tap aerator/restrictor | Current flow less 4 L/min |
| Efficient showerhead | Current flow less 9 L/min |
| Dual-flush toilet | 7 L per full flush, 10 L per half flush |
| Single urinals vs. a trough system | 3.2 L per flush |
| Waterless Urinal vs. a trough system | 6 L per use |
| Waterless Urinal vs. single flushing urinal | 2.8 L per flush |

Source: Adapted from Corr, Adams and Boynton, 2009

**Actual savings will depend on specific device characteristics as per supplier specifications*

Water-efficient gardening is a further aspect of water conservation for which the knowledge and resources are available in South Africa. The Green Building Handbook is an example of a local reference guide that can be used to assess water saving options for the commercial sector.

3.2.4.3 The Forestry Sector

Stream flow reduction represents the biggest water use in the forestry sector. Stream flow reduction due to commercial plantations primarily occurs through:

- Rainfall interception by the forest canopy, with subsequent evaporation;
- Incorporation of water into the cellular material of growing trees and;
- Transpiration after the water that reaches the ground is taken up by the trees

Commercial forests tend to be exotic with evergreen canopies and deep root systems. This is in stark contrast to the indigenous vegetation (such as grasslands) that commercial

forests replace during afforestation. Introduction of exotic species therefore results in a negative impact on available water resources.

The drivers of stream flow reduction due to afforestation are in broad terms:

- The total area planted;
- The type/species of tree planted;
- The precise location of planting – for example, planting in riparian zones has been shown to increase stream flow reduction;
- The age of the plantation;
- Silvicultural practices such as fertilisation and site preparation, aimed at influencing the growth of trees, could influence their water uptake.

The following are approaches used by the local industry to reduce water use.

3.2.4.3.1 External Certification as a Driver of best practice

The South African Forestry sector is generally well developed in terms of environmental protocols and practices, and is ranked 4th in the world in terms of the number of forest management units with Forest Stewardship Council (FSC) certificates. The certification requires compliance with South African water legislation. The industry has adopted the Forest Industry Environmental Guidelines for Conservation Management of Commercial Plantations in South Africa.

3.2.4.3.2 Use of Legislative Requirements to Drive Best Practice

The Afforestation Permit System (APS) was introduced in 1972, and is the vehicle through which water resources in the sector were managed, by limiting forestry activities subject to water availability and specifying plantation practices. In the 1990's, a registration and licensing system was introduced to regulate stream-flow reduction activities (SFRA's). Licence conditions are a powerful vehicle for controlling forestry activities, and can be used by Government to ensure that best practices as regards water use efficiency are enforced.

3.2.4.3.3 Water-efficient Practices in South African Forestry

The measures that have been shown to work in terms of water use efficiency in the sector are as follows:

- *Effective management of riparian zones* through avoidance in terms of new plantations and ongoing clearing. Plantations in riparian zones are thought to consume roughly twice as much water as those outside riparian zones;

- *Active management of alien invasives*, which may grow among trees in plantations and can cause large water losses through transpiration;
- *Weed control*, again to prevent excessive transpiration losses;
- *Even distribution of age classes*, which if maintained as a normal distribution, will result in more even water uptake over time;
- *The matching of tree species to site conditions* – certain species consume less water than others when subjected to the same conditions and;
- *Relocation of forest sites to more productive areas* (in terms of fibre produced per unit of water consumed).

The industry suffers from poor fibre productivity i.e. mass of fibre produced per unit of water consumed. If ways can be found to increase fibre yield while not increasing stream flow reduction impacts, the overall water use efficiency of the industry can be improved. According to the WC/WDM Strategy for the Forestry Sector, the “Fibre Options” study commissioned by DWAF has shown that water use productivity (i.e. the volume of fibre used per volume of water consumed) can be increased by up to 20% by 2020 through improvement in forest management practices.

The stream-flow aspects of the forestry sector’s water use are not amenable to their inclusion in the Stakeholder Accord on Water Conservation, since there are a number of measurement difficulties associated with relating stream-flow to plantations. The areal extent of plantations is a matter of debate, and the measurement and attribution of the stream-flow reductions associated with specific areas can be difficult. The forestry aspects of the Accord will therefore focus on the water that is directly used by the forestry sector, which at the last iteration of the NWRS totalled some 428 million cubic metres per annum. The principles to be used in managing this water use are of a similar nature to those used in irrigation agriculture.

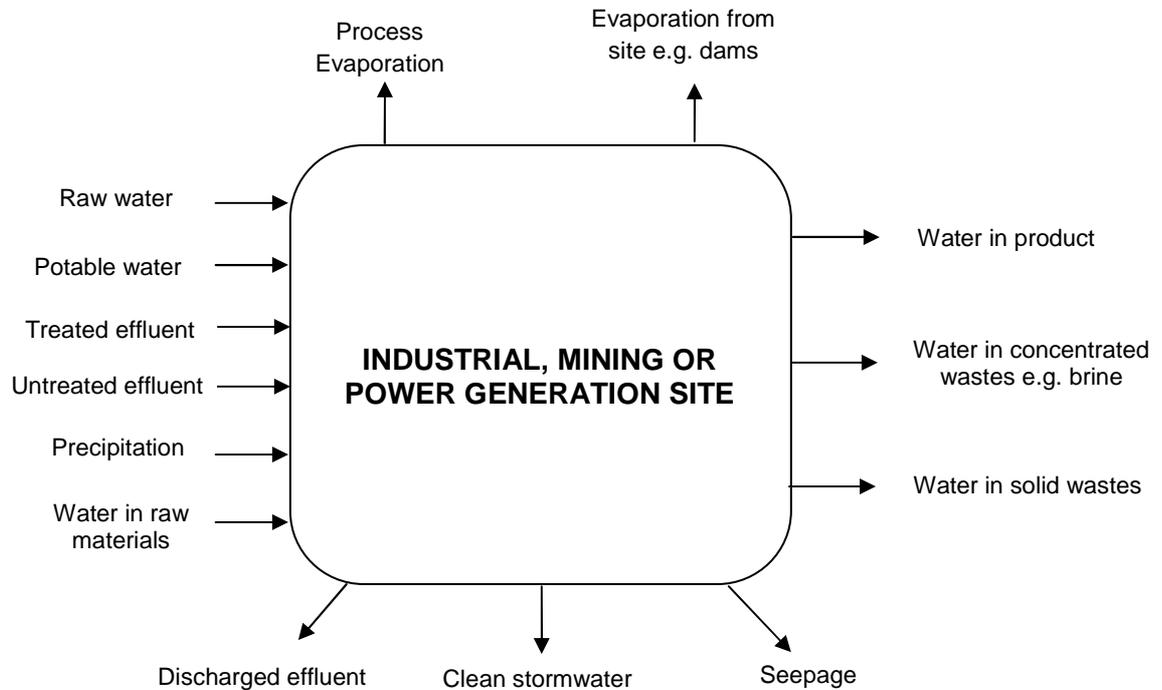
3.2.4.4 The Industries, Mining and Power Generation (IMP) Sector

The IMP sector comprises a wide range of industrial manufacturing operations, a diverse mining and beneficiation sector and the power generation sector. While there are often stark differences between individual member organisations, the principles that have been shown to be successful in this sector are fairly generic.

Closing the water balance i.e. permitting as little water as possible to leave site battery limits/boundaries is a common strategy employed both in pursuit of water conservation

and as a means of avoiding effluent discharges to the environment in the South African IMP sector. Figure 3 below outlines the overall generic water balance for this sector.

Figure 3: Generic Water Flow Diagram for a Site in the IMP Sector



3.2.4.4.1 Use of Alternative Water Sources

Fresh water resources can firstly be conserved by using alternative sources. There are examples of sites in South African industry that utilise wastewater from other sites as an input to processes. One such site is operated by a large coastal chemical manufacturer that uses untreated wastewater from a neighbouring site for conveyance of waste materials to a disposal outfall at sea. This saves raw water. A further example is the power generation industry, which supplements its raw water supplies with mine water and treated sewage.

IMP sites often have significant rainwater harvesting potential. Harvested rainwater could be diverted into processes, thereby reducing abstractions. Most sites enjoy good rainfall recovery rates due to the large surface area available for capturing precipitation, and the nature of the infrastructure, which in most cases comprises tarred or concreted surfaces and good drainage systems for capturing the rainfall. Excessive stormwater on site could become undesirable should the water not be recyclable due to the absence of a suitable sink, particularly when its quality is negatively impacted, in which case it becomes an

effluent that has to be safely disposed of. While rainwater harvesting is permissible without formal authorisation for domestic use, commercial and industrial rainwater harvesting has to be registered with the Department of Water Affairs.

3.2.4.4.2 Minimisation of Evaporation

Minimisation of evaporation is an important means of reducing consumptive water use in the IMP sector. The nature of the evaporation is important, as this drives the types of water use efficiency interventions that can be applied. In power generation, where evaporation from cooling towers at wet-cooled stations comprises up to 85% of total site water use, the industry solution has been the installation of dry cooling units. This saves large quantities of water, but has the drawback of being sensitive to climatic conditions, and generally resulting in lower turbine efficiencies than wet-cooled systems. As a result, dry cooling can increase coal costs and carbon dioxide emissions.

Where the evaporation is the result of a direct heating process, many South African industries condense the hot vapour stream in order to capture the heat as well as the water. In the brewing industry, the opportunity exists to use mechanical vapour recompression to compress kettle vapours and then condense them through the use of these vapours as a heating medium. Kettle evaporation amounts to roughly 7% of volume boiled in the brewing process (van der Merwe and Friend, 2002), which is some 5% of final production volume. The technology has not been adopted in South Africa to date. The condensate could potentially be reused, but would require some treatment since it does contain organic impurities. In the chemical manufacturing and petroleum industries, cooling tower evaporation is minimised by taking a holistic view of the entire site and examining opportunities to exchange heat between processes as opposed to simply rejecting the heat at the cooling towers. This is a prime example of the intimate links between water and energy management in this sector.

Besides process evaporation, large amounts of water may be lost through evaporation from dams and impoundments. The extent of this evaporation is a function of climatic conditions and the temperature of the water involved, and can be minimised by reducing the surface area of the dams. Where dams are not lined, both surface area and depth require careful consideration, since here there is a trade-off between evaporation and seepage losses.

3.2.4.4.3 Minimisation of Seepage

Seepage losses in the IMP sector can be significant, particularly in the mining industry and industries which routinely employ dams, such as the iron and steel industry, the ferrochrome industry and power generation. There is no common standard as regards the lining of dams in South Africa, and many sites operate un-lined dams. In such cases, seepage losses will depend on the geology of the site, the nature of the water contained in the dam (e.g. a natural lining may form where suspended solids levels are high) and characteristics of the dam itself, specifically the depth of the dam. Many South African IMP operations employ seepage recovery systems to allow recovery and reuse of seepage from on-site dams.

3.2.4.4.4 Avoiding Water Losses in Waste Materials

Water is routinely found in waste materials in wet industries. In agro processing industries such as processed food production, it is common to find moisture levels of up to 80% in waste materials. The mass of these waste materials is however typically small. In mining, water is typically associated with tailings, which is the undesirable fraction of the ore. The design of cyclone separators used in the mining and mineral-processing industry should be such that the mass of water entrained with waste materials is minimised. Many South African mining operations employ seepage recovery systems at tailings stockpiles, further reducing water losses. Some South African mining operations use ponds to evaporate the water from waste materials, while others recover water from these ponds for reuse. Again, the sector does not employ a consistent approach.

3.2.4.4.5 Minimisation of Effluent Discharge

The discharge of liquid effluents is still a feature in many South African industries, examples being the pulp and paper industry, the food and beverage industry and the sugar processing industry. Some industries, examples being the iron and steel and power generation industries have however adopted a “zero liquid effluent discharge” (ZLED) philosophy in which discharges are eliminated. Effluent discharge and water use efficiency are linked. The correlation between the volume of effluent discharged and the volume of water used depends on the extent of consumptive use at an individual site. Where consumptive uses are high, the relationship between effluent discharge and water use will be weaker than for the situation where there is limited consumptive use. In general terms, for sites at which consumptive use is low, the lower the volume of effluent discharged at an individual site, the more efficient the site will tend to be.

Reducing the volume of effluent discharged requires focus on two key areas:

- i. The minimisation of water consumption at point of use and;
- ii. The reuse of effluents.

Point-of-use water consumption minimisation requires specific process knowledge to implement, and is an area where water conservation converges with a number of other organisational objectives. For example, in the fruit juice industry, water is used to displace products from pressurised processes, as is the case at the end of juice filtration. The volume of water used can impact on a number of important process goals, such as product quality, manufacturing costs, safety, effluent quality and throughput. This is therefore not a simple case of minimising the amount of water used, but one of optimising water use efficiency within the context of numerous, often competing objectives. Where equipment is required to effect point-of-use water conservation, capital costs can be very large relative to the quantities of water saved. An example would be the use of wash presses in the paper industry as a means of increasing pulp consistency and reducing wash water volumes.

Effluent reuse is practiced in a number of South African industries, notably power generation, the food processing industry (where cleaning solutions are recycled), the pulp and paper industry, mineral processing and the iron and steel industry. The recycling of effluents may occur with or without treatment, depending on the specific requirements of water-demanding processes relative to the quality of the effluents generated. According to global consulting firm Frost and Sullivan, the South African industrial water and wastewater treatment market is currently growing at 8% per annum.

Treatment technologies are diverse, and are often used in specific combinations targeted at contaminants in the incoming effluent and the desired final quality of the treated effluent. Treatment processes result in two streams: the purified water, which can be reused or discharged to a water resource, and a concentrated waste stream containing the contaminants that have been removed. In the case of biological treatment, biomass would be a significant by-product of treatment processes. The waste stream has to be disposed of in a manner that does not compromise the environment. Typical treatment technologies employed in South African industry are desalination (using reverse osmosis or ion exchange), Membrane Filtration, Sand Filtration, Dissolved Air Flotation, Clarification, Lime Softening and Biological Treatment. These treatments can come at a significant capital and operating cost, which has to be traded off against the benefits of water conservation when making investment decisions.

3.3 Considerations Arising from the Review of National Water Conservation Initiatives

The Stakeholder Accord on Water Conservation is an initiative very much aligned to South African water policy and law. The Accord is aligned to the National Water Act and the National Water Resource Strategy, both of which stress the conservation of water resources. At the level of individual users, interactions with Catchment Management Agencies will most likely increase over time as these become better established. It is important that the water conservation plans and targets of individual water users are aligned to water use licence conditions. Communication with local water regulation structures (Department of Water and Environmental Affairs local representatives and, going forward, CMA's) regarding the existence and role of the Stakeholder Accord on Water Conservation will become increasingly important. The Accord is aligned to the Constitution of South Africa, since water conservation supports the provision of water where water resources are limited, as is the case in South Africa.

The integrated water resource management philosophy of the NWA and the NWRS has a unique relevance in the context of water conservation, since conservation initiatives should not be contemplated or implemented in isolation. By the same token, participants to the Accord should recognise the impacts of their actions on water conservation. A water conservation initiative that results in an inordinate increase in energy consumption would in this context be undesirable, for example, as would an initiative aimed at decreasing air pollution that resulted in an inordinate increase in water consumption. Where the Water for Growth and Development Framework seeks to place water at the centre of national discourse, the Stakeholder Accord on Water Conservation is a potential vehicle for placing water conservation at the centre of decision-making, or at least significantly raising the profile of water conservation among participant stakeholders.

Both the National Water Act and the Water Services Act consider water pricing as an instrument of Government. In an environment of increasing water scarcity, it is feasible that water prices will increase in South Africa in response to increasing demand. There are no direct impacts on the Accord itself arising from this situation, though the success of the Accord in reducing water consumption would in itself assist in delaying potentially rapid price increases. Increasing prices could also drive reduced water use, both through users seeking to reduce direct water costs as well as through the increased attractiveness of investments in water conservation technologies.

The individual water use sector National Water Conservation Strategies are deficient as regards concrete actions that will be taken by Government in reducing water use in the Agriculture, IMP and Forestry sectors. These strategies are in the process of being reviewed, which would entail engagement with stakeholders. The Accord may not always be the best vehicle through which stakeholders may wish to influence these strategies, but there is an opportunity for Government to communicate progress to the various water use sectors through forums that may be created by the Accord.

The water conservation studies conducted by the Department of Water Affairs in the various WMA's represent a potential source of information, which could be used by the Accord to support water conservation among participant sectors. While some of the information concerning private organisations may be confidential, the approaches, benchmarks and WMA-level assessments could be of use in assisting participant sectors with water conservation. For example, an assessment of a site from a particular sector could provide information that could be used to develop a water-use audit document that could be applied by users at participant sites. It may be possible, through engagements between the stakeholders, to take the water conservation-related needs of the Accord stakeholders into account in carrying out these studies so that both Department of Water Affairs' aims and those of the Accord are supported, since the Department of Water Affairs is a key Accord stakeholder.

The concept of a Stakeholder Accord on Water Conservation is well-aligned to the Water for Growth and Development Framework. The WfGD Framework is however far broader than conservation alone, and it is probably inappropriate to use the Accord as a platform for engagement in this regard. The WfGD's stated aim of promoting conservation could potentially be leveraged as a means of marketing the Accord to potential participants. The Eskom/DWAF MOU on Water Conservation holds promise for future collaboration between Accord structures and the MOU, given that some of the aims of these initiatives overlap. This engagement will most probably happen over time once the management structure of the Accord is established and implemented.

The Accord supports the National Framework for Sustainable Development, which itself appears aligned to the WfGD Framework. No formal links to this initiative are required as far as the Accord is concerned.

The WWF Water Neutrality initiative addresses both conservation as well as water supply issues, though it could be argued that the removal of alien vegetation is itself a

conservation initiative. The commitments required of participants are significant, despite participation being voluntary, and would exceed those envisaged for the Stakeholder Accord on Water Conservation. The concepts used in determining water use levels and in the compilation of a water efficiency strategy are useful, since these inform the types of tools required by Accord participants.

The Energy Efficiency Accord (EEA) has fundamental differences to the proposed Stakeholder Accord on Water Conservation, principally the fact that the former has an organisational focus as opposed to a sector focus. Commitments in both instances still do however have to be made at the user level. Despite the presence of industry associations among the membership of the EEA, it is likely that the number of users involved in the Stakeholder Accord on Water Conservation will be significantly larger, particularly when the agricultural sector is considered. The institutional arrangements for the Stakeholder Accord on Water Conservation will therefore most likely have to be of a multi-tiered nature, with engagements directly between users and sector or sub-sector representatives at lower levels, followed by engagements between these sector representatives and other stakeholders at an “Accord” level.

Measurement of performance for the EEA based on energy use only was found to be a deficient approach, with energy intensity recommended for future performance evaluation. For much the same reasons, water intensity (also commonly referred to as specific water consumption) would be preferred over absolute water use when measurement of performance as regards the Stakeholder Accord on Water Conservation commences. This measurement will not be practical in the short term, but should be planned for at the outset, and timelines agreed as to when performance measurement will begin.

Difficulties encountered with the EEA regarding sector dynamics should automatically be catered for by the chosen structure of the Stakeholder Accord on Water Conservation, which is aimed at the sector level and will rely on intra-sector collaboration. Issues of capacity encountered with the EEA will most likely be mirrored in the implementation of the Stakeholder Accord on Water Conservation, since training and development in this area is underdeveloped. It was recommended by the reviewers of the EEA that the revised EEA make commitments to training and development aimed at enhancing skills in the area of energy efficiency improvement. The Stakeholder Accord need not deal with these issues directly, but could be used to channel the needs of the various sectors as regards water conservation skills to the relevant parties who carry out such work.

The EEA began with a small institutional framework managed by the National Business Initiative, and it is envisaged that this will now become more formalised. This need has arisen from the broadening scope of activities foreseen for the EEA. The activities that will be pursued by the Stakeholder Accord on Water Conservation will to a large degree drive the institutional arrangements required. It is however probably fair to say that a higher degree of formalisation than was initially adopted for the EEA will be required. This is due to the need for sector-level engagement, which will require some initial facilitation from a central body, and then ongoing communication as the Accord is put into effect.

The review of current approaches in specific South African water use sectors highlights the following key issues:

- Adapted and durable technologies required for water conservation are available locally, can be manufactured in South Africa or may be imported into South Africa at short notice where they do not exist;
- Solutions have to be adapted to local environments due to site-specific drivers of water conservation. Benchmarks are useful as a means of referencing performance, but are not a universally definitive indication of best practice in any sector;
- Water conservation can be a technically complex undertaking. This is particularly so where water use is being optimised together with a range of other objectives. Process owners are best placed to conduct such optimisation;
- Insufficient metering could compromise baseline water use determination, benchmarking and ongoing monitoring of water use efficiency improvement. In some sectors, specifically forestry, measurement is an inherent challenge.
- There can be significant costs involved in implementing water conservation. The incremental costs of improvement generally increase as users become progressively more efficient, since improvement then becomes less a case of changing practices than one of implementing new technologies. The individual circumstances of users should therefore be catered for.

4 REVIEW OF INTERNATIONAL WATER CONSERVATION INITIATIVES

4.1 Overview

The numerous international protocols relevant to water conservation and demand management originated from the need to ensure environmental sustainability and sustainable water resource management. These concepts emphasize consideration of the long-term future when making decisions regarding the present.

Because sustainability is a function of various economic, environmental, ecological, social, and physical goals and objectives, the management of water resources involves multi-objective tradeoffs in a multidisciplinary and multi-participatory decision-making process (Loucks, 2000).

4.2 The United Nations (UN) Global Compact

The UN Global Compact is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption. The initiative involves over five thousand corporate and stakeholder participants from 130 countries. The United Nations Environmental Programme (UNEP) has been closely involved as a core UN agency in the initiative, acting as guardian of its environment principles and building on its longstanding experience in engaging the private sector in voluntary action for sustainable development.

The two objectives for the strategic policy initiative of the UN Global Compact are to:

- Mainstream the ten principles in business activities around the world and;
- Catalyse actions in support of broader UN goals, including the Millennium Development Goals (MDGs).

Three of the ten principles outlined in the Global Compact deal specifically with the environment. These three principles identify that the policies and operations of business can play a role in reducing impacts on resource use and the environment. The three principles are:

Principle 7: Businesses should support a precautionary approach to environmental challenges;

Introducing the precautionary approach, Principle 15 of the 1992 Rio Declaration states “where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”.

The precautionary principle applies to water conservation initiatives only insofar as actions taken in order to conserve water lead to risks of harm that may not be easily quantified. The principles on Integrated Water Resource Management (IWRM), as outlined in the National Water Resource Strategy (NWRS) deal comprehensively with this issue. Provided IWRM is integrated into the Accord principles, there is no need for explicit inclusion of the precautionary principle.

Principle 8: Undertake initiatives to promote greater environmental responsibility;

In Chapter 30 of Agenda 21, the 1992 Rio Earth Summit formulated the role of business and industry in the sustainable development agenda as: "*Business and industry should increase self regulation, guided by appropriate codes, charters and initiatives integrated into all elements of business planning and decision making, and fostering openness and dialogue with employees and the public.*"

The relevant steps that businesses could take, as explained in this principle are the following:

- Development of sustainability targets and indicators (technical, economic, environmental, and social);
- Establishment of sustainable production and consumption programmes with clear performance objectives to take the organisation beyond compliance in the long-term;
- Adoption of voluntary charters, codes of conduct or practice internally as well as through sectoral and international initiatives to confirm acceptable behaviour and performance;
- Measurement, tracking and communication of progress in incorporating sustainability principles into business practices, including reporting against global operating standards and;
- Transparency and unbiased dialogue with stakeholders.

In doing the above, the existence of appropriate management systems is crucial in helping businesses and industries meet organisational challenges. This principle and its subsequent steps for implementation lend themselves well to the Accord. They highlight that the development of targets, the measurement of performance against these and reporting of this performance are important components of an action-orientated sustainability plan. It is important to note however that the philosophy of the UN Global Compact is not to monitor performance, but for participants to report on performance themselves. Failure to report can ultimately lead to exclusion from the Compact.

Principle 9: Encourage the development and diffusion of environmentally friendly technologies.

Environmentally sound technologies, as defined in Agenda 21 are technologies that:

- i. Protect the environment;
- ii. Are less polluting;
- iii. Use all resources in a more sustainable manner;
- iv. Recycle waste products better and;
- v. Handle residual wastes in a more acceptable manner than the technologies for which they were substitutes.

In the context of water conservation these technologies would either permit the recycling of water or the use of reduced quantities of water for individual processes.

The relevance of this principle to the Stakeholder Accord on Water Conservation would be in the communication of best practices as regards technologies between stakeholders, and the development and implementation of incentives by Government to promote water-efficient technologies.

4.3 The World Business Council for Sustainable Development

The World Business Council for Sustainable Development (WBCSD) is a CEO-led, global association of some 200 companies dealing exclusively with business and sustainable development. The primary aim of the Council is to provide a platform for companies to explore sustainable development, share knowledge, experiences and best practices, and to advocate business positions on these issues in a variety of forums, working with governments as well as non-governmental and intergovernmental organizations.

Membership to the Council is drawn from more than 35 countries and 20 major industrial sectors. The Council has links to 58 national and regional business councils globally. Since 1997, water has become a key factor in the sustainable development agenda of the WBCSD in its attempt to ensure that business, and not merely water sector organisations, addresses water-related environmental, social and economic challenges. The water-related initiatives of the WBCSD aim to:

- Clarify and enhance business understanding of key water issues and drivers;
- Promote mutual understanding between the business community and non-business stakeholders on water management issues and;
- Provide tools and models to support effective business action.

In 2007 the WBCSD launched an initiative called 'The Global Water Tool' that links a company's water inventory with external data. The intended use of the tool is to:

- Compare a company's water uses (including staff presence, industrial use, and supply chain) with validated water and sanitation availability information – on a country and watershed basis;
- Allow the calculation of water consumption and efficiency;
- Establish relative water risk in the company's portfolio to prioritise for action – including more detailed assessment;
- Create key water Global Reporting Initiative indicators, inventories, risk and performance metrics and geographic mapping and;
- Enable effective communication with internal and external stakeholders on the company's water issues.

In support of its varied initiatives in water, the WBCSD Water Working Group brings together companies from the mining and metals, oil and gas, consumer products, food and beverage, chemicals, finance, and infrastructure services and equipment sector. The Global Water Tool has been used and further enhanced by companies such as Royal Dutch Shell, Dow Chemical Company, DuPont, Alcan, Unilever, PepsiCo and Petro-Canada.

The broad approach of the WBCSD has relevance to the Stakeholder Accord on Water Conservation from the perspective that it creates an enabling environment for member organisations. The proposed Accord will be voluntary, and hence this provision of an enabling environment provides an incentive to join the Accord. The enabling environment referred to should encompass the provision of opportunities for participants to engage and share best practices, and gain access to tools, standards and assistance in measuring and managing water use performance.

Membership of the WBCSD is by invitation, and member companies are asked to publicly report on their environmental performance. Member companies to the WBCSD provide staff and resources in support of its work. A Council, which meets once per year, and an Executive Committee, which meets three times a year, oversees the initiative. A staff secretariat of 50 people runs the day-to-day operation.

4.4 The UN Global Compact CEO Water Mandate

The CEO Water Mandate is a public-private initiative designed to assist companies in the development, implementation and disclosure of water sustainability policies and practices. While the initiative is voluntary, participation is restricted to existing corporate endorsers of the UN Global Compact (UNGC). Companies that are not currently signatories of the UN Global Compact may endorse the CEO Water Mandate provided they intend to join the UNGC within six months of endorsing the CEO Water Mandate. The initiative already features close to 50 endorsers with sector and geographic diversity, including companies such as Coca-Cola, Dow Chemical, Levi Strauss, Nestlé, PepsiCo, Royal Dutch Shell and Unilever.

The CEO Water Mandate recognises that businesses impact on water resources both directly and through supply chains, and has six focus areas: Direct Operations; Supply Chain and Watershed Management; Collective Action; Public Policy; Community Engagement; and Transparency. Endorsing companies are required to report annually on their implementation progress, per a Transparency Policy. One of the focus areas within the broader water management goals of the CEO Water Mandate is to reduce the water footprint of organisations through the implementation of programmes to improve water use efficiency in business operations.

The focus areas in the CEO Water Mandate that have relevance for the Stakeholder Accord on Water Conservation are Direct Operations, Collective Action and Transparency. Each of these is discussed in more detail below.

In terms of *Direct Operations*, which deals with water use by an organisation's own operations, participants are expected to commit to:

- Completion of a comprehensive water-use assessment to understand the extent to which water is used in the direct production of goods and services;
- The setting of targets for the company's operations related to water conservation and waste-water treatment, framed in a corporate cleaner production and consumption strategy;
- Investment in and use of new technologies to achieve these goals;
- Raising of awareness of water sustainability within corporate culture and;
- Inclusion of water sustainability considerations in business decision-making – e.g., facility location, due diligence, and production processes.

The principle of *collective action* in implementing water conservation initiatives is based on multi-stakeholder collaboration. It allows organisations to draw on significant expertise,

resources and capacity to achieve the objectives of improving water use efficiency. The CEO Water Mandate commits to the following actions:

- The building of closer ties with civil society organizations, especially at the regional and local levels;
- Working with national, regional and local governments and public authorities to address water sustainability issues and policies, as well as with relevant international institutions – e.g., the UNEP Global Programme of Action;
- Encouragement of the development and use of new technologies, including efficient irrigation methods, new plant varieties, drought resistance, water efficiency and salt tolerance and;
- Support to the work of existing water initiatives involving the private sector – e.g., the Global Water Challenge; United Nation Children’s Fund (UNICEF) Water, Environment and Sanitation Programme; International Federation of the Red Cross and Red Crescent (IFRC) Water and Sanitation Program; the World Economic Forum Water Initiative – and collaboration with other relevant UN bodies and intergovernmental organizations – e.g., the World Health Organization (WHO), the Organisation for Economic Co-operation and Development (OECD), and the World Bank Group.

The CEO Water Mandate pledges to undertake the following actions in the interests of *transparency and disclosure*:

- Inclusion of descriptions of actions and investments undertaken in relation to The CEO Water Mandate in the annual Communications on Progress for the UN Global Compact, making reference to relevant performance indicators such as the water indicators found in the Global Reporting Initiative (GRI) Guidelines;
- The publishing and sharing of water strategies (including targets and results as well as areas for improvement) in relevant corporate reports, using – where appropriate – the water indicators found in the GRI Guidelines and;
- Transparency in dealings and conversations with governments and other public authorities on water issues.

The CEO water Mandate convenes two working conferences each year involving corporate water experts and practitioners, as well as a range of key stakeholders and partners. The aim of these workshops is to assist companies in the development of sustainability strategies and to focus on water-related issues.

The Stakeholder Accord on Water Conservation does not have as wide a focus as the CEO Water Mandate. It is however possible to extract approaches that would be relevant

to water conservation for possible application in the Stakeholder Accord on Water Conservation. The following approaches are of value:

- *Collective Action* would allow the Accord stakeholders to benefit from a broader spectrum of resources. In the context of the Stakeholder Accord on Water Conservation, potential engagement partners would be organisations such as the Water Research Commission, The National Cleaner Production Centre, Waste Minimisation Clubs across South Africa, Universities/Academia and organisations involved in conservation e.g. Eskom, who has an MOU with the Department of Water Affairs. The benefits of this engagement would be access to resources that augment those of the Accord and more rapid acquisition and dissemination of best practices.
- *Transparency* is an important issue given Government's involvement in the Accord, particularly as regards the potential use of state resources in support of the Accord.
- Reporting in the public domain on the performance of the Accord and its accomplishments, without divulging sensitive corporate information, could be an important aspect of the marketing of the Accord, as well as the fulfilment of public accountability.
- *Water use assessment* is a useful approach through which stakeholders could understand their unique water use profiles, and be enabled to set individual targets. These targets need not necessarily be declared at the Accord level, but are necessary if water conservation at site level is to be achieved.

4.5 The waterMAP programme

At inception in 2003, the waterMap programme was a voluntary programme between 200 non-residential water consumers in Melbourne and the water authorities. The programme was designed to develop water management plans with significant water users. Water use efficiency and water loss targets were established based on industry-specific benchmarks that were established by the programme. By 2006, the initial programme, called the "Pathways to Sustainability" programme, had achieved savings of 6.2 million cubic metres, which amounted to 13% of water use by the most significant non-residential consumers in Melbourne. The programme was then expanded to become mandatory for all non-residential consumers using 10 000 m³ per annum or more.

The Victorian Government requires users to:

- Register their intent to develop a water Management Action Plan (waterMAP);
- Develop and submit a waterMAP;

- Annually report to their local water corporation on the implementation of their waterMAP and water savings and;
- Review their waterMAP at the request of their water corporation.

In order to assist users in the development of their waterMAP, the Victorian Government developed a handbook, which includes a process guide, assisting businesses to develop a program to:

- Assess their current water use;
- Identify inefficiencies and potential water savings;
- Prepare an action plan to implement water conservation actions and;
- Annually review and report implementation of water conservation actions.

The waterMAP guide also includes templates that businesses can use in the development of their action plans and in setting annual targets. The guidelines provide 12 steps which businesses can follow in developing and implementing water conservation initiatives. These steps range from registering the business's intent to prepare a waterMAP, to the development of overall and specific targets, to implementation and monitoring, including how reporting is done against the waterMAP the business has developed.

The waterMAP programme provides for financial assistance for development of the plan as well as assistance with the capital required to implement the actions arising from the plan, depending on whether there are funding programmes for the specific actions the business has identified.

A fundamental difference between the waterMap programme and the Stakeholder Accord on Water Conservation is that the waterMap programme is mandatory for all non-residential users above the volume threshold of 10 ML/annum, while the Accord is voluntary. This has implications for what can reasonably be expected from participants, since if the conditions of participation are made too onerous, not enough participants may be attracted to the Accord. The methodologies applied in achieving savings, specifically the use of water audits and targets, are however useful.

4.6 Water Footprint Network (WFN)

The WFN, as it is commonly known, is a non-profit entity working to promote water stewardship through the advancement of the concept and methodology of water footprinting. Driven by growing concerns about water scarcity and unchecked water consumption, corporate water footprinting has emerged as a useful tool for assessing water use. It has two main benefits that can be summarised as follows:

- It helps to determine a company's basic water use and;
- It can provide a standard for comparing and benchmarking water use with industry peers.

The WFN is involved in developing standards and tools for water footprinting, and facilitation, harmonisation and dissemination of the methodology. This network can assist local businesses and corporations to measure their water use and benchmark water use against similar business operations and companies.

SABMiller is an example of a South African organisation that used water use footprinting to analyse its operations. The analysis measured the amount of water used in malt production, container manufacturing and barley growing, concluding that 95-98 percent of the organisation's water footprint lies within agricultural production. The final analysis estimated that 155 litres of water are used for every litre of SABMiller beer produced, though the company predicts this number may be even higher in reality.

Water use footprinting is useful for the analysis of water use in value chains, but would be an impractical tool for use in the Stakeholder Accord on Water Conservation, since it requires very detailed analysis and large amounts of data. It may be something that stakeholders may want to pursue on a limited basis at some time in the future e.g. as a test project in a selected sector.

4.7 Sydney Water's "Every Drop Counts" Programme

Sydney Water has implemented a water conservation strategy that addresses the needs of various water use sectors in the city, including the residential, commercial, industrial and government sectors. Users are categorised on the basis of their water use, with the initial programme focusing on users of above 80 KL/day. The programme has since been extended to include users between 20-80 KL/day. Users who use more than 80 KL/day are the subject of "one-on-one" engagements as opposed to targeted programmes involving groups of users.

Specific water conservation projects are executed through targeted programmes. Targeted programmes are based on principles of defined time periods for execution and a selected group of customers (volume may not be the only criterion used for selection). A number of targeted programmes or sub-initiatives may be in progress at any one time within the ambit of the overarching “Every Drop Counts” programme.

The broad approaches used in this programme are to assist users by:

- Provision of water conservation guidelines, including audit documents, water use benchmarks and best practices;
- Co-funding of water use audits and;
- Provision of on-line water metering services.

The guidelines provide procedures on how to calculate water intensity and also provide benchmark figures for comparison to actual performance. Procedures for identifying and implementing water conservation measures such as retrofitting are provided, as well as the procedures to be used in determining the marginal value of water savings.

The initiatives used in this programme have relevance to the Stakeholder Accord on Water Conservation, as the guidelines provided are enablers of water conservation, and could be replicated for the various participant sectors to the Accord. The approach of targeting users at a specific water use level could also be of value. For example, while the Accord will be promoted to all water users, larger users could in time have different reporting requirements to smaller users, or have different protocols as regards engagement. This approach could make the large potential number of participants more manageable.

4.8 Water Alliances for Voluntary Efficiency (WAVE)

The US EPA's Office of Water established the Water Alliances for Voluntary Efficiency (WAVE) programme in December 1992. Its mission is to "encourage commercial businesses and institutions to reduce water consumption while increasing efficiency, profitability, and competitiveness". The programme is voluntary.

The WAVE programme has three participant groups: “partners”, “supporters” and “endorsers”. “Partners” are the organisations who subscribe to the WAVE programme through a memorandum of understanding (MOU) with the US EPA. The various sectors involved each have specific, targeted programmes that address their specific water use

efficiency characteristics. The US EPA provides training, workshops and a nationwide help line for participating “partners”.

“Supporters” are equipment suppliers, manufacturers, government agencies, utility companies and water service companies, who provide technical expertise and technologies to water users. An example would be an audit of “partner” facilities to identify water conservation opportunities. Supporters also assist with the recruitment of organisations into the programme. The US EPA provides outreach and training material and establishes a network for the supporters to share information.

“Endorsers” are environmental groups and trade associations that also help to promote the WAVE programme and water conservation within their sphere of influence. They are permitted to use the WAVE logo in promotional materials.

The MOU commits the “partners” to water efficiency practices in exchange for technical assistance, publicity, and use of the EPA and WAVE logo. “Partners” have the following obligations:

- A “WAVE Implementation Manager” must be appointed to oversee implementation;
- They must conduct a water use audit;
- They must commit to the achievement of 90% of their projected water use improvement within 5 years;
- They must commit to the inclusion of water-efficient devices in any new infrastructure projects;
- They must commit to the achievement of water use efficiency targets and practices as specified by the MOU. In principle, commitments that adversely impact on profitability are not incorporated into the MOU.

Participation from various water use sectors is extensive, an example being the hotel sector where there are currently 750 hotels, owned by 33 companies, participating in WAVE.

There are various important considerations arising from the WAVE programme that have relevance to the Stakeholder Accord on Water Conservation, though the strong compliance aspects of the programme, despite it being voluntary, would most likely not be suitable for direct implementation. It is notable that concrete targets and commitments to specific practices are a large part of the implementation focus of the WAVE programme.

The inclusion of stakeholders, which are not necessarily signatories, means that the programme gains access to a wide support base. The fact that there is an MOU with each participant (i.e. “partner”) means that agreements and commitments are tailored to unique circumstances. The use of the WAVE logo by participants enables them to gain recognition for their participation in the programme.

4.9 The Great Lakes St-Lawrence River Basin Sustainable Resources Agreement

The Great Lakes St-Lawrence River Basin Sustainable Resources Agreement, established in December 2005 by the federal states of Illinois, Indiana, Michigan, Minnesota, New York, Ohio and Wisconsin, the Commonwealth of Pennsylvania and the provinces of Ontario and Quebec, is a regional agreement. The agreement aims to establish co-operation on sharing the duties of protecting, conserving, restoring, improving and managing the water resource in the Great Lakes Basin. The agreement, encompassing a number of integrated water management components, focuses on water conservation as an important option for intervention.

The agreement commits the members to the joint definition of objectives and initiatives in the Great Lakes Basin. Members have the following obligations:

- To develop and implement on water conservation and efficiency programmes which could either be mandatory or voluntary for their water users;
- To develop goals and objectives, with targets, for water conservation and efficiency within 2 years;
- To make annual assessments of performance against commitments;
- To report performance to the council and the regional body, the managers of the agreement, as well as the public;
- To review individual plans every five years to ensure that these align to regional objectives of the Great Lakes Basin, and to incorporate new technologies and exploit new opportunities to conserve water.

As part of the management framework of the agreement, a common base of data is to be established along with protocols for the exchange of the data. Provision is made within the agreement for the use of agencies to assist in the development and execution of the water conservation and water efficiency programs. Research and development and the dissemination of information to meet the objectives of the agreement are also provided for within the agreement. Furthermore, the agreement makes provision for the entry into force of certain aspects of the agreement in a phased approach, as information is made available.

This agreement, although one that focuses on regional co-operation between federal states and provinces, has some important considerations that may be of value to the Stakeholder Accord on Water Conservation. The development of a common reporting protocol and the requirement to report to both internal and external stakeholders of the agreement highlights the need to advocate transparency and public involvement in the process. The development of a scientific body of knowledge to aid the participants in fulfilling the objectives of the agreement and sustain performance is seen to be important in promoting the sustainability of work undertaken in the agreement. Notably, targets and commitments as regards the implementation of water conservation measures are key elements of the agreement. This latter point is not necessarily directly applicable to the Stakeholder Accord on Water Conservation at inception, but may be a consideration at some point in the future.

4.10 The Alliance for Water Stewardship

The Alliance for Water Stewardship (AWS) is an initiative seeking to develop a global freshwater stewardship certification programme. This voluntary standards-based water stewardship program will provide independent attestation (e.g. certification) that rewards responsible water management with recognition and possibly competitive advantage, given the global increase in environmental awareness of consumers.

The Alliance intends for this certification scheme to be applicable both to water “users” (businesses) and water “providers” (utilities). The initiative is currently in the standards development phase in which a range of stakeholders are defining what constitutes water stewardship. Originally conceived and initiated by The Nature Conservancy, the Water Stewardship Initiative, and the Pacific Institute, the Alliance is expanding to include participation from a variety of stakeholders, including NGOs, water utilities, and businesses.

Accreditation for participation or for specified achievements as regards the Stakeholder Accord on Water Conservation could be employed at some time in the future. For example, participants who meet certain criteria e.g. completion of a water audit, may be given some form of accreditation for their efforts. Achievement of such criteria could hence not be mandatory, but those who do perform certain specified tasks in the interests of the Accord would be able to achieve some form of recognition.

4.11 The Global Environmental Management Initiative (GEMI)

The Global Environmental Management Initiative (GEMI) is programme driven by international corporations focusing on the development of tools and strategies to promote best practice in sustainability, including water management. Established in 1990, GEMI currently has 37 members representing more than 22 sectors. Though GEMI's focus is broader than water alone, it has developed two water management tools, a Water Sustainability Tool and a Water Sustainability Planner, both of which are useful in enabling water management and water conservation within organisations.

Tool such as these could form part of the enabling framework of the Stakeholder Accord on Water Conservation i.e. part of a portfolio of mechanisms (along with standards, benchmarks and best practices for example), which would assist participants in the achievement of improved water use efficiency. The tools, should these be included in the scope of the Accord, would however have to be focused on water conservation, and would have to be adapted for each sector or sub-sector. Their development would be part of the initial work programme of the Accord, and need not be undertaken directly with Accord resources, but with support from Government or other partners e.g. the Water Research Commission.

4.12 The Global Reporting Initiative

The Global Reporting Initiative endorsed by the United Nations Environmental Programme (UNEP) aims to develop a generally accepted framework for reporting on any organisation's economic, environmental, and social performance. Its development has resulted in a design that could be used by organisations of any size, sector, or location. It generally takes into account the practical considerations faced by a diverse range of organisations – from small enterprises to those with extensive and geographically dispersed operations.

The GRI Reporting Framework contains general and sector-specific content that has been agreed by a wide range of stakeholders around the world to be applicable for reporting an organization's sustainability performance. The reporting principles provide an accepted methodology that endorses principles that ensure that information is comparable, accurate and reliable. Currently more than 900 companies world-wide have endorsed the use of this methodology to report on sustainability issues. Water is one of the aspects reported on. Although water use efficiency is not reported on as a core measure, there are core measures such as total water withdrawal by source (a limit of 5% of local resources is proposed as an upper limit of water use for individual facilities), total water discharge by

quality and destination, total materials used by weight or volume and percentage of materials that are recycled input materials. These measures, in combination with other standard operational output data such as volume of product produced, as reported by organisations in audited annual reports, provide a reliable source for comparison of performance. South African companies across different sectors such as Anglo American, SABMiller, De Beers, Exxaro Resources, Gold Fields and Group Five have endorsed this reporting framework.

The concept of a standard reporting framework has relevance for the Stakeholder Accord on Water Conservation and the measures used should, as far as possible, align to those used by the GRI. The key issue in terms of the Accord is that standard measures are developed, and that all stakeholders understand how these measures are to be used. These standard measures would form a part of the enabling framework of the Accord.

4.13 The Alberta Water Council

Established in 2004, the Alberta Water Council is a multi-stakeholder initiative with representatives from industry, non-government organisations, the national Canadian Government, the government of Alberta and Provincial authorities. The Council oversees the implementation of Alberta's "Water for Life" strategy, of which one of the key outcomes is water conservation. Where required, partnerships outside of the membership to the Council are sought.

One of the goals of the Council is to transform Alberta into a leader in water conservation, and a detailed strategy and plan of action has been mapped out as to how the Council will support this goal. The role of the Council is seen as one of partnership, in which leadership, expertise and advocacy are provided in order to enable the various water-use sectors to achieve the outcomes of the "Water for Life" strategy.

The Council conducts work on a number of water conservation projects, and has dedicated project teams for each of these. The project teams conduct their work in an environment of extensive stakeholder engagement. The two primary conservation projects are:

- i. Water Conservation, Efficiency and Productivity Sector Planning, which entails the development of standards which individual sectors can use for development of water conservation plans. Included in these standards are the documentation of best practices, the determination of water use benchmarks, ascertainment of

research needs and a number of other tools which would support users in achieving water use efficiency improvements.

- ii. Water Conservation, Efficiency and Productivity definitions, which entails the definition of water use efficiency measures, as well as the mechanisms through which water use performance would be reported to show achievements in conservation, efficiency and productivity.

The Council (through government) funds projects and participating sectors are expected to contribute through non-financial support to individual projects. The Council reports annually on institutional performance as well as on progress towards the “Water for Life” strategy. A long-term target of 30% improvement in water use efficiency (between 2005 and 2015) has been established as an aspirational goal for the programme. This goal was determined prior to development of detailed conservation measures for each sector, and is subject to review. An electronic system has been established to allow water users to capture water use data. The use of this system has not been as well-entrenched as the Council would like, and a project has been initiated to understand why this is so.

The Alberta Water Council is a provincial initiative, but it does present a model from which the Stakeholder Accord on Water Conservation can draw. As with some of the initiatives reviewed earlier, standards, benchmarks and documentation of best practices are seen as important enablers of conservation. Targets are seen to be important as a means of tracking progress. Importantly, much effort has gone into the development of standard approaches to performance measurement. Evidence of intensive engagement is shown in the manner in which the Council operates routinely as well as the manner in which individual projects are carried out. There is a clear strategy that provides the direction to all of the work carried out by the Council, and it is therefore important that the goals of the Stakeholder Accord on Water Conservation are clearly articulated in order to guide the work of the Accord. The goals of the Alberta Water Council include aspects other than conservation, and would hence be more wide-ranging than those of the Stakeholder Accord on Water Conservation. While the Alberta Water Council seeks to make Alberta a leader in conservation, the Stakeholder Accord on Water Conservation is conceptually about the creation of a mechanism for cooperation between Business and Government to implement water conservation.

4.14 Institutional Arrangements

A review of the characteristics of each relevant initiative and a broad description of institutional arrangements are contained in Table 8.

Table 8: Overview of Selected International Initiatives

| INITIATIVE | AFFILIATION | TARGETS | REPORTING | SUPPORT PROVIDED | INSTITUTIONAL ARRANGEMENTS | FUNDING |
|-------------------------------------|--|--|---|--|--|--|
| UN Global Compact CEO Water Mandate | <p>Voluntary affiliation;</p> <p>Commitment to implement six core elements;</p> <p>Endorsers posted on the CEO Water Mandate section of the UN Global Compact website;</p> <p>Companies will be de-listed for failure to report and be prohibited from using the logo.</p> | <p>Expected that practical actions are implemented for all core elements;</p> <p>Concrete activities are implemented within 5 years;</p> <p>Measurement of outcomes using a broadly acceptable protocol.</p> | <p>Transparency Policy requires reporting at end of first year of endorsement;</p> <p>Reporting is based on three elements:</p> <p>a) Statement of continued support;</p> <p>b) Description of policies and practical actions;</p> <p>c) Measurement of outcomes using broadly accepted water-related indicators.</p> | <p>Working symposiums, guidance documents, resources, information provision and research;</p> <p>Increasing awareness of the Mandate and encouragement of endorsement of the initiative;</p> <p>Creating a network of signatories and stakeholders to support implementation;</p> <p>Use of promotional material and use of “We Support the CEO Water Mandate” logo.</p> | <p>Steering Committee of ten corporate representatives representing different geographies and one representative from the UN Global Compact Office;</p> <p>Strategic, administrative and financial arrangements determined by Steering Committee;</p> <p>Decisions made on a consensus model, failing which a simple majority;</p> <p>Steering Committee can co-opt special advisors representing different stakeholder interests or spheres;</p> <p>General endorsers semi-annual meeting sets overall administrative, financial and strategic commitments;</p> <p>Secretariat supports steering committee and is resourced by the UN Global Compact Office;</p> <p>Secretariat develops annual work program and budgets to be approved by the Steering Committee;</p> <p>Constitutional amendments: 50% of the members;</p> <p>Mandate and six core elements: Steering Committee after wide consultation</p> | <p>Two revenue sources: Voluntary fees and sponsorship;</p> <p>Fees: based on two categories of sales revenue;</p> <p>Sponsorships for the large semi-annual working conferences: several sponsorships of equal value.</p> <p>Funding flows through a separate foundation.</p> |

Table 8: Overview of Selected International Initiatives (continued)

| INITIATIVE | AFFILIATION | TARGETS | REPORTING | SUPPORT PROVIDED | INSTITUTIONAL ARRANGEMENTS | FUNDING |
|---|--|---|---|--|--|--|
| Melbourne, Victoria State, waterMap program | Initially voluntary, targeted 200 top non-residential users; Compulsory for all non-residential users above 10ML/annum use. | Develop a waterMap with targets for water conservation. | Annual review of waterMap and progress on initiatives; Reviews done at the request of the water utility/corporation; Reporting guide to each participant. | Technical support provided by utility, either directly or through intermediaries; Guides in water conservation and target-setting are provided; Financial assistance to develop plan for the user and where required capital for the implementation of projects that are related to financial assistance programs. | Water utility/corporation runs program; Part of regulatory framework and conditions for the provision of water; User needs to provide reasons for opting out of the program. | Funded by the State via the water utility; Improvements to be funded by participants, some funding appropriated from financial assistance programs. |

Table 8: Overview of Selected International Initiatives (continued)

| INITIATIVE | AFFILIATION | TARGETS | REPORTING | SUPPORT PROVIDED | INSTITUTIONAL ARRANGEMENTS | FUNDING |
|------------------------------------|-------------|--|--|---|--|--|
| Sydney Water's 'Every Drop Counts' | Voluntary | Set with Sydney Water based on benchmarks developed. | As required by the guides developed by Sydney Water. | Provision of water conservation guidelines, audit documents, water use benchmarks and best practices; Co-funding of water use audits; Provision of on-line water metering services. | Water utility/corporation runs program; Two categories of sign-up: One-on-one relationship for users of 80 KL/day and above; Targeted Programmes for users of 20-80 KL/day. | Funded by the State via the water utility; Improvements to be funded by participants. |

Table 8: Overview of Selected International Initiatives (continued)

| INITIATIVE | AFFILIATION | TARGETS | REPORTING | SUPPORT PROVIDED | INSTITUTIONAL ARRANGEMENTS | FUNDING |
|------------------------------|---|--|---|--|---|---|
| <p>Alberta Water Council</p> | <p>Voluntary;</p> <p>Target the largest users per sector to start interventions in sectors.</p> | <p>Commitment to Water Conservation and Efficiency and Productivity Plans (CEP);</p> <p>Specific conservation and water efficiency targets at site, sector and regional level;</p> <p>Base year for targets to be an average of any three years between 2000 and 2005.</p> | <p>Electronic data capture by participants (intention to implement mandatory electronic reporting);</p> <p>Plans and reports to be made available to the public;</p> <p>Annual or biennial reporting process summarizing progress to plan and performance against targets;</p> <p>Formal review in 2012 of plans, process and progress in water conservation to consider if mandatory plans to be implemented via water licences.</p> | <p>Development of standards for target setting for each sector;</p> <p>Recognition awards for CEP initiatives.</p> | <p>Multi-stakeholder council: representatives from various business sectors, government and non-governmental organizations;</p> <p>Consensus based model for decision making;</p> <p>Sector plans are reviewed by the Alberta Water Council before adoption;</p> <p>New applicants for water licence would have mandatory CEP measures.</p> | <p>Initiative funded by government;</p> <p>Improvements to be funded by participants.</p> |

Table 8: Overview of Selected International Initiatives (continued)

| INITIATIVE | AFFILIATION | TARGETS | REPORTING | SUPPORT PROVIDED | INSTITUTIONAL ARRANGEMENTS | FUNDING |
|--|---------------------------|---|--|---|---|---------------------------------------|
| World Business Council for Sustainable Development | Voluntary, by invitation. | Voluntary performance targets using the water tool. | Water tool used as a means of communication with internal and external stakeholders. | <p>Development of water management tools;</p> <p>Data security ensured by company keeping data;</p> <p>Guides to standards and best practices;</p> <p>Share best practices through networks with a cross-section of industries and countries.</p> | <p>Governed by a Council comprising of the members. Membership is restricted to parent companies;</p> <p>Council meets annually to set strategic direction;</p> <p>Executive committee oversees the management of the organization, and meets 3 times a year;</p> <p>Day-to-day operations undertaken by Secretariat of the President and 50 personnel;</p> <p>CEO-led initiative, co-chairs of working groups;</p> <p>Members provide support by:</p> <p>Sharing experience, knowledge and appropriate human resources;</p> <p>Drawing on skills of company experts to assist on individual projects, staff seconded to the Secretariat by member companies;</p> <p>Co-operative agreements with other agreements such as IUCN</p> | Members support the work of the WBCSD |

Table 8: Overview of Selected International Initiatives (continued)

| INITIATIVE | AFFILIATION | TARGETS | REPORTING | SUPPORT PROVIDED | INSTITUTIONAL ARRANGEMENTS | FUNDING |
|--|--|--|--|---|--|--|
| Great Lakes-St. Lawrence River Basin Sustainable Resources Agreement | Inter- state and provincial agreement. | <p>Voluntary or mandatory for water users in the respective states or provinces;</p> <p>Water conservation targets to be developed within 2 years by each member state or province;</p> <p>Annual assessments.</p> | Report performance to Council and public annually. | <p>Common data exchange protocols to be developed;</p> <p>Research and development and dissemination of information relevant to meeting objectives.</p> | <p>A Council of Members consisting of the Governors of the different states and provinces;</p> <p>Each member has a designated alternative;</p> <p>Decision making is by simple majority vote;</p> <p>Council responsible for management, budget and administration;</p> <p>Can co-opt special advisors and organizations to assist in carrying out of its duties;</p> <p>Powers of the Council relate to:</p> <p>Enforcement of rules and regulations to ensure the enforcement of the Agreement;</p> <p>Review of the Agreement and performance of the Parties in respect of the Agreement. In respect of Water Conservation measures a mandatory review of process, performance and progress of initiatives;</p> <p>Mechanism put in place to deal with new proposals, which includes technical and administrative review of any proposals;</p> <p>A decision-making standard adopted by the Council to streamline decision-making.</p> | Funding costs shall be split in equal measure between the various members. |

Table 8: Overview of Selected International Initiatives (continued)

| INITIATIVE | AFFILIATION | TARGETS | REPORTING | SUPPORT PROVIDED | INSTITUTIONAL ARRANGEMENTS | FUNDING |
|---|--|---|--|---|--|--|
| <p>US EPA Water Alliances for Voluntary Efficiency program (WAVE)</p> | <p>Sectors targeted by the EPA; Voluntary affiliation, tailored memorandum of understanding with each partner includes best practices; Partners: implement water conservation; appoint a WAVE implementation manager; survey current practices and implement more efficient water use techniques; Supporters: provide technical, promotional and infrastructure support. Assist in recruitment; Endorsers: Provide support to the concept and pledge in promotion of water conservation practices.</p> | <p>Agree to develop and implement a plan of action; Commitment to achieving 90% of projected savings within 5 year period; Implement water saving practices and technologies.</p> | <p>Required to report to EPA on progress on water efficiency and data generated from EPA software provided periodically.</p> | <p>Partners receive technical assistance, publicity and the use of the EPA and WAVE logos; WAVE supporters that are endorsed by the EPA to provide technical support, the supply of equipment and promotional support to sector partners; Review of information from member businesses by EPA to provide targeted technical interventions through training, workshops and nation-wide help line and review of information from other sectors and business affiliates to structure appropriate literature dissemination.</p> | <p>Government Department, the EPA, runs the program through its Office of Water; Contractual arrangements are set up by the use of a Memorandum of Understanding with partner, supporter and endorser organizations.</p> | <p>Funded by the EPA's Office of Water; Membership services free of charge; Improvements to be effected are funded by the company.</p> |

Table 8: Overview of Selected International Initiatives (continued)

| INITIATIVE | AFFILIATION | TARGETS | REPORTING | SUPPORT PROVIDED | INSTITUTIONAL ARRANGEMENTS | FUNDING |
|--------------------------------|-------------|--|--|---|---|---|
| Alliance for Water Stewardship | Voluntary. | Sector targets and standards to be defined. | Verification program to assess whether criteria are being met. | Development of standards and frameworks for certification of water conservation; Stakeholder forums to provide input to the certification process. | Multi-stakeholder forum- governments, NGOs, multinationals etc.; Governance still be defined; Program affiliated to Water Environment Federation. | Member organizations driving the process currently providing the funding; The Nature Conservancy; The Pacific Institute; Australia's Water Stewardship Initiative. |
| Global Reporting Initiative | Voluntary | Cap on withdrawal from a local resource - less than 5% per facility. | Standardised reporting protocol. | Development of standards for a reporting protocol. | Not for profit organization. | Financial and in-kind support of contributors and stakeholders; -institutional grants from governments; -organisational stakeholders provide financial support. |

Table 8: Overview of Selected International Initiatives (continued)

| INITIATIVE | AFFILIATION | TARGETS | REPORTING | SUPPORT PROVIDED | INSTITUTIONAL ARRANGEMENTS | FUNDING |
|---|---|--|---|---|---|--------------|
| Global Environmental Management Initiative (GEMI) | Voluntary; Applications decided upon by Board of Directors. | Not applicable, this initiative is about the provision of tools. | Alignment to Global Reporting Initiative. | Development of standards for a reporting protocol; Dialogue with stakeholders to understand concerns and to advocate businesses' undertakings in practices and results; Access to other international and national groups and agencies. | Non-profit organization; Board of Directors drawn from the member companies; no more than one representative from one company; Not to engage in political advocacy; Competitive issues are not addressed through the initiative; Members review strategic goals every 3 years; Facilitate access to other agencies, national and international groups; Provision of senior EHS managers to participate in membership meetings; Membership: Termination only happens after 60 days. Membership may cease by voluntary resignation or by termination for lack of participation or inconsistent behaviour; Approval of business at GEMI meetings shall be by 2/3 vote. | Annual fees. |

4.15 Considerations Arising from the Review of International Water Conservation Initiatives

The following can be concluded from the international review of water conservation initiatives:

- Internationally, multi-stakeholder sustainability initiatives at global and local levels have been instituted and have demonstrated quantitative water conservation benefits;
- Business has been shown to be both an initiator and a key driver of water conservation, demonstrating that there is a business case for such initiatives and that compliance is not the only driver of progress. The existing global policy frameworks such as the UN Global Compact provides sufficient evidence that businesses play a significant role in the development and implementation of water conservation and demand management;
- Participation, whether voluntary or not, comes with defined commitments from participants and from the initiative itself. The latter is shown to typically provide supporting resources in exchange for explicit commitments to conservation;
- In order for water conservation initiatives to be effective and sustainable, there is a need for buy-in and commitment in implementing water conservation at senior management level. Senior management can make resources available as well as ensure that sustainability issues are mainstreamed into business operations; It is shown that each industry and corporation should establish its own target based on its current water use baseline (e.g. waterMAP), whether this is reported at central level or not. The unique circumstances of each user must be accounted for in some way. This does not however detract from an overall aspirational target, which need not be scientifically derived, as was implemented by the Alberta Water Council;
- Many of the initiatives involve engagement with agencies and support resources, thereby augmenting the capabilities of the members of the initiative. This allows access to a broader resource base, and assists with ensuring that the most appropriate expertise is utilised.

- Most international initiatives have a dedicated website, which is an important interface between the participants and the institutional vehicle used to manage the initiative, as well as an important source of information for potential participants and other stakeholders.
- Tools and standards are seen to be important enablers of water conservation e.g. GEMI and the GRI;
- Each international initiative reviewed is seen to have a defined agenda of action, supported by a work programme. The work programme is focused on the goals of the initiative, which in some instances is in the form of an underlying strategy. The work programme is typically centred on the development and improvement of the tools and standards supporting the initiative;
- Reporting on performance is seen to be a characteristic of most of the initiatives reviewed;
- Organisations attach value to being recognised for sustainability efforts, as seen by the examples of the Alliance Water Stewardship and the WAVE programme.

None of the initiatives reviewed may be viewed as an exact representation of what the Stakeholders Accord on Water Conservation is trying to achieve, however these do provide experiences and methodologies from which relevant concepts can be gleaned. It is however possible to determine which of the concepts used are relevant, and these are proposed below.

4.16 Proposed Concepts for Application in the Stakeholder Accord on Water Conservation

4.16.1 Recommended roles for participating stakeholders

In order for the stakeholders to work together in achieving increased levels of conservation, the roles of each of these parties has to be defined. Thereafter the engagements necessary to fulfil the mandate of the Accord can be developed.

There is however an additional role, which is at the centre of the Stakeholder Accord on Water Conservation, and that is the role of the Accord itself. It is useful to define this role first, and then the role of the other stakeholders, since the roles of individual stakeholders either support the role of the Accord or are supported by it. These roles may be considered to be the recommended roles as informed by the initiatives that have been reviewed.

The role of the Accord is recommended to be that it be a vehicle through which the stakeholders work together on increasing the levels of water conservation in industry in South Africa. More specifically, it is to enable Business to conserve water with the support of Government and Labour. In order to fulfil this role, the Accord requires specific capabilities that are outlined below as individual recommendations.

As regards the role of government departments and government-funded agencies that could play a role in the Accord, it is useful to review their mandates, as it is important that the roles adopted are indeed aligned to these mandates. Table 9 outlines the mandates of the Department of Water Affairs, the Department of Trade and Industry, The Industrial Development Corporation, the Water Research Commission and the National Cleaner Production Centre, state institutions that have a close relationship with water.

Table 9: Mandates of Key Stakeholders and Potential Supporting Parties

| DEPARTMENT OF WATER AFFAIRS | DEPARTMENT OF TRADE AND INDUSTRY (DTI) | INDUSTRIAL DEVELOPMENT CORPORATION (IDC) | WATER RESEARCH COMMISSION (WRC) | NATIONAL CLEANER PRODUCTION CENTRE (NCPC) |
|---|---|--|--|--|
| <p>Promote the conservation and sustainable utilization of natural resources to enhance economic growth and poverty eradication.</p> <p>www.deat.gov.za</p> <p>Ensure the water resources and infrastructure to support social development and economic growth while meeting the needs of future generations.</p> <p>www.dwaf.gov.za</p> <p>Sector leadership; performance and support: Provide direction, information, capacity and financial support to sector to ensure sector performance against agreed targets.</p> <p>www.dwaf.gov.za</p> | <p>Lead and facilitate sustainable economic activity and employment for all South Africans;</p> <p>Development of an adaptive economy characterized by growth, employment and equity, built on the full potential of persons, communities and geographic areas;</p> <p>www.dti.gov.za</p> | <p>The IDC is a self-financing national Development Finance Institution (DFI), whose primary objectives are to contribute to the generation of balanced, sustainable economic growth in Africa and to the economic empowerment of the South African population, thereby promotion the economic prosperity of all citizens.</p> <p>The IDC achieves this by promoting entrepreneurship through the building of competitive industries and enterprises based on sound business principles.</p> <p>www.idc.co.za</p> | <p>Promoting co ordination, co-operation and communication in the area of water research and development;</p> <p>Establishing water research needs and priorities;</p> <p>Stimulating and funding water research according to priority;</p> <p>Promoting effective transfer of information and technology;</p> <p>Enhancing knowledge and capacity-building within the water sector.</p> <p>www.wrc.org.za</p> | <p>The NCPC-SA aims to enhance the competitiveness and productive capacity of the national industry, focusing on SME's through Cleaner Production (CP) techniques.</p> <p>The NCPC-SA exists as a national body to strengthen market access by South African industry and business sectors through the fostering of networks to transfer Cleaner Production technologies & services that can contribute to the sustainability of value chains by delivering measurable economic, environment and social impacts that support the national priorities of growth, equity and employment.</p> <p>www.ncpc.co.za</p> |

It is clear from Table 9 that there is nothing in the mandates of the institutions reviewed which would preclude their active support of the Accord.

The role of Business is recommended as being primarily to use the vehicle of the Accord to conserve water at the site level in a quantifiable fashion on a voluntary basis. Individual signatories would however be expected to meet a number of commitments, all of which are outlined in more detail below. Business as a whole would also be expected to perform the following functions:

- i. Provide resources as agreed by all parties. These resources could include financial support and the secondment of personnel;
- ii. Provide input to the specification and development of the work programme of the Accord, including contributions to individual projects.

The role of Government, which will be coordinated by the Department of Water Affairs, will be primarily to support Business in establishing and implementing the Accord. This support is envisaged to be as follows:

The DTI would support the Accord by:

- i. Leveraging institutions under the auspices of the DTI which could add value to the Accord e.g. The National Cleaner Production Centre and the Council for Scientific and Industrial Research;
- ii. Serving on strategic structures of the Accord, thereby assisting with its management;
- iii. Providing financial resources to the Accord as agreed by the stakeholders.

The Department of Water Affairs is envisaged as providing support to the Accord in the following ways:

- i. Availing the results of relevant past water use efficiency studies to the Accord;
- ii. Serving on strategic structures of the Accord, thereby assisting with its management;
- iii. Providing assistance with marketing of the Accord;
- iv. Leveraging institutions under the auspices of the DWEA which could add value to the Accord e.g. Water Research Commission
- v. Integration of Accord activities into the relevant existing conferences and other knowledge-sharing platforms.

4.16.2 Establishment of a formal management structure

As with other initiatives, a formal management structure is required for the Stakeholder Accord on Water Conservation. It is recommended that this structure have a strategic tier, which will guide the work of the Accord, and an operational tier, which will carry out this work.

The strategic tier (or Accord Governing Body) should comprise senior representatives from each of the participating stakeholders as well as the most senior representative from the operational tier, who will provide feedback as to operational challenges and opportunities to the Governing Body.

The members of the Governing Body should make decisions relevant to the development and increasing success of the Stakeholder Accord on Water Conservation by:

- Considering information provided by the operational tier, identifying problems and proposing solutions to these for implementation;
- Allocating resources based on the needs of the Accord. Principle among these will be financial resources, and it is the Governing Body that is envisaged as being in a position to secure financial support for the Accord as well as approve annual budgets;

The operational tier (or Accord Secretariat) will undertake the administrative functions of the Accord and manage the work programme. This will include the management of expenditure, recruitment of staff, development of management systems, reporting to the Accord Governing Body and engagement with Accord participants. It is proposed that the secretariat be comprised of a senior manager, a technical specialist and an administrator to begin with.

In order to operate with this lean structure, it is proposed that the Stakeholder Accord on Water Conservation be housed within an existing institution. This will allow access to support from specialist functions such as finance, human resources and the like. The workload generated by the Accord in these areas is expected to be small, and hence the establishment of independent functions for the express purposes of the Accord is considered to be inappropriate.

4.16.3 Establishment of a work programme

It is recommended that the Accord Governing Body define a work programme for the Accord annually. This work programme will inform the budget required to operate the Accord, as well as the resources that may need to be committed by the various stakeholders. The work

programme is envisaged to entail two primary elements, a developmental element and an operational element.

The developmental element of the work programme would be aimed at the development and implementation of the various systems necessary to run the Accord, and the various services the Accord intends to offer to signatories. These services would need to be agreed, but based on the national and international review would entail the provision of tools to assist users in conserving water, and the facilitation of knowledge sharing within and between water use sectors.

The operational element of the work programme would entail the execution of defined sub-projects. For example, metering in agriculture has been identified as a challenge that would have to be overcome to enable water conservation to be more effectively implemented within the sector, and this issue could be tackled through the vehicle of the Accord. Since the Accord is to be a vehicle through which Business, Government and Labour can work together on water conservation issues, water conservation challenges in any of the sectors, raised by individual users, can be identified, and programmes of action developed to address these. This of course refers to issues applicable to sectors as a whole, and which could best be resolved through stakeholder collaboration. It would be the role of the Secretariat to screen all such issues for relevance prior to referring them to the Governing Body for consideration.

In terms of support required to establish and carry out the developmental work programme of the Accord, which could include development of a website, development of business processes, the sourcing and possible modification of standards and guidelines and the like, temporary staff or external service providers are recommended. This will permit more flexibility in terms of human resources, since the needs of the Accord could change significantly over time. It is expected that there will be a significant workload in the early life of the Accord as standards are put in place, with a decline to a lower workload once systems have been established and are in operation.

If it were deemed important to focus on operational issues without the potential distraction of a large developmental workload, one potential option would be to complete the bulk of the developmental work prior to the launch of the Accord. This could be achieved by contracting specialist service providers. Alternatively, this work could be carried out outside of the structures of the Accord and made available as it is developed. This will free up the resources of the Accord to focus on operational aspects of the work programme. Funding would need to be made available if these routes are to be pursued. Review by users of any standards or tools developed would still be desirable.

4.16.4 Water use targets

The setting of targets is seen to be a feature of many of the initiatives reviewed. Targets give users a level of performance to aspire towards, and measurement against targets provides a means of assessing the level of success of the Accord. A number of options as regards target-setting are available to the Stakeholder Accord on Water Conservation, some of which are as follows:

- i. A single target could be set for all sectors;
- ii. Sector-specific targets could be set;
- iii. Individual users could set and report on their own targets;
- iv. Individual sectors could set and report on their own targets;
- v. A combination of these options could be implemented.

The setting of targets is a difficult undertaking when attempted through a top-down process, since the individual circumstances of water users are not only largely unknown at the Accord level, they are also dynamic. The fact that no two users, even within the same sector, operate at the same efficiency levels or possess the same opportunities and requisite financial, technical and human resources necessary to conserve water, means that a single target could never be wholly appropriate for all water users.

A bottom-up approach to target setting would take the unique circumstances of all users into account. In this approach, users would each declare their own targets, and these would be aggregated to arrive at targets at the sector level and for the Accord as a whole. The advantage of this approach is that individual users, having a direct stake in target-setting, would most likely show higher levels of commitment to the achievement of the target than towards a target imposed on them. A disadvantage could be that the targets arrived at by individual users may not be sufficiently challenging to elicit meaningful levels of water conservation. The acquisition/development and communication of peer-group and best practice water use benchmarks is a useful approach towards the encouragement of realistic, challenging targets.

Unlike the Energy Efficiency Accord, the Stakeholder Accord on Water Conservation does not have a single national target to aspire towards or to align to. It has also become apparent during the course of this project that data as regards water use efficiency in the various water use sectors is not freely available. Even if such data were available at the sector level, it will

not necessarily be meaningful for individual water users within sectors, since there would be spread of performance between users in each sector.

For these reasons it is therefore recommended that target-setting be practised using a bottom-up approach informed by the targets of individual users rather than through sectoral targets proposed by the Accord. Should an aspirational water conservation target for the Accord be desired, this target should not be imposed on participants, but should rather be used as a yardstick for judging whether the Accord as an initiative is meeting strategic stakeholder requirements. Such an aspirational target would best be ascertained after some data from participants has been received as to baseline water use and water intensity levels, since it would in some way be informed by what is possible. More details as to how these parameters may be ascertained for each sector are outlined in the proposed management framework for the Accord.

4.16.5 Supporting/enabling tools

Many of the national and international initiatives reviewed involve the provision to participants of tools that could be used to assist with water conservation. The role of these tools in the context of the Accord would be two-fold:

- i. To provide for standardisation in terms of measurement and reporting and;
- ii. To assist users to improve their water use efficiency at the site level i.e. to assist with capacity building.

Examples of these tools would be:

- Best practice guidelines;
- Benchmarks to allow comparison of water use performance with peers;
- Target-setting guidelines;
- Water use audit frameworks;
- Water conservation case studies;
- Electronic assessment tools and;
- Reporting standards.

A core component of the work programme of the Accord would be to identify existing and emerging tools of the nature above that are available, and to assess their applicability for use by participants to the Accord. Selected tools could be proposed to users and, based on feedback, adopted in their existing form or adapted where possible to meet user needs.

Some of the tools may require a period of familiarisation in order for users to be able to utilise them effectively. Provision of training and support as regards how tools are to be applied is not envisaged to be a role of the Stakeholder Accord on Water Conservation, as this would place demands on the resources required by the Accord. In principle then, users should expect to be provided with the requisite tools (or given guidance as to how to access them from outside sources), but not with any significant support as to how to use them. This approach is in line with the overarching spirit of the Accord, which entails provision of an enabling environment for conservation, but places the onus for conservation on water users themselves.

4.16.6 Development of a website

It is recommended that a website be developed to support the Stakeholder Accord on Water Conservation. This website can be used to provide access to the tools described above, either through links to other websites containing existing tools or through a “downloads” area from which users can download material. The website can in addition support administrative functions by allowing users to download forms, templates and other documentation required to participate in the Accord.

In time, the website could be used by water users to upload the data required for reporting, and to comment on the overall initiative or on sector-specific programmes. Use of the website could therefore reduce the need for face-to-face interaction and reduce the burden on participants and Accord structures.

Finally, the website could also be used to link sector specialists to individual users through allowing advertising via links to service provider sites or provision of their contact details. These service providers could be suppliers of metering systems, water-efficient technologies, water conservation training services, consulting services and the like. Participants to the Accord could then make the website a central part of their water conservation efforts. Care must however be taken to ensure that participants understand that it is their individual responsibility to implement water conservation, in order to prevent a situation where the institutional resources of the Accord are relied upon to assist with implementation.

4.16.7 Extension of engagement beyond participants

It is recommended that resources outside of the Accord stakeholders be engaged to assist with realising the goals of the Accord. These “Accord Supporters” could be government agencies with a vested interest in the success of the Accord as a consequence of their mandates, business formations not directly represented by the Accord or even business organisations with a profit motive.

The work programme of the Accord would direct these engagements. Hence organisations such as the Water Research Commission could be engaged to provide best practice guidelines for each sector for example. These organisations could also link Accord participants to water sector specialists and professionals whom participants may wish to engage on an individual level. If the work programme makes provision for supporting water use sectors in accessing technologies, the suppliers of water-efficient equipment could be engaged. The approach is similar to that followed by the US EPA’s WAVE programme and could ultimately catalyse increased activity in the area of water conservation research in South Africa, the development of capacity building solutions in the area of water conservation (specialist training providers could be among the service providers engaged), and the development and deepening of markets for water-efficient technologies.

These engagements between the structures of the Accord and external stakeholders would initially require resources, but this should become less demanding over time as the fundamental frameworks and tools are put into place. The situation could also be handled in a fashion that promotes a work programme that is manageable within the resource constraints of Accord structures, though it would be advisable to fast-track provision of support tools and resources to participants.

A further aspect of engagement, which represents an important means for participants to share knowledge as well as publicise individual conservation efforts, would be the holding of water conservation workshops or conferences. These could be easily integrated, with the support of the Department of Water Affairs, into existing activities such as National Water Week for example.

4.16.8 Support in exchange for commitment

Even with voluntary international initiatives, participants are expected to meet defined commitments. Examples are commitments to report on performance, provide staff to assist with projects, implement specific water conservation measures and the like. For the Stakeholder Accord on Water Conservation to be effective, participants would also need to

make specific commitments, which should be outlined in the text of the Accord document itself. These commitments need to be of the nature of the commitments in these international examples, but would have to be clearly defined.

Due to the large potential number of users who could participate in the Accord, the specification of an excessive number of commitments for all participants would make the monitoring of these an enormous task for the Secretariat. It is therefore recommended that a minimum number of commitments be specified for all participants at the outset of the Accord. Over time, individual users may be categorised according to specific criteria such as absolute water use, water intensity and the like. Specific commitments could then be defined for each category. This categorisation cannot however be done in the absence of data, and this data will only become available once participants begin to report performance.

Examples of commitments that could be made are:

- i. Determination of site-level baseline water use within one year of joining the Accord;
- ii. Determination of site-level short term (1 year) and long term (5 year) annual absolute water use and water intensity targets within one year of joining the Accord;
- iii. Installation of the minimum metering systems required to routinely measure absolute water use and water intensity (should these not be in place) within 2 years of joining the Accord. The minimum metering standards need to be developed with due consideration for the unique features of individual sectors;
- iv. Sharing of water conservation best practices;
- v. Annual reporting of absolute water use, water intensity and percentage change in water intensity within 1 year of joining the Accord. Users will be shown how to ascertain these measures in the site level in guidelines provided by the Accord Secretariat;

Of these recommendations, only annual reporting of performance and knowledge sharing are ongoing commitments.

4.16.9 Annual reporting

Annual reporting is a core element of most initiatives covered. However, this cannot be implemented without clear reporting standards and the clear definition of performance measures. Reporting of performance does not imply that performance is monitored, simply that organisations that are committed to the initiative demonstrate this commitment through reporting of progress.

Reporting on actual water use performance in the context of the Stakeholder Accord on Water Conservation should most likely be implemented at some time in the future, though individual participants would need to implement measures internally without delay in order to establish a baseline and to measure improvements for their own purposes. Reporting should not be viewed as a means of ensuring compliance, and there should be no consequences for organisations that do not meet water conservation targets. It is however important that the effectiveness of the Accord as regards the key outcome of saving water is measured in some way. It will therefore be necessary to implement a mechanism to ensure that reporting by participants does happen.

It is envisaged that reporting be done by calendar year, since if individual organisations each report based on individual financial years, the Accord will not be able to compile a holistic annual view of performance. Reporting requirements could be met through electronic reporting via e-mail, or through direct updating via the Accord web page through an interface linked to a secure database. Reporting should be made as easy as possible, both in terms of the requirements of participants as well as the resources required by the Secretariat. To assist users, the Accord website could be equipped with simple sector calculators, which would enable users to use raw data to arrive at the measures required to be reported to the Secretariat. This is aligned for example to the approach followed by the WWF South Africa Water Neutrality Initiative. The Secretariat should also be provided with reporting tools that use data in the database used to store information from participants to produce reports outlining performance for users, sectors and the Stakeholder Accord on Water Conservation as a whole. These tools would need to be developed specifically for the Accord.

4.16.10 Transparency in implementation of water conservation

The sharing of information between participants is an important potential vehicle for the acceleration of water conservation. It is recommended that the Accord establish mechanisms for information to be shared without compromising the confidentiality of participating organisations.

Mechanisms could be through physical engagements e.g. meetings and conferences, but should also be through the production of case studies and the documentation of best practices. In order to limit the functions of the Accord in terms of the guarding of confidentiality, participant organisations are to be advised that any technical information shared should be regarded as information they would be comfortable with placing in the public domain.

An aspect of confidentiality that the Accord would however be expected to maintain through internal processes would be the water use data specific to individual organisations. While consolidated information may be communicated to a wider audience in order to publicise the achievements of the Accord as a whole, organisation-level data would have to be kept confidential unless expressly permitted by the organisation concerned.

4.16.11 Commitment at executive level

One of the key success factors identified in the review of national and international water conservation initiatives (e.g. the World Business Council for Sustainable Development and the CEO Water Mandate) is the need for senior management in organisations to commit to the principles of mainstreaming water conservation in business operations. With commitment at executive level, the chances of success in the development and implementation of water conservation initiatives are improved. This has implications for how the Accord is marketed, specifically that senior organisational personnel should be targeted. At the operational level, organisational representatives involved in the Accord should preferably have a mandate from senior management.

It is therefore recommended that marketing of the Accord be targeted at the executive level of individual organisations.

5 IDENTIFICATION OF POTENTIAL PARTICIPANT SECTORS

5.1 The Status of Water Conservation Data in South Africa

The Stakeholder Accord on Water Conservation was conceived as a voluntary instrument aimed at allowing Business, Labour and Government the opportunity to work together in making a contribution towards water conservation in South Africa.

While some research on water conservation in industry has been carried out in the past (for example the National Industrial Water and Wastewater Survey (NATSURV) study commissioned by the Water Research Commission (WRC), which examined a number of industrial water use sub -sectors beginning in the 1980's and extending until 2005), the current status of water conservation in South Africa has not been comprehensively determined.

The Water Use Efficiency Directorate at The Department of Water Affairs has carried out a number of studies at Water Management Area (WMA) level, where individual large users in stressed WMA's have been investigated. This has encompassed the agricultural, Industries, Mining and Power Generation (IMP) and water services sectors. In the water services sector, the focus has been on the water losses in municipal infrastructure rather than that of commercial and industrial users serviced by municipalities. These projects are in the process of being extended to all water-stressed WMA's over time, but are still fairly limited in extent. The findings of these studies in all sectors do however show that water use efficiency levels vary widely both within and between water use sectors.

5.2 Important Definitions and their Relevance in Identification of Potential Participants

The Alberta Water Council, a Canadian water conservation and water quality initiative, commissioned a study to, among other outcomes, define key concepts as regards water conservation. Recommended definitions for "water conservation" included "any beneficial reduction in water use, loss or waste" and recommended definitions for "water efficiency" included "accomplishment of a function, task, process, or result with the minimal amount of water feasible".

The use of the word "feasible" highlights that constraints exist for individual organisations in the pursuit of water conservation. Hence the degree to which conservation is implemented could in some instances be less than what is technically possible, often for good reason. For

example, implementation of the best options available from a water use efficiency point of view could result in undesirable impacts on product quality or costs.

It is useful at this point to define what is meant by “benchmarks” and “best practice standards”, two terms that are commonly used with reference to water use efficiency. A benchmark is a defined reference point of performance to which a water user may compare individual water use performance. It is important to note however that the use of benchmarks cannot be used to make conclusions about an organisation’s absolute level of water efficiency, only its level of efficiency relative to the organisations surveyed in producing the benchmark.

Such benchmarks are generally determined from field data. Table 10 below outlines water use benchmarks for Australian office buildings.

Table 10: Australian Office Building Benchmarks

| Normalised Water Intensity (kL/m ² /annum | Percentage of sample at this level or better |
|--|--|
| 1.5 | 80% |
| 1.25 | 63% |
| 1.125 | 50% |
| 1.0 | 36% |
| 0.75 | 17% |
| 0.5 | 5% |

Source: Bannister, Munzinger and Bloomfield (2005)

As indicated in Table 10, water use is typically expressed in terms of water intensity to allow comparisons that are independent of the level of production/economic activity. In this instance, a user with a water intensity of 2 kL/m²/annum would be described as inefficient relative to benchmark performance, while a user with a water intensity of 0.4 kL/m²/annum would be efficient relative to benchmark performance.

“Best practice standards” is a term used interchangeably to describe both the practices required to achieve the best water use efficiency performance possible as well as the quantitative level of water use performance that would be achieved should these practices be followed. The practices referred to include both the manner in which operations are managed as well as the technologies employed, both of which have significant impacts on water use efficiency. Table 11 below outlines an example of a quantitative best practice standard for the pulp and paper industry.

Table 11: Best Practice Water Use Standards in the Pulp and Paper Industry

| PRODUCT | INTERNATIONAL BEST PRACTICE WATER USE (m³ / ton) |
|----------------------------------|--|
| Fully bleached Kraft pulp | 27 |
| Unbleached Kraft pulp | 9 |
| Newsprint | 6 |
| Linerboard | 3 |

Source: CJM Macdonald (2004)

A user in this sub-sector of the overall manufacturing sector could use these standards to calculate what an absolute water use level corresponding to best practice for a defined product mix would be, taking production levels of each product into account. Comparison to current water use levels would then reveal how far from best practice the facility is. This information would be an important input to the target-setting process.

Benchmarks and best practice standards are therefore important elements for providing context to individual organisations when implementing water conservation. It is however an understanding of how much water could feasibly be conserved that is of most importance in assessing the potential for conservation. The total amount of water that could feasibly be conserved by an organisation is the amount of water saved when all water conservation initiatives that are feasible, based on each organisation’s unique technical, financial, operational and strategic considerations, are implemented.

The amount of water that could feasibly be conserved by an individual organisation at a given level of economic activity could be expressed as follows:

$$\text{Feasible Water Savings (FWS)} = \text{Current Water Use (CWU)} - \text{Lowest Feasible Water Use (LFWU)} \dots\dots\dots(1)$$

The attractiveness of a water use sector in terms of participation in the Stakeholder Accord on Water Conservation would be directly proportional to the feasible water savings in each sector, which would be the sum of feasible water savings on individual organisations in the sector.

It should be clear from the above that in order to identify potential participant sectors based on water use efficiency, the following information would be required for each sector:

- i. Levels of economic activity at the site level e.g. production levels in the manufacturing sector;

- ii. Details regarding this activity e.g. the mix of products produced as per our example in Table 2;
- iii. Levels of absolute water use at the site level i.e. total volume of water used and;
- iv. Detailed site-specific information necessary for determination of lowest feasible water use. Such information is often not generally known, even by the users themselves, and typically requires a site-level study supported by technical specialists.

The point of the above is to highlight that this definitive approach of sector identification is not pragmatic in the context of this study.

In the absence of this comprehensive data, the initial identification of potential participants will therefore be carried out based on absolute water use levels and qualitative information as to the water use practices in individual industries. Hence sectors that are qualitatively known to be water-intensive e.g. the pulp and paper industry are proposed for inclusion. While it is possible for a sector to have a relatively large absolute water use but be an efficient user, such large users would still need to maintain their efficient performance, since small drops in efficiency translate into large increases in water demand for such sectors. Hence the larger the water demand of an individual sector, the more suitable it is considered to be for inclusion in the Accord, regardless of its water use efficiency.

It is recommended that the best approach is to determine potential Accord participants at the sectoral level, while structuring the Accord in such a manner that individual users in selected sectors may set their individual targets within the framework of the Accord. Water use *sectors* for inclusion in the Accord are therefore identified, not organisations. Finally, the Accord will be inclusive, which implies that while individual sectors may be proposed in order to leverage the impact of the Accord on total national water use, all water users are welcome to participate in the Accord.

5.3 Approach Used in Identification of Potential Participants

The process followed in the identification of participant sectors for the Stakeholder Accord on Water Conservation was to undertake the following:

- A review of the broad economic classifications in the South African economy based on the social accounting matrix (SAM) was conducted. In terms of this framework:
 - **Primary industries** include the agriculture, forestry and fishing, mining and quarrying industries;

- **Secondary industries** include the manufacturing, electricity, and construction industries;
- **Tertiary industries** include wholesale-, retail- and motor trade; catering and accommodation, transport, storage and communication, finance, real estate and business services, community, social and personal services, general government services, and other producers.
- Water intensive organisations and hence sub-sectors were identified based on the review of the latest Water Authorisation Resource Management System (WARMS) data, qualitative assessment and sources such as NATSURV reports numbers 1 to 16.
- Potential sectors for participation in the study were identified, considering all of the above.

5.4 Assumptions and Limitations Associated with the Data Used

The WARMS database contains information on the amount of water that is *allocated* to users, which can differ markedly from the amount of water actually used. There are in addition, some problems with the integrity of the data, based on comparisons made between data in the database and verified field data. This does not mean that the data has no utility, but that its use must be approached with caution. Where possible, field data was used to make conclusions. Such field data is however not comprehensive.

Urban water users, which include numerous industrial and commercial undertakings, are not captured in the WARMS database comprehensively, but in databases held by municipalities. Attempts to obtain data from municipalities, specifically the large metros, were met with little success. Each metro tends to store and manage their data differently, and a reporting system to easily extract this data in a common format was hence not available. It was therefore decided to use organisational reports in the public domain as a source of water use data as regards potable water use. While this approach is sensible in terms of large users that report on water use performance, gaps in the data used did exist for small users.

The NATSURV reports, an important source of information, cover a period from 1986 to 2005 and hence some of these reports are quite dated. Where possible, water use was corrected to account for increased production levels. In doing so however, levels of water use intensity were assumed to be constant i.e. at the same levels as reported by the NATSURV studies.

Despite these limitations, it is believed that the above approach is a useful point of departure for the selection of potential Accord participants since it uses the data that is available. The

Accord will in any event be embedded in a living framework that will allow new users to participate on an ongoing basis, and once reporting begins, data of an improved quality will be available to allow enhancement to this exercise.

5.5 National Water Consumption by Individual Sectors

According to the National Water Resource Strategy (NWRS), the estimated water requirements for different water use sectors in 2000, the most recent period for which this data was aggregated, were as follows (the data is standardised to the 98% assurance of supply level to aid comparison):

| | |
|--|-----|
| Irrigation (Primary users) | 62% |
| Urban and rural (Primary, secondary and tertiary users): | 27% |
| Mining and bulk industries (Primary and secondary users) | 6% |
| Power Generation (Secondary) | 2% |
| Afforestation (Primary users) | 3% |

Note that the water use due to afforestation is based on abstractions from water resources and not stream flow reduction.

While it is acknowledged in the NWRS that there are considerable uncertainties in the data, it does provide an indication of the orders of magnitude involved in the different water uses between the sectors.

Given that the focus of the Stakeholder Accord on Water Conservation will be on the water used by businesses in South Africa, it is clear from the above that these users account for a minimum of 73% of national water use, and an even greater proportion when urban industries and commercial undertakings supplied by municipalities are included.

A more detailed breakdown of this data is contained in Table 12 below. This data is from the same period, but has been modified using ratios of water use from 1995 data. The breakdown is therefore indicative only, and may be significantly different today should the proportion of economic activity in the various sectors have changed and/or if water use practices in the various sectors have changed. It is however the most recent consolidated data available, and will be used to draw our conclusions on water use in the various sectors.

According to this information, water use categories besides domestic and government users make up some 83% of water use. The 27% urban and rural use alluded to above is split further, with domestic now shown to represent 16% of total water use. This means that 11% of total water use may be attributed to urban and rural businesses and industries, most of which can be expected to be urban.

Table 12: Detailed Breakdown of National Water Use

| SECTOR | SUB-SECTOR | VOLUME OF WATER USED (Mm ³ /annum) | PERCENTAGE OF WATER USE |
|---------------------------|---------------------------------|---|-------------------------|
| AGRICULTURE | Irrigation | 7,920 | 62% |
| | Livestock and game | 313 | 2% |
| | Forestry | 428 | 3% |
| | TOTAL AGRICULTURE | 8,661 | 67% |
| POWER | Power Generation | 297 | 2% |
| MINING | Gold mining | 127 | 1% |
| | Other mining | 261 | 2% |
| | TOTAL MINING | 388 | 3% |
| MANUFACTURING | Food processing | 123 | 1% |
| | Other manufacturing | 577 | 4% |
| | TOTAL MANUFACTURING | 700 | 5% |
| TRADE AND SERVICES | Construction | 110 | 1% |
| | Transport | 120 | 1% |
| | Government | 152 | 1% |
| | Other | 483 | 4% |
| | TOTAL TRADE AND SERVICES | 865 | 7% |
| DOMESTIC | Urban | 1,698 | 14% |
| | Rural | 261 | 2% |
| | TOTAL DOMESTIC | 1,959 | 16% |
| TOTAL | | 12,867 | 100% |

Source: Stats SA (2006), Updated Water Accounts for South Africa: 2000

5.6 An Overview of Water Use in the Primary Sector in South Africa

5.6.1 Irrigated Agriculture

As evidenced by the data above, irrigated agriculture is by far the largest water use sector in South Africa. Water use in irrigation agriculture can be split into two areas:

- i. Water consumed by crops and;
- ii. Water lost during crop production.

The water consumed by crops is driven by irrigation management practices such as irrigation scheduling, irrigation systems; cropping systems, rainfall, etc. The water lost in crop production occurs throughout the supply chain from abstraction, storage, conveyance of the water to field edge, distribution of the water in the field and application on the field.

5.6.2 Mining

Mining plays a vital role in the national economy, and is a sector that relies heavily on water to conduct operations. Processed materials of mineral origin accounted for nearly 6 percent of RSA's Gross Domestic Product (GDP) during 2007 (StatsSA, 2008). The country's electricity costs are among the lowest in the world due to the availability of low-cost coal, which is used to generate 90 percent of all electric power in South Africa.

The mining sector is diverse and is further complicated by the fact that many mines also undertake some form of beneficiation of the recovered ore. According to current information supplied by the Department of Minerals and Energy (DME), mining and mineral processing operations in South Africa currently total 1,451 and include 344 diamond mines, 98 coalmines, 50 gold mines and 31 platinum-group metal mines.

There are large differences in water intensity across the mining sector. Coal mining uses far less water than platinum mining and refining for example. To illustrate this point, a desktop study conducted on water use among selected coalmines in the Olifants WMA found that water use varied between 0.01 m³/ton to 0.24m³/ton of coal produced. No clear correlation between mining technique and water use could be found, highlighting the fact that there are differences arising from the unique features of each deposit.

A breakdown of water use for the mining sector, which uses some 388 million cubic metres per annum based on the NWRS (2000) data, is outlined in Table 13 below. The table estimates water use per sub-sector in 2000 based on 2004 production levels:

Table 13: Mining Water Use by Sub-sector

| MINING SUB-SECTOR | ESTIMATED WATER USE (Mm ³ /annum) | % OF MINING SECTOR'S USE |
|--|--|--------------------------|
| Gold and uranium | 211.51 | 54.51 |
| Chrome, manganese and other metal ores | 60.43 | 15.57 |
| Platinum group metals | 49.86 | 12.85 |
| Iron ore | 28.02 | 7.22 |
| Coal | 26.82 | 6.91 |
| Stone quarrying, clay and sandpits | 3.3 | 0.85 |
| Diamonds | 1.59 | 0.41 |
| Phosphate and other chemicals | 1.36 | 0.35 |
| Limestone | 0.99 | 0.26 |
| Dimension stone | 0.48 | 0.12 |
| Other mining | 3.64 | 0.94 |

Sources: Stats SA, *LSS of Mining, 2004*; Stats SA, *Updated Water Accounts for South Africa: 2000 (D0405)*

While the recent commodities boom and subsequent global financial crisis may have changed the relative production levels of individual mining sub-sectors significantly since 2004, it is clear that “gold and uranium mining” dominates the sector in terms of water use, and that the only other sub-sectors of any significance as regards water use are “chrome, manganese and other metal ores”, “platinum group metals”, “iron ore” and “coal”. These sub-sectors of the mining sector could be included in the Stakeholder Accord on Water Conservation by virtue of their absolute water use. Despite some differences in processing requirements and hence water use practices between these sub-sectors, mining may be handled as a single sector for the purposes of the Stakeholder Accord on Water Conservation.

Finally, from a qualitative perspective, the mining sector has a significant potential impact on water quality, and much of this impact can be ameliorated through water conservation initiatives. Examples would be reduction in seepage from dams containing polluted mine-water and the use of desalination technology with safe brine disposal as opposed to the use of evaporation pans. This potentially virtuous relationship between water conservation and the reduction of water quality impacts in the mining sector is in itself a driver for the inclusion of the mining sector in the Stakeholder Accord on Water Conservation.

5.6.3 Forestry

Commercial plantation forestry is currently the only activity regulated in the National Water Act (NWA) (Act No. 36 of 1998) as a stream flow reduction activity (SFRA). In terms of the Act, stream flow reduction activities must be licensed.

Stream flow reduction activities reduce the amount of water available to downstream users. While commercial forests are typically not irrigated, the volume of water taken up by these forests is calculated and allocated to commercial forestry operations, and must be paid for.

Afforestation is estimated by DWAF to reduce stream-flow by some 1,500 million cubic metres per annum, and on this basis appears attractive for inclusion in the Stakeholder Accord for Water Conservation. The sector has a few large players as well as a large number of emerging growers that feed into the supply chain. SFR measurement does however pose challenges in terms of incorporation into the Stakeholder Accord on Water Conservation. The focus of the Accord will therefore be on water directly used in the forestry industry to begin with as opposed to SFR. The future incorporation of SFR could be an issue the sector may wish to pursue through the vehicle of the Accord.

5.7 An Overview of Water Use in the Secondary Sector in South Africa

5.7.1 Power Generation

Power generation is the most water-intensive activity within the IMP sector, largely due to evaporative losses from cooling towers at wet-cooled power stations. Water use efficiency is driven by the recycling of water, and the advent of dry cooling systems has meant that it is possible to reduce power station water use at dry-cooled stations by up to 15 times when compared to wet-cooled stations (Eskom, 2009). Upward pressure is being placed on water use by the introduction of air quality remediation technologies such as boiler flue gas desulphurisation.

There are strong links between water use efficiency and water quality impacts in this industry. Incoming water quality drives cooling tower blow down rates, which can influence the water balance at a wet-cooled station significantly. Power stations can also impact on both surface waters and groundwater through seepage, discharge and aerial deposition of pollutants.

Current water use in the power generation sector in South Africa is of the order of 340 million cubic metres per annum, driven largely by Eskom's coal-fired operations, and including other smaller independent producers. Eskom dominates the sector, and since Eskom already has a Memorandum of Understanding on Water Conservation with the Department of Water Affairs, it is not necessary to include power generation in the Stakeholder Accord on Water Conservation.

5.7.2 Industry

The industrial sector of the economy is concerned with adding value through the manufacturing of goods. The sector is characterised by diversity in the magnitude and nature of its water use that includes both consumptive and non-consumptive uses. Where water use is not consumptive, return flows can lead to significant impacts on water resource quality. Consumptive uses are typically in the form of evaporative losses, entrainment in discarded solid waste materials or incorporation into products.

Water is widely used as a cooling medium, to produce steam, as a carrier of both physical materials and chemical compounds and, in the food processing industry, for cleaning purposes. It is directly incorporated into many products e.g. soft drinks. It is extensively used in pulp and paper production in washing and bleaching operations. In sugar processing and in brewing, it is used to extract desirable soluble materials. It is not uncommon for

organisations within the same sector to employ vastly different processing techniques and hence to have different water use footprints. Product mix is also a strong driver of water use levels e.g. consider the amounts of water used to produce newsprint versus bleached pulp in the paper industry and beer versus malt-based flavoured alcoholic beverages in the brewing industry. This wide variety of applications for water and the range of unit operations in which water is employed in the industrial sector highlight the need for site-specific benchmarking and target setting.

Not all industries are water-intensive and efforts to reduce water use in the sector on a national level should concentrate on the most water-intensive industries in order to deliver the greatest impact. Water intensity in the industrial sector is commonly expressed as the amount of water used to produce one unit of product.

The sub-sectors proposed for potential inclusion in the Stakeholder Accord on Water Conservation are as follows:

5.7.2.1 The Pulp and Paper industry

Pulp and paper manufacture is highly water-intensive, consuming in excess of 130 million cubic metres per annum nationally. The two largest mills in the country, both located in water-stressed areas, have contemplated extensive capacity upgrades in the recent past, indicating that absolute water use in the industry could increase. On the evidence of previous studies (e.g. Macdonald, 2004), opportunities exist to increase water use efficiency at specific sites, highlighting the need to include this sub-sector in the Stakeholder Accord on Water Conservation.

5.7.2.2 The Iron and Steel industry

Water intensity in this sub-sector arises from the need to cool equipment and products, with consequent evaporation, and the need to scrub furnace and smelter gases, which leads to evaporation and entrainment in solid wastes. Recycling is a big driver of water use efficiency, as are careful management of energy balances and the control of seepage losses from dams. Water use is not known with certainty at this stage, but the 3 biggest producers use between them approximately 30 million cubic metres per annum. It is worth noting that much of the water use in this sector tends to be consumptive, since the industry tends to avoid discharges to surface waters. This is a further reason for inclusion of this sub-sector in the Accord.

5.7.2.3 The Textile Industry

The last national survey of this industry was conducted in 1993, and estimated total water intake for the sub-sector to be 30 million cubic metres per annum, which is considerable. Most of this water use is not consumptive.

The survey found that the industry exhibits significant diversity, with operations ranging from “dry” garment manufacturers to “wet” operations that process various fibre types and have widely varying water use. The authors of the survey suggest site-specific targets as an appropriate strategy to achieve water use efficiency improvement in the sector.

Current water use for the sector is unknown. The challenges faced by the sector due to competition from cheap imports are well documented, and contractions in production levels will no doubt have impacted on total water use levels. Wet operations within the sector should be included for participation in the Accord.

5.7.2.4 The Clear Beer Brewing Industry

The largest organisation in volume terms in this sub-sector is the South African Breweries Ltd, which, according to the company's sustainability report, consumes some 10.5 million cubic metres per annum at the 7 breweries in South Africa. In addition, there are a number of very small brewing operations around the country. International competitors are in the process of building a new brewery in Gauteng, which could improve total water use in this sub-sector. As with most industries, water intensity is a strong function of throughput at individual sites. Opportunities in this industry tend to lie in the area of CIP (clean in place) system optimisation, bottle washing and reductions in effluent volume through point-of-use reductions in water consumption.

Water intensity has increased recently at SAB Ltd's breweries, from 4.24 L/L in the 2007 financial year to 4.4 L/L in the 2008 financial year (SAB Ltd, 2008). This indicates that there may be potential for water conservation in this sub-sector.

5.7.2.5 The Dairy Industry

The dairy industry in South Africa is characterised by diversity as a consequence of the large variety of dairy products that are produced, even at individual sites. Product mix is therefore a strong driver of absolute water use at any particular site. The NATSURV study of the dairy industry, conducted in 1989, surveyed over 150 dairies and estimated total water use for the industry at 4.5 million cubic metres per annum. While this data is out of date, it highlights that

individual sites typically do not consume large quantities of water. The study estimated that between 75% and 90% of the water used was discharged as effluent, highlighting the industry as one with a low level of consumptive water use. Water saving opportunities are typically in the CIP area. While as a “wet” industry the dairy industry should be included in the Accord, it is not regarded as a high priority sub-sector, since overall water use is small relative to sub-sectors such as pulp and paper production for example.

5.7.2.6 The Soft Drink Industry

The NATSURV study of this sub-sector defined soft drinks as carbonated soft-drinks, fruit juices and dairy-based drinks, and placed total water use for this sub-sector at 4.0 million cubic metres per annum in 1987. According to Euromonitor International, South Africa is one of the ten fastest growing soft drinks markets in the world, with growth of 44% projected between 2007 and 2012. The industry is therefore clearly a significant and growing water user. Water is used consumptively in making the product, with additional water required for CIP, facility cleaning, bottle washing and cooling.

5.7.2.7 Red Meat Abattoirs

The NATSURV survey of the red meat abattoir industry (where “red meat” is categorised as being the meat of cows, calves, goats, sheep and pigs) was conducted in 1989 and estimated total industry water use to be 5.8 million cubic metres per annum. Using the most recent comprehensive slaughter data available from the South African Meat Industry Company, and assuming a similar specific water intake for the industry as was the case at the time of the study, the volume of water consumed by the industry currently would approximate 5.4 million cubic metres per annum.

The decline in water use is due to a decline in the number of cattle, calves, goats and sheep slaughtered, which offsets the increase in the number of pigs slaughtered. Specific water use in the industry is measured on the basis of “water related cattle units”, which accounts for differences in water use associated with the slaughter of different animals. The industry has undergone significant structural change, with the number of abattoirs increasing to 470 (Red Meat Abattoir Association) from the 285 reported at the time of the NATSURV study, due to deregulation. Average water use per site has therefore declined significantly.

5.7.2.8 The Poultry Industry

Poultry producers supply the “white meat” portion of the meat market, producing some 718 million broilers annually (USDA). The industry has grown significantly in recent years – on current production, annual physical volume growth has averaged some 6% over the last two decades, the period since the last national industry water use survey was conducted. If it were assumed that water intensity levels have remained static over this period, (at 18.18 litres/bird) this would place total water use for the sector at roughly 13 million cubic metres per annum. The growth of two large players in this industry has probably led to increased water use efficiency for the sector as a whole, which means that this estimate may be overstated. Even at higher efficiency levels, the industry remains significant and should be included in the Accord.

5.7.2.9 The Chemical Industry

Chemical manufacturing represents a diverse sector broadly comprising commodity or basic chemicals and speciality chemicals. Water is used as a raw material in the manufacture of some products, and is also used for other purposes such as cooling, steam production, scrubbing and washing. At the sector level, water use is not accurately known at this stage, but there are a few very large allocations made to individual users in the sector based on WARMS data. The industry uses both raw water and potable water. In 2007 the industry is reported to have used 5.61 m³ of water per ton of production, excluding water used for steam production (Chemical and Allied Industries’ Association, 2009).

The above sub-sectors of the industry sector are considered to be prime candidates for inclusion in the Stakeholder Accord on Water Conservation. The non-food industries discussed here are estimated to use roughly 62% of total non-food industrial water use. There are other industries that use water, and can hence participate in the Accord, but the proposed sectors are clearly significant water users in the industrial sector of the economy.

5.8 An Overview of Water Use in the Tertiary Sector

5.8.1 The Commercial Sector

The commercial sector comprises commercial buildings such as office complexes, shopping malls, entertainment venues and the like. In some instances water is an integral part of the functioning of the business venture, such as at an ice rink or an indoor swimming venue. In

the main, water use at commercial sites is associated with building utilities and staff amenities.

The water use breakdown in Table 12 highlights that the trade and services sector uses some 7% of total water used in the country, with 4% in the “other” category, which is expected to largely comprise commercial undertakings.

The types of commercial ventures/ sub-sectors, which could be incorporated into the Accord, would include:

- i. Facilities Management, particularly shopping malls and entertainment venues
- ii. Office parks and the office facilities of large corporate organisations
- iii. Health clubs
- iv. Private education facilities

5.9 Balance between volume impact and inclusivity

For the Accord to deliver measurable value through concrete water savings over time, key participants must include larger users. Among these larger users, those who are relatively inefficient will provide the opportunity for the Accord to make a meaningful impact on the total volume of water saved. Without site-level water intensity data it is difficult to ascertain which users are efficient and which are not, but this will become possible once the Accord reaches a level at which participants are in a position to report on performance. This will require agreement as to the appropriate key performance indicators (KPI's) and the methods to be used for determination of water use and water use efficiency baselines. These issues are detailed in the development of the management framework for the Accord.

Smaller users should however not be excluded from participating. Among these users will be efficient operators who may be able to share valuable knowledge and practices with other participants, thereby enhancing the success of the Accord.

5.10 Categorisation of Water Use Sectors Using SIC Codes

It has been proposed by Business that water use sectors be aligned to the sector classification used for GDP accounting. This would have utility in terms of linking water use to economic value added. Ultimately, this information could be used to examine economic and water use linkages for entire value chains, or alternatively to conduct economic analysis in conjunction with a “life cycle” approach to water use efficiency analysis. This approach clearly has more value the greater the number of Accord participants, since not every sector

will have complete representivity in terms of participants. Table 18 in Appendix 2 outlines the proposed water use sectors and their respective SIC codes. Selected sectors are based on the analysis presented above and on qualitative assessment of which sub-sectors within these broader sectors are water-intensive.

Since the Accord is a voluntary mechanism, water use sectors outside of those represented in Table 18 may participate, and these would need to be grouped into the requisite categories. This classification process would be one of the business processes designed into the management framework of the Accord, ensuring that as participation grows, new members are automatically categorised.

6 PRINCIPLES OF SETTING WATER CONSERVATION TARGETS

6.1 Why Targets are Necessary

Water conservation is by definition a quantitative exercise. In order to measure the performance or effectiveness of the Stakeholder Accord on Water Conservation it is necessary to quantify the amount of water that has been saved through its implementation. This measurement process may not necessarily be established at the outset of the initiative, since systems will need to be established to enable it, but one of the objectives of the Accord should be to ultimately measure its contribution in terms of water savings.

Targets are the level of water use that individual users aim for, taking planned site-level water conservation initiatives into account. Given that each user faces unique operational and strategic circumstances, it is preferable that targets are not imposed on users but that users determine their own site-level targets. Once users have targets, they are then in a position to meaningfully evaluate water use performance by comparing the levels of water use achieved to the targets set.

6.2 Key Performance Indicators

In order to standardise water use and water use efficiency measurement, it is important that all participants have access to a uniform set of performance indicators. These indicators could then be used for reporting of performance at some time in the future.

The indicators proposed are:

- Absolute volume of water used and;
- Water intensity.

In general terms, “water used” comprises water from all sources and of varying quality that enters the site and that is used on the site. More details are available in the sector-specific baseline and target-setting guidelines referenced in this report. The proposed KPI’s are outlined below:

6.2.1 Absolute volume

This indicator outlines the total volume of water used by a site over a defined period, for example a calendar year. All forms of water are included in the measure e.g. treated and untreated effluent, potable water, raw water etc. in line with the principle that all water is part of an integrated cycle, and using the approach espoused by the Global Reporting Initiative.

6.2.2 Water Intensity

This indicator measures water use relative to some measure of economic activity, and is the basis for the measurement of how efficiently water is used. The inclusion of this measure is based on findings of a review of the Energy Efficiency Accord, where total energy use alone was found to be a deficient indicator. This deficiency, which would be analogous in the case of absolute water use, is that changes in throughput or activity are not inherently catered for where levels of production or economic activity are not considered. Hence an operation could use less water due to reduced activity, but actually be less efficient.

The details of how water intensity is to be measured in the key water use sectors are outlined in Table 14 below.

Table 14: Recommended Key Performance Indicators for Different Sectors

| SECTOR | PERFORMANCE MEASURES | | |
|----------------------|---|---|--|
| | MEASURE | METRIC | |
| AGRICULTURE | SUBJECT TO FINALISATION PENDING THE OUTCOME OF A STUDY ON METERING IN THE SECTOR BY THE DEPARTMENT OF WATER AND ENVIRONMENTAL AFFAIRS | | |
| COMMERCIAL | Absolute Volume | cubic metres used per period | m ³ / annum |
| | Water Intensity | cubic metres per square metre per period | m ³ / m ² / annum = kL/m ² /annum |
| MANUFACTURING | Absolute Volume | cubic metres per period | m ³ / annum |
| | Water Intensity | cubic metres per mass/volume of production | m ³ / ton or m ³ / m ³ |
| MINING | Absolute Volume | cubic metres per period | m ³ / annum |
| | Water Intensity | cubic metres per mass of production (ore mined or finished product, depending on the nature of the mine) per period. Both indicators may be used in some cases. | m ³ / ton and/or m ³ / ounce |

The focus of this Accord is on improving water use efficiency on a volume basis however in the future the stakeholders may need to work together to explore the development and implementation of additional water demand management instruments as the need for these

arise. Some of these may be qualitative, an example being the promotion of specific practices in various sectors.

6.3 Baseline and Target-setting Guidelines

First-pass water use baseline and target-setting guidelines were produced in the course of development of the Stakeholder Accord on Water Conservation. These documents have been developed for the Irrigated Agriculture, Mining, Manufacturing and Commercial sectors and are based on the KPI's discussed. The documents follow a generic framework, but have each been adapted to include sector-specific characteristics, with quantitative principles illustrated through worked examples. What follows is a brief overview of the approach used in the development of these guidelines.

6.3.1 Water Use Baseline Determination

Baseline water use may be determined for both absolute volume and water intensity, and requires accurate measurement of the volume of water used and the level of economic activity (e.g. the level of production in a manufacturing environment) over a defined period. In principle, the period chosen should take seasonality into account in order for the baseline water use to be representative. Unusual periods of activity should not be used for baseline determination. Hence if an agricultural area experienced severe drought, or experienced unusually high levels of rainfall, these periods should either not be used, or the data should be corrected/normalised if possible.

The issue of a baseline that varies with varying levels of production is acknowledged, but has not been incorporated into the guidelines. Instead a static baseline has been assumed. The reason for excluding the approach of a "moving baseline" is that this would complicate the guidelines, and a simple yet workable approach was preferred. Determination of a baseline that depends on production levels would require statistical analysis of water intensity and production data, using regression analysis to determine a relationship. The relationship would then be used to correct the baseline used for the level of production for the period being assessed, in order to ensure that water savings were expressed against a common activity base.

For similar reasons to the above, the issue of product mix was not included in baseline determination (or indeed target-setting). It is well known that different products require different amounts of water to produce them, and that individual facilities could produce a range of products. Without making any changes to operations, water intensity could therefore change based purely on product mix. It is possible to standardise water intensity to a base

product for any industry provided that the standard water intensity for each product is fairly accurately known relative to the standard water intensity of the base product selected. The complexity of this calculation was considered onerous for this first iteration of the Accord.

6.3.2 Water Use target-setting

The target-setting philosophy adopted is one in which a water audit is conducted on the site to identify water conservation opportunities. Of these opportunities, only those that are viable in terms of criteria applied within each individual organisation are considered for implementation. The target-setting time horizon is envisaged to extend over a five-year period, with targets set in each year. Hence in terms of the target-setting philosophy proposed, an organisation would have five individual targets, one for each of the five years following the year in which target-setting is conducted. The process is designed to be repeated each year.

Targets are determined by subtracting the anticipated water savings in each year from the baseline water use value expected at the start of that year. A conservative approach is adopted in which the savings in each year are not incorporated into the same year's target, but into the target for the following year. This allows users some time to cement operational changes and prove the achievement of anticipated savings.

7 GUIDING PRINCIPLES OF THE STAKEHOLDER ACCORD ON WATER CONSERVATION

7.1 The Strategic Goal of the Accord

The essence of the Stakeholder Accord on Water Conservation is that it will be a voluntary instrument that will promote water conservation within various participating water use sectors. An explicit statement of the overarching goal of the Stakeholder Accord on Water Conservation would read as follows:

“To develop a voluntary mechanism through which participating water use sectors are enabled to achieve improved levels of water conservation in support of the equitable, sustainable use of national water resources.”

7.2 Overarching Accord Principles

There are a number of fundamental principles that are recognised by the stakeholders who are party to the Stakeholder Accord on Water Conservation. They form the fundamental framework within which the Accord is formulated and will carry out its work. They apply at all levels of operation of the Accord, from the strategic engagements at national level down to the individual user/site level.

In the words of the Alberta Water Council, a Canadian initiative with similar water conservation objectives to that of the Stakeholder Accord on Water Conservation, “Principles reflect the fundamental beliefs and attitudes that underpin efforts to improve water conservation.” The Council went on to highlight the following core characteristics of principles:

- They are statements of fact;
- They are beliefs about the value of water and;
- They are declarations regarding the anticipated behaviour and actions for implementation.

What follows are the guiding principles of the Stakeholder Accord on Water Conservation. For a review of the source of each these principles, please refer to Appendix 3.

The key principles identified are as follows:

Water is a finite, integrated resource vital for life and development;

This principle stems from sources such as the Dublin Statement (which informed the White Paper on National Water Policy for South Africa, 1997), the National Water Act (Act 36 of 1998) and the National Water Resource Strategy.

Its relevance to the Accord is that it stresses the need for conservation and highlights that water resources are part of a single hydrological cycle. This principle also highlights that water is linked to social and economic development and natural ecosystems. Whilst this Accord concerns water in the business context, water use in the domestic and environmental sectors will impact the Accord and be impacted by the Accord. If successfully implemented, water conservation will help to alleviate the need to expand the expensive water supply infrastructure that has already been developed in response to South Africa's limited and geographically dispersed water resources. The development and implementation of water conservation is a collective effort amongst all stakeholders from the different water use sectors, making this a responsibility of all water users. Furthermore, water conservation needs to be included in the range of options being pursued in order to meet economic growth requirements whilst not compromising the need to share water equitably amongst all users, including the environment.

Water conservation is an enabler of equitable, affordable access to water resources;

This principle originates from the Dublin Statement, the Constitution of the Republic of South Africa, the National Water Act and the National Water Resource Strategy.

According to the National Water Resource Strategy, water conservation as a facet of integrated water resource management, when adopted and implemented, is able to generate social, economic and environmental advantages. The issue of conserving water to prevent a national shortage and reduced infrastructure spending has been addressed earlier, but it is further important to appreciate that conservation enables equitable sharing of water resources and expanding economic activity among all existing users, ultimately promoting economic equity. This principle links directly to the strategic goal of the Accord, as well as to the social and economic implications of conservation.

The principles, values and norms enshrined in the National Water Act (no. 36 of 1998) will be upheld;

This principle is a commitment from Accord participants to operate within the central themes or principles of sustainability and equity, the cornerstones of the NWA. The significance of this principle is that, besides the obvious improved access in volume terms that accompanies water conservation, issues of social, economic and environmental responsibility also require committed consideration in the adopting of this principle. It is the best overall outcome that is sought through implementation of the Accord, not simply the conservation of the most water possible in volume terms “at all costs”.

Voluntary commitments in terms of this Accord will not be in conflict with the South African legislative and regulatory framework governing water use;

This principle recognises that the Accord operates within a comprehensive legislative and regulatory framework, is designed to complement this framework and should at no times violate this framework. This includes commitments that participants may have to instruments such as water use licences and their associated conditions.

Water is recognised as an economic good;

This principle stems from the Dublin Statement, the National Water Act, the National Water Resource Strategy and the National Water Conservation and Demand Management Strategy Framework. It highlights the economic role of water.

Savenije and Van der Zaag (2002) assert, “considering water as an economic good is about making integrated choices, not about determining the right price of water”. Thus treating water as an economic good should factor in other water uses such as the water required to meet social and environmental needs. This principle demands that decision-making regarding water be undertaken in a pragmatic manner, considering a number of factors that are not purely economic. Hence, whilst the costs of water conservation are an important consideration to users, they are not the only consideration in the context of the Accord.

Water conservation should be carried out within a framework of integrated water resource management;

This principle originates from the National Water Act and the National Water Resource Strategy, as well as the Dublin Statement.

In terms of this principle, as articulated by the National Water Resource Strategy, water conservation is to be pursued in a manner that “maximises the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.”

Cooperation, openness and transparency are important to the achievement of the goals of the Accord;

This principle stems from the numerous national and international initiatives reviewed, which all indicate that conservation efforts are facilitated by mutual cooperation, openness and transparency. There are clear examples of the delivery of quantitative improvements being delivered from such initiatives e.g. the waterMAP, CEO Mandate and the Every Drop Counts programmes, among others.

Opportunities to effect water conservation differ within and between sectors

This principle originates from The National Water Resource Strategy, which states that “each water use is unique and guidelines (for licensing) must not be regarded as rigid prescriptions”.

The principle recognises that each user has unique circumstances that will determine the timing and extent of conservation initiatives possible. These circumstances include existing technological footprint, available skills, financial resources and other unique characteristics. The implications include the fact that each user should set an individual target and that best practices may not be universally imposed on users. This principle does not detract from the fact that even efficient users have some scope to improve water use efficiency, especially in water stressed catchments.

Any future regulations that may be promulgated will take experience with implementing the Accord into account;

This principle seeks to position the Stakeholder Accord on Water Conservation as an important vehicle of dialogue and engagement between Government, Business and Labour,

thereby ensuring that lessons learnt are incorporated into potential future water conservation regulations.

The principles discussed above are all reflected in some way in the Accord, either in the preamble, the background or as explicit statements, as well as in elements of the responsibilities assigned to the individual stakeholders. More detail on their use is outlined in Appendix 2.

7.3 Characteristics of the Accord

In addition to the principles, the Accord will have a number of defining characteristics. These characteristics govern the nature of the Accord and how it will be operated. Unlike the principles above, they are not universally accepted norms/beliefs but rather a view of how the Accord should operate based on stakeholder requirements.

The important characteristics are the following:

- The Accord is a voluntary instrument;
- Any water user from any water use sector, except domestic water users, may join the Accord;
- The terms of the Accord will apply to all participants equally;
- Participants will be provided with support that will enable them to implement water conservation;
- The Accord should not impose an undue burden on participants in terms of engagements and the submission of information, however, all stakeholders should demonstrate achievements made in respect of water conservation;
- The Accord should not impose an undue burden on participants in terms of costs;
- The expectation is not for participants to comply with specific water use targets. Participants are however expected to set internal targets to be used to measure water use performance at site level;
- It would be expected of participants to report annually on water use performance for the purpose of aggregate reporting on the effectiveness of the Accord;
- The commitments of Government and Business will be clearly defined;
- The date at which the Accord becomes effective and the terms of its dissolution will be clearly defined;
- The management framework to be used will be outlined in the Accord document.

As with the principles, the characteristics are reflected in the Accord document itself in various forms.

7.4 The Operational Nature of the Accord

The overall structure of the Accord, the work programme envisaged over its life cycle and other aspects of the management framework were derived through consideration of the requirements of stakeholders and the nature of other national and international initiatives, as reviewed earlier.

In the context of the Accord, individual water users are expected to take ownership for conservation within their operations, with the Accord serving as a vehicle to support their efforts. Government and Business are expected to work as partners in determining the medium and long-term strategic direction of the Accord as well as enabling day-to-day operations.

Support provided by the Accord to the water use sectors is envisaged to be in the form of:

- Provision of a sector-specific platform for engagement on water conservation issues;
- Opportunities to share best practices, both at the sector level and across sectors;
- Access to tools, templates and methodologies which will assist with determination of baseline water use, the setting of targets and the implementation of water conservation;
- Opportunities to communicate water conservation issues to a strategic platform (the Accord Governing Body) and to receive feedback from this platform.

7.5 Potential Role-players in the Accord

A number of potential role-players could be involved in the management structures of the Accord and its operation. These are:

- i. An Accord Governing Body;
- ii. An Accord Secretariat;
- iii. Accord Supporters;
- iv. Water Use Sector Bodies and;
- v. Individual Water Users.

An overview of the potential functions of each of these role-players is outlined below. It should be noted that not all of these role-players may ultimately be involved, as this will depend on the specific structure chosen for management and operation of the Accord.

7.5.1 The Water Conservation Accord Governing Body

The Governing Body would provide the link between Business and Government at the national level within the context of the Accord and would have the following core functions:

- Provision of strategic direction regarding the work programme of the Accord, based on feedback received from the operational level (the Secretariat) and strategic information related to the overall water sector;
- Approval of projects proposed by the Water Conservation Accord Secretariat. As the work programme of the Accord develops, specific projects will be proposed by the Secretariat or by the Governing Body in support of the strategic agenda of the Accord;
- Approval of resources required to carry out the work of the Accord and;
- Approval of co-operative agreements with agencies or other initiatives should these be required.

This tier should be chaired by a representative from Business and would include representatives from the Department of Water Affairs, the Department of Trade and Industry and the most senior representative of the Water Conservation Accord Secretariat.

7.5.2 The Water Conservation Accord Secretariat

The Secretariat is the level that will carry out the work of the Accord, which is primarily to provide an enabling environment within which the water use sectors will conserve water. The core functions of the Secretariat would be:

- To carry out the agreed work programme of the Accord;
- To manage the resources that have been provided for the execution of this work;
- To communicate with the various water use sectors;
- To manage the forums of engagement (at Accord level) agreed with the Governing Body. It is envisaged that there will be additional forums at the sector level which could either be managed by the sectors themselves or by the Secretariat, depending on the model chosen.

7.5.3 Accord Supporters

Accord Supporters comprise the various organisations, agencies and business ventures that could play a meaningful role in assisting water users to conserve water. They could be formally engaged to play a routine role in the functioning of the Accord. Examples of potential Accord Supporters are:

- Suppliers of water-efficient technologies and equipment;
- Suppliers of expertise e.g. independent consultants;
- Research organisations such as the Council for Scientific and Industrial Research (CSIR), Water Research Commission (WRC) and other relevant research institutions, or elements of such organisations, such as Water Efficiency SA;
- Government Funded non-profit support organisations such as the National Cleaner Production Centre and the organisations they collaborate with, such as Waste Minimisation Clubs;
- Venture capital/financing institutions, which may be willing to fund economically viable “green” investments and;
- Any other stakeholders deemed significant in terms of supporting users in achieving the goals of the Accord.

The concept of formalising relationships with Accord Supporters is to integrate and mobilise the capabilities of various stakeholders in support of water conservation, specifically through linking water users to these stakeholders. The specific Accord Supporters involved, should their formal involvement be deemed useful as an element of the operation of the Accord, would depend heavily on the work programme of the Accord, options for which are proposed below. A further driver of their involvement would be the specific needs of individual participating water users.

7.5.4 Water Use Sector Bodies

The Water Use Sector Bodies would comprise representative structures that already exist within various water use sectors, through which the issues unique to each sector as regards water conservation are dealt with. Examples would be the Chemical and Allied Industries' Association and the South African Iron and Steel Institute. These bodies have not been formed for the express purposes of the Accord, and hence the responsibilities placed on them should not be so onerous as to discourage their involvement. Sector bodies are not essential to the operation of the Accord, but their inclusion would make the management of

technical sector-specific issues easier, as well as facilitate communication and data gathering in each sector.

Should they be included as an option, sector bodies would be expected to:

- Facilitate sector-specific aspects of the work of the Accord e.g. solicitation of a volunteer to review the technical content of a guideline on behalf of the sector;
- Gather water use data from users and provide this data to the Secretariat at agreed reporting frequencies;
- Solicit water conservation case studies from members, and review these prior to submission to the Water Conservation Accord Secretariat;
- Promote the Accord among members of the sector body. This will augment any national promotion efforts by Business, Government and/ or the Secretariat;
- Arrange and facilitate formal engagements between users in the sector on water conservation;
- Share generic best practices with other water use sectors in forums convened/arranged by the Water Conservation Accord Secretariat e.g. an annual multi-sectoral conference;
- Collate sector-specific concerns / issues from individual users and communicate these to the Secretariat and;
- Agree to provide small, less-organised users that are not part of their membership with the same support provided to members, in the interests of inclusivity.

At the sector level, the representative sector bodies could be expected to sign the Accord directly.

7.5.5 Individual Water Users

Water conservation will ultimately occur at the level of individual water users. Individual users in the various water use sectors would be expected to:

- Determine site-level baseline water use within a reasonable period of joining the Accord;
- Determine site-level short term (1 year) and long term (5 year) annual absolute water use and water intensity targets within a reasonable period of joining the Accord;
- To routinely measure absolute water use and water intensity by installing metering systems (should these not be in place) or develop other means of reasonably estimating water use. Special arrangements in this regard would apply to agriculture due to unique challenges regarding metering in this sector;

- Implement water conservation initiatives at site level aligned to internal targets;
- Monitor and report on water use performance and;
- Share water conservation best practices.

Individual users would be expected to sign the Accord directly.

7.6 Potential Options for the Management Structure of the Accord

There are a number of potential structural options that could be pursued as regards implementation of the Accord. With all of these options, a minimum level of governance is required, comprising a level that will govern strategic aspects of the Accord and a level that handles day-to-day operations. Hence the Accord Governing Body and the Accord Secretariat feature in each of the options to be discussed. These options are now outlined in more detail below.

7.6.1 Option 1: Governing Body, Secretariat, Sector Bodies, Users and Accord Supporters

In this option, individual water users would join the Accord by signing the Accord directly with the Accord Secretariat. The Secretariat would assign users to Sector Bodies, after which engagements regarding the technical aspects of water conservation would largely be between users and their respective Sector Bodies. These engagements will comprise the sharing of knowledge and best practices. Sector bodies would also engage individual specialists among water users for input on a voluntary basis e.g. to review a best-practice guide for the sector.

Users could be connected to Accord Supporters via a common portal. If this option of including Accord Supporters is exercised, it is recommended that this portal be the Accord website. It would be up to individual users to solicit support from these Accord Supporters, and to pay for services where required.

Each Accord Supporter would need to be accredited/approved before being included. This accreditation would have to be carried out by the Secretariat or possibly outsourced to a third party.

Advantages of this option:

- Gives participants a single interface for water conservation activities;
- Promotes collaboration among various stakeholders, raising the profile of water conservation and;

- Holistic support is provided to participants i.e. all facets of water conservation are addressed.

Disadvantages of this option:

- The Secretariat would require increased resources to allow engagement with Sector Bodies and Accord Supporters, which implies increased costs and;
- Increased time to establish required protocols as compared to less complex options.

An overview of this option is outlined in Figure 4.

7.6.2 Option 2: Governing Body, Secretariat, Sector Bodies and Users

In this option, Accord Supporters are not formally included in the overall structure of the Accord. This would place more of the onus on water users as regards the identification of credible support resources. The work of the Secretariat could possibly be reduced since less engagement would be required.

Advantages of this option:

- Reduced costs at the Accord level as compared to Option 1;
- Reduced operational complexity and lead times for establishment as compared to Option 1.

Disadvantages of this option:

- Reduced support from Accord structures to Accord signatories and the Secretariat;
- Potentially longer lead time until quantitative results of the Accord become apparent.

This option is outlined in Figure 5.

7.6.3 Option 3: Governing Body, Secretariat, Accord Supporters and Users

In this option, the Sector Bodies are not included, but users are provided with formal support from Accord Supporters. The Secretariat would no longer be required to engage with the Sector Bodies, but would have to take on some of the sector functions directly, specifically the coordination of knowledge sharing at the sector level and the review of sector-specific technical issues e.g. guidelines. The Secretariat would also be required to gather quantitative water use data directly from users when reporting is implemented.

Advantages of this option:

- Small reduction in costs as compared to Option 1;
- More integration of stakeholders as compared to Option 2;
- Obviates the need to engage with Sector Bodies, but does increase workload of the Secretariat significantly.

Disadvantages of this option:

- Secretariat may lack specialist sector knowledge to discharge functions effectively;
- Secretariat will lack the sector networks possessed by Sector Bodies, hindering functioning;
- The Secretariat would have to communicate directly with users, which would increase the workload of the Secretariat;
- Increased resources will be needed at the Secretariat level;

This option is outlined in Figure 6.

7.6.4 Option 4: Governing Body, Secretariat and Users

This option represents the simplest management structure for the Accord. Here users engage directly with the Secretariat. All sector-specific work would be undertaken by the Secretariat itself, and external support for on-site conservation efforts by users would be identified and solicited by users themselves.

This option places an increased onus on users i.e. less support is provided through the vehicle of the Accord. The Accord would however still provide significant sector-specific support through guidelines and the like, the details of which are outlined in the proposed work programme of the Accord.

The Secretariat would still engage with external service providers to assist with completion of its work if required.

Advantages of this option:

- Simplified structure when compared to Options 1,2 and 3;
- Potentially less costly structure, but that does depend on the chosen work programme and resource requirements of the Secretariat;
- Is a useful initial structure that could be easily adapted to a more complex form as the functioning of the Accord develops over time.

Disadvantages:

- Secretariat would require either a number of technical specialists or multi-skilled individual staff members to cope with the diverse scope of duties and the differences between water use sectors;
- Reduced support to users could be a disincentive for participation.

This option is detailed in Figure 7.

Figure 4: Overview of Option 1: Governing Body, Secretariat, Sector Bodies, Users and Supporting Stakeholders

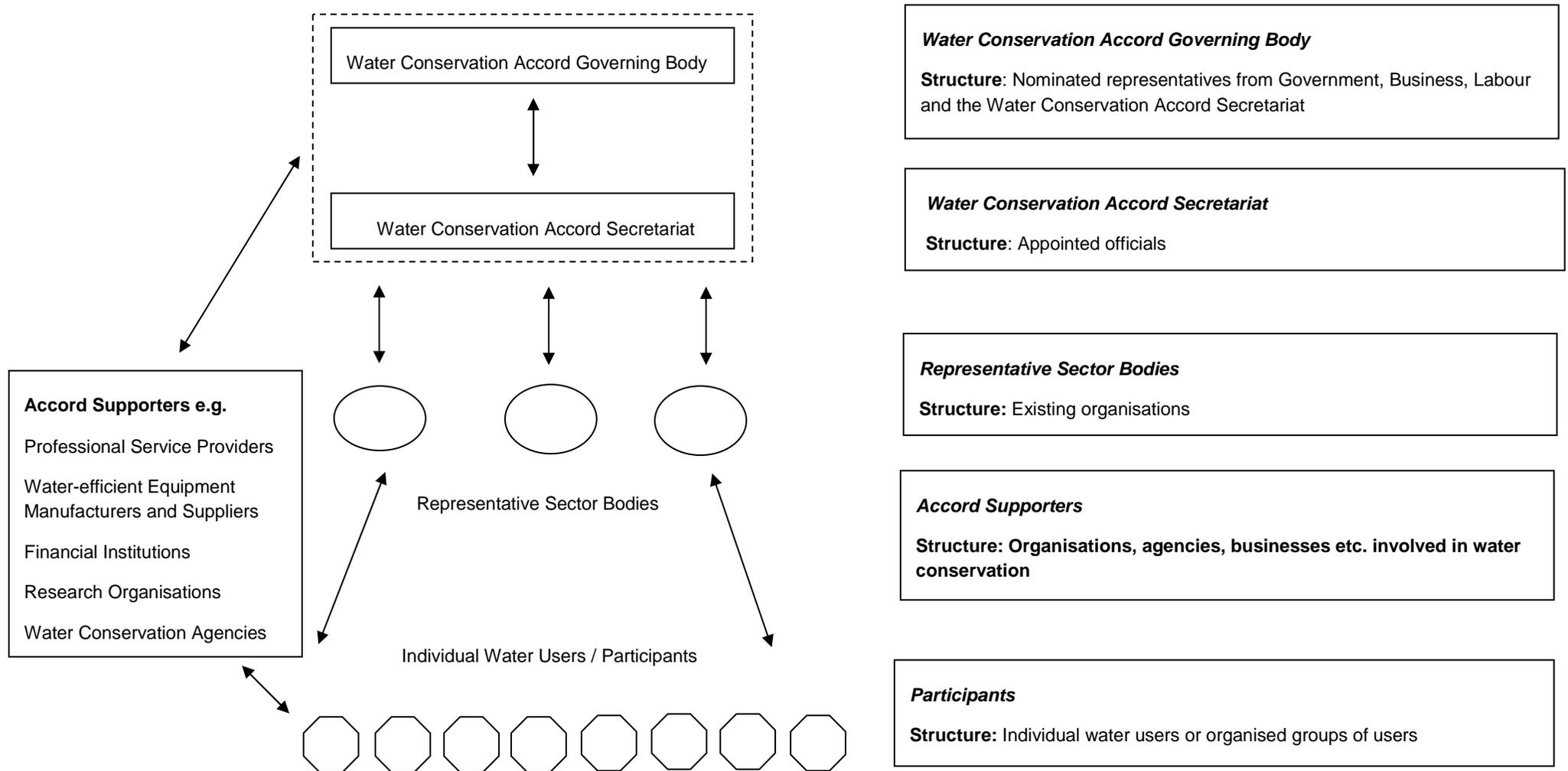
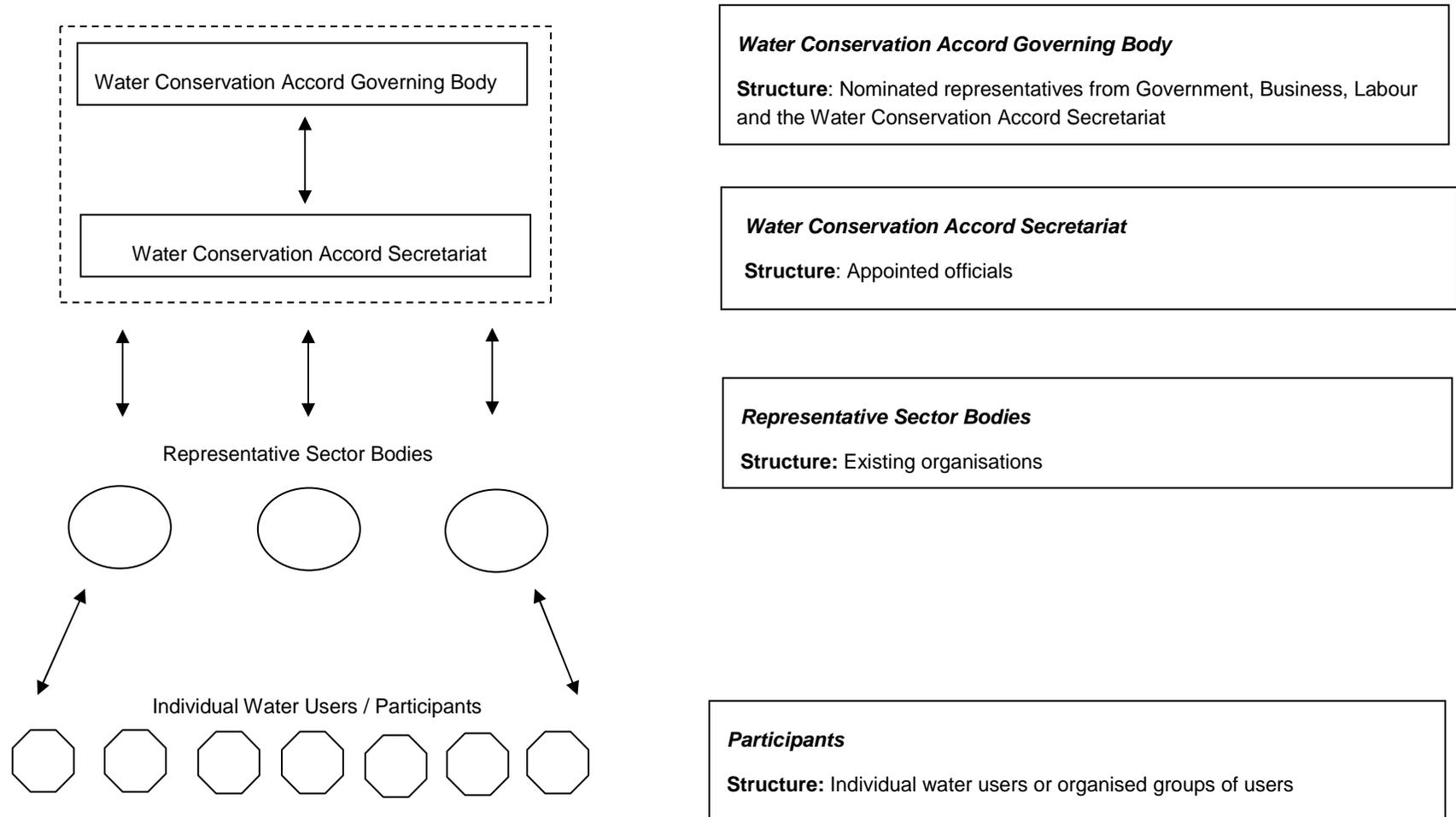
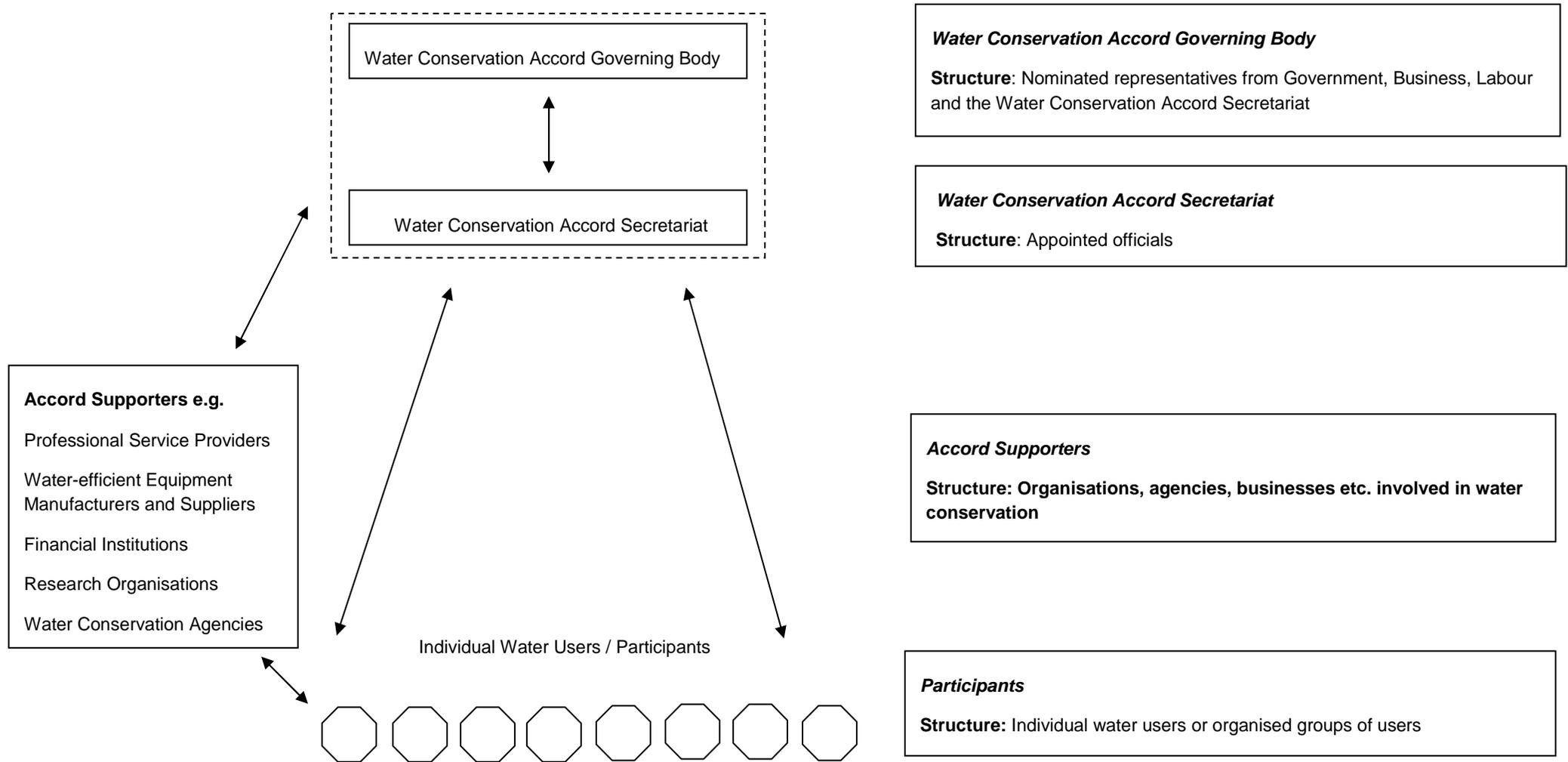


Figure 5: Overview of Option 2: Governing Body, Secretariat, Sector Bodies and Users



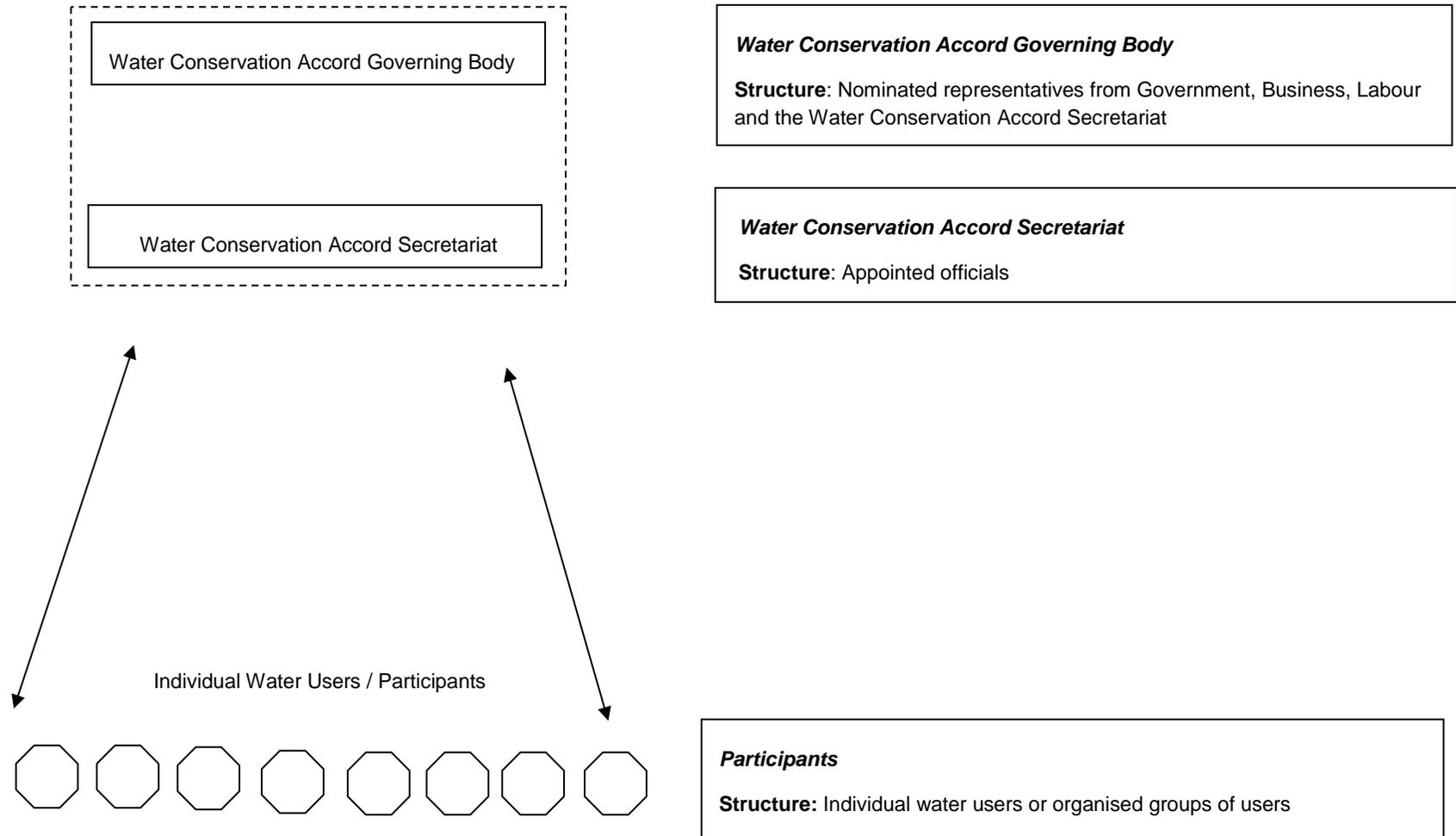
*Arrows denote lines of communication

Figure 6: Overview of Option 3: Governing Body, Secretariat, Accord Supporters and Users



***Arrows denote lines of communication**

Figure 7: Overview of Option 4: Governing Body, Secretariat and Users



*Arrows denote lines of communication

7.7 Institutional Options for the Accord

The form that the management structure of the Accord ultimately will take could vary significantly, with options being the following:

- Establishment of a Section 21 company;
- Integration into an existing business forum e.g. the NBI;
- Integration into an existing government structure e.g. the NCPC or;
- Outsourcing of the management structure to a third party.

Selection of the appropriate management structure should be made on the basis of criteria that would include:

- i. The legal ramifications of the institutional option chosen;
- ii. The costs involved with establishing and operating the Accord with the chosen institutional option;
- iii. The ease with which the institutional option could be implemented and operated;
- iv. The flexibility of the chosen institutional option and;
- v. The implications the chosen institutional option has for the funding of the Accord.

A review of these institutional options in the light of the criteria mentioned is outlined in Table 15 on the next page.

Table 15: Overview of Potential Institutional Options

| Aspect | Section 21 Company | Part of an existing Business Forum e.g. NBI | Part of a Government agency e.g. NCPD | Contracted to a Third Party |
|---|--|---|--|---|
| Governance | <p>Independent company under the auspices of the Companies Act;</p> <p>Board ensures representation across key stakeholders and implementing agent;</p> <p>Audited financial statements;</p> <p>Required to develop legal and institutional structures, and resource the company.</p> | <p>Need to fit into current processes and procedures of organization;</p> <p>No requirement to develop significant additional legal and institutional structures.</p> | <p>Need to fit into current processes and procedures;</p> <p>Compliance to PFMA and other regulatory requirements;</p> | <p>Control is based on a contractual agreement;</p> <p>No requirement to develop processes and procedures, need to specify;</p> <p>Ongoing project/performance management required.</p> |
| Relative cost and ease for establishment | <p>Require a time period, estimated to be at least 6 months, to establish structures and resource company, including development of management systems;</p> <p>Need to ensure that the appropriate number of resources are appointed to meet the requirements of the Companies Act- Chief Operating Officer and Chief Financial Officer etc;</p> | <p>Low cost of establishment- part of existing structure;</p> <p>Potential delays since financing may need to coincide with budgeting cycle.</p> | <p>Low cost of establishment- part of existing structure;</p> <p>If entirely funded by the DTI, funding needs to be appropriated from the DTI Budget- this will occur subject to timelines of the process.</p> | <p>Time required for execution depends on TOR and the source of funding. Most likely the most expensive option.</p> |

Table 15: Overview of Potential Institutional Options (continued)

| Aspect | Section 21 Company | Part of an existing Business Forum e.g. NBI | Part of a Government agency e.g. NCPC | Contracted to a Third Party |
|--|--|--|--|--|
| Relative cost and ease of operation | <p>Independent company, tailored processes and these can be adapted to suit requirements;</p> <p>Administration costs are dependent on scale and can be off-set by participants providing resources as volunteers.</p> | <p>Cost of administration low since it shares overhead costs with parent organization;</p> <p>Administration costs can be off-set by volunteers from participants;</p> <p>Opportunity to leverage similar initiatives already in progress e.g. Energy Efficiency Accord.</p> | <p>Cost of administration low since it shares overhead costs with parent organization;</p> <p>Administration costs can be off-set by volunteers from participants;</p> <p>Existing networks can facilitate operation of the Accord e.g. links to Waste Minimisation Clubs, although more links are needed for expansion.</p> | <p>Costs are built into contract arrangement; Professional fees would be costly.</p> |
| Adaptability | Highly adaptable | Less adaptable than Section 21, subject to constraints imposed by organisation. | Less adaptable than Section 21, subject to constraints imposed by Government. | Highly adaptable, flexibility could increase costs. |
| Funding | Flexibility in sourcing funding. | Flexibility in sourcing funding. | Flexibility in sourcing funding. | Flexibility in sourcing funding. |

7.8 Minimum Requirements for Establishment of the Accord

Before the Accord can be marketed and put into operation, certain minimum infrastructure requirements and business processes have to be put into place. An outline of these is indicated in Table 16 below.

Table 16: Minimum Requirements for Establishment of the Accord

| REQUIREMENT | DESCRIPTION |
|--------------------------------------|--|
| Funding | Funds have to be appropriated in order to establish the structures to be used to manage the Accord and to carry out the agreed work programme. Funds could be provided by industry, government, donors, stakeholders and/or membership fees. |
| Appointment of Accord Governing Body | Selected representatives (2 from each constituency) from Business and Government (DWA and DTI). |
| Appointment of Secretariat | Secretariat Leader, Water Conservation Specialist and at least 1 general office administrator. |
| Office infrastructure | Office space (at least one private office and an open plan area plus a boardroom for Governing Body and other meetings), office equipment (incl. computers and software), furniture. |
| Website | Must have pages describing the Accord as well as a download facility for access to selected documentation by users. |
| Basic documentation | Accord document, MOU for individual participants, Baseline and target setting guidelines, Reporting standards and general office documentation (HR, Finance, IT). |
| Promotional material | Brochure to market Accord, including contact details. |
| Business processes | Basic processes for running the office in a single business manual. |

If the Accord is housed within an existing institution, it will clearly be easier to establish, since existing infrastructure can then be leveraged.

7.9 A Proposed Work Programme for the Secretariat

The Secretariat will ensure that the systems required to establish and manage the Accord on an ongoing basis are put in place. In the early phases of the establishment of the Accord, the Secretariat would be involved in both a developmental and an operational role.

What follows is a proposed work programme for the Secretariat. The developmental work programme would be executed over a period of time, but should be completed within a period of no longer than two years. The functions of the Secretariat would then become more of an operational nature, concerning:

- i. Attraction of new members;
- ii. Engagement with participants;
- iii. Engagement with the Accord Governing Body;
- iv. Reporting.

What follows is therefore a proposed work programme for the developmental aspects, which would be intensive when the Accord is initiated, but should become a smaller part of the work of the Accord over time. It should be noted that what follows is indicative only, and would depend in part on the management structure chosen.

7.9.1 Provision of Tools and Standards to Enable Conservation

As with the international initiatives reviewed, the provision of enabling tools is proposed as an essential component of the work of the Accord. These tools would need to be developed or acquired (should they already be available), made available to participating sectors at the user level, and improved based on consolidated feedback from users over time. Potential tools to be provided, a description of their characteristics and an indication of how they would be obtained are outlined in Table 17 below. In addition to these specific tools, the work of the Secretariat would also entail scanning the local and international environment for other appropriate tools that could be made available to signatories. Each tool would have to be reviewed and approved before being made available, and should come from reputable and reliable sources.

7.9.2 Development and Management of a Website

It is proposed that a website be developed to assist with dissemination of tools, among other important tasks. Users can then download the tools as required for site-level use. As with other international initiatives of this nature, it is not considered necessary to control access to these tools i.e. access to the website should be open to the public.

The website would also be an important vehicle for marketing of the Accord, and would contain information about the nature and purpose of the Accord and how individual users could become signatories.

To aid with administration, the website could also be used to provide documentation required to join the Accord, as well as to allow signatories to provide information for reporting purposes. This latter function need not be established immediately, but could be developed once baseline and target setting methodologies have been agreed and communicated and users are in a position to begin reporting on performance. Data entry could be via a secure area in the website, which implies that each signatory would require a username and password.

7.9.3 Management of Resources

An important aspect of the work of the Secretariat would be the management of resources required to carry out the work of the Accord. These resources could include:

- Personnel seconded to assist with the work of the Accord from stakeholder groups;
- External specialists e.g. consultants;

In addition, financial resources would have to be managed e.g. budgets for specific projects and operational budgets for day-to-day running of the Accord.

Detailed records would need to be kept to allow structured reporting to the Accord Governing Body at least on a quarterly basis.

Table 17: Potential Tools and Standards Required by the Accord

| TOOL / STANDARD | DESCRIPTION | POTENTIAL SOURCES OF THE TOOL / STANDARD |
|--|--|---|
| Baseline and Target-setting guidelines for each sector | These are guidelines that outline how to determine a water use baseline and how to set short and long-term absolute water use and water intensity targets. | These guidelines are being provided as part of the scope of this project. They would however be open to refinement and modification over time using input from users. |
| Best Practice guidelines for each sector / sub-sector | These are guidelines that indicate to users how water intensity can be reduced, based on best available practices. | These guidelines would require development/acquisition. Where current guidelines exist internationally, these can be adopted and customised to South Africa. The provision of these will be a collaboratively effort amongst the stakeholders. |
| Water use audit templates for each sector / sub-sector | These are guidelines that indicate the process of assessing water conservation status at the site level by sector. They would typically be in the form of a checklist, and could have a rating system to rate practices. | These guidelines would require development/acquisition. Where current guidelines exist internationally, these can be adopted and customised to South Africa. The provision of these will be a collaboratively effort amongst the stakeholders. |
| Reporting standards | These are guidelines that provide standard reporting frameworks by sector. Their content will depend on the reporting requirements of the Accord (if any). | Proposed absolute water use and water intensity measures for the various sectors are indicated in this report. In time however, reporting may be required on other parameters. |
| Water Use Benchmarks | These are quantitative studies of water use performance in individual sectors, which will allow users to compare performance to that of their peers. The studies should employ the same measures as those used for measuring performance in the context of the Accord. | These studies have to be carried out at the sector level. The stakeholders will collaboratively undertake these as and when required. The Water Research Commission or similar research institutions could be engaged to include such studies in their work programme. These studies have to be repeated periodically in order to remain current. |

7.9.4 Capacity Building within the Water Use Sector Bodies

The various water use sectors could be represented by Sector or Sub-sector Bodies, which are expected to facilitate intra-sectoral engagements regarding water conservation, and to communicate to the Secretariat.

While each sector is unique, it is important that some form of standardisation is entrenched among all sectors as regards:

- The types of activities expected to be carried out;
- The types and frequencies of engagement;
- Modes of communication between the Secretariat and the Sector Bodies.

Sector bodies would all be fundamentally different, with different capacities and capabilities. Over time it is to be expected that they could therefore develop quite differently from each other in terms of how water conservation is advanced in each sector. From the perspective of the Stakeholder Accord on Water Conservation, certain minimum requirements would however have to be met, and these would have to be communicated to each sector body. The Secretariat would have to prepare a generic information pack for sector bodies.

7.9.5 Communication with Sectors

The Secretariat would need to communicate with the various water use sectors participating in the Accord in order to:

- Disseminate progress regarding the work programme to Accord participants;
- Communicate decisions made at the Accord level;
- Obtain input from the sectors on how the Accord could be improved to better suit their purposes;
- Obtain input from the sectors on specific issues as required e.g. review of a guideline;
- Obtain data from sectors as required.

The modes of communication envisaged would be via telephone, face-to-face engagements (see below), use of the Accord website and, once formal sector representation has been established, use of e-mail. Communication would either be to Sector Bodies or to users themselves should Sector Bodies not be included as an option.

7.9.6 Management of the Forums of Engagement

A number of face-to-face engagements are envisaged at which sector representatives would meet to further the purposes of the Accord. The primary purposes of these engagements would be to share knowledge between sectors. It is proposed that this is carried out through sector representative forums e.g. metal plating and finishing and textiles, amongst others, or mini-conferences at which representatives and even individual users from the various sectors share their achievements in water conservation. These conferences could be scheduled to occur once each year. Further engagement could also occur during events such as National Water Week, facilitated by the Department of Water Affairs.

Engagements with external stakeholders would also be required. For example, project meetings will be necessary with external service providers and/or seconded resources to ensure implementation of aspects of the work programme.

The Secretariat would also be responsible for scheduling the engagements of the Accord Governing Body, and for the logistics around these engagements.

Finally, the Secretariat itself will have internal engagements required for day-to-day management of Accord functions.

7.10 Endorsement of the Accord

The Accord itself will be concluded between Government and Business, and will be signed by the respective representatives of the parties:

- i. Government will be represented by the Minister of Water and Environmental Affairs;
- ii. Business to be represented by Business representative bodies, sector bodies and/or individual business organisations.

While it is envisaged that the Minister of Water and Environmental Affairs will physically sign limited copies of the Accord, this duty will most likely be delegated to local entities e.g. CMA's or regional offices of the Department of Water Affairs in terms of the national roll-out of the Accord. A centralised, consolidated list that is updated on an ongoing basis would need to be maintained by the Accord Secretariat. Individual participants would have to exit the Accord in writing, whereupon they would be removed from the list.

8 A PROPOSED MANAGEMENT FRAMEWORK FOR THE STAKEHOLDER ACCORD ON WATER CONSERVATION

Based on the range of potential options presented, a proposed one for the management and administration of the Stakeholder Accord on Water Conservation could be made.

8.1 Review of Institutional Arrangement Options

8.1.1 Section 21 Company

This option is considered too expensive, and would require an intensive work programme to establish the necessary management processes. Hence costs and lead-time make it unattractive.

8.1.2 The National Business Initiative (NBI)

The NBI is attractive due to possible synergies between the Energy Efficiency Accord, currently housed in this vehicle, and the Stakeholder Accord on water Conservation. Capacity within this institution is however limited, and while the EEA has achieved some success using this institutional arrangement, it is inadequate as a long-term option, and it has been proposed that the EEA be housed in a more formal institution (DME and NBI, 2008).

8.1.3 Outsourcing to a Third Party

This option offers significant flexibility and the commitment of highly specialised resources. However, costs would most likely be prohibitive and there would also be a significant contract management burden.

8.2 Recommended Institutional Arrangement

Given the above, it is proposed that the National Cleaner Production Centre (NCPC) be the vehicle used to house the Stakeholder Accord on Water Conservation. Besides it being an existing structure, which would optimise the use of resources, the NCPC offers the following advantages:

- i. Water Conservation lies within the mandate of the organisation;
- ii. Existing institutional arrangements could accommodate the needs of the Accord fairly easily:
 - a. The existing Advisory Council structure could be modified to include an additional subset, which would serve as the Accord Governing Body;

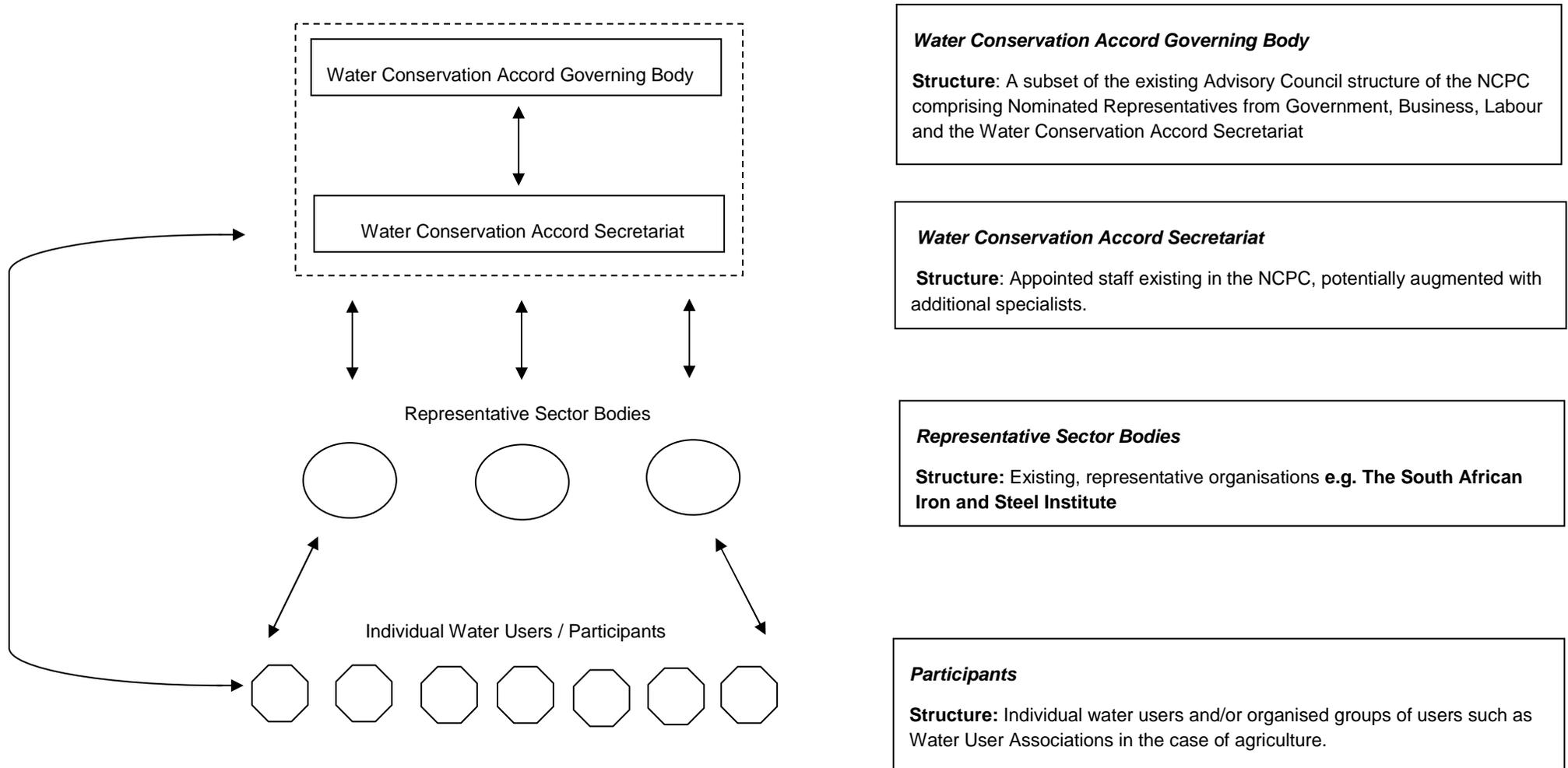
- b. Business processes regarding finance, human resource management, information technology and general administration are already in place, and could easily be adapted to serve the needs of the Accord as required;
- c. Project Management competencies are already in place;
- d. Linkages to important service providers are already in place. For example, the NCPC has a current database of Cleaner Production consultants, some of whom are experts in water conservation. The NCPC also has formal ties to waste minimisation clubs.

8.3 Recommended Participants and Structure

The proposed model is one that includes an Accord Governing Body and a Secretariat that are housed within the NCPC, Sector Bodies that interface with the Secretariat and Users that interface with the Secretariat, Sector Bodies and among themselves. While no Accord Supporter structure is proposed at this stage, the NCPC will be able to provide linkages to specialised service providers. Users are able to access this database through the NCPC website currently, and the NCPC could augment current specialists by targeting additional water conservation consultants and service providers, taking care to include sector-specific specialists as required.

An outline of the proposed structure is contained in Figure 7.

Figure 8: Proposed Structural and Institutional Option: Governing Body and Secretariat within NCP, Sector Bodies and Users



*Arrows denote lines of communication

9 CONSIDERATIONS FOR IMPLEMENTATION OF THE ACCORD

In the next steps to implementation of the Accord, some key issues need to be considered by the stakeholders. These relate to issues such as:

i. The development of a comprehensive business plan for the Accord

The stakeholders would require a comprehensive business plan for the Accord to be developed to understand the costs and funding mechanisms that could be used to support the activities of the Accord. The funding models should consider manner revenue generating activities that can be undertaken by the Accord.

A business plan would also assist in agreeing the pace of rolling out various elements of the work programme. Another aspect that the business plan would also need to address is how to promote or market the Accord and how to attract users and organisations to participate in the activities of the Accord. For the latter, consideration should be given to incentives and the practicalities of how to implement these.

ii. Explicit commitment to reporting

The stakeholders have committed to reporting on various water use metrics. However there would be a need to formalise a communication protocol on how and what would be reported for the various Accord stakeholders that may either be participants or not.

The Stakeholder Accord on Water Conservation

Between

The Government of South Africa,

Represented by

Minister of Water and Environmental Affairs

And

[]

1 Preamble

The Parties recognise that water is a limited resource vital for life and development. It is recognised further that South Africa is a water-stressed country, facing increasing levels of demand on these scarce resources and increasing competition between and within water use sectors. Water conservation has a role to play in the equitable and affordable provision of water.

2 Background

The parties to this Accord seek to voluntarily collaborate to advance water conservation initiatives in South Africa. Among the drivers of this Accord are water resource deficits in several water management areas and evidence of declining water quality, both of which impact on the availability of the water resource.

The National Water Resource Strategy highlights the importance and relevance of water conservation as a key facet of integrated water resource management. Internationally, collaborative approaches to water conservation have grown in prominence. This Accord symbolises a voluntary commitment to action by the parties in support of water conservation, resulting also in the improvement in the quality of South Africa's water resources.

3 Parties

This document constitutes an accord between Government and Business.

4 Purpose

This Accord provides a collaborative framework for action to promote water conservation in water use sectors in South Africa. To this end, the parties agree to develop and implement a mechanism to promote voluntary water conservation improvements by the parties.

5 Principles

The Parties agree that:

1. The Accord will in principle and action at all times strive to comply with the principles and requirements of the National Water Act (Act 36 of 1998);
2. Water conservation is an important component of integrated water resource management and needs to be promoted and implemented by all water users;
3. Water is recognised as an economic good;
4. Co-operation, openness and transparency are important to meet the agreed objectives of the Accord;
5. Opportunities to effect water conservation improvements differ within and between the various water use sectors;
6. Voluntary commitments in terms of this Accord will not be in conflict with the South African regulatory framework governing water use and;
7. Any future regulations that may be promulgated will take experience with implementing the Accord into account.

6 Parties' Commitments

The parties recognise that various opportunities exist for an improved national effort in water conservation, and co-operation amongst the parties would be required to realise voluntary improvements in water use efficiency. Furthermore, the parties recognise that a range of water service institutions could have a role to play in the implementation of the Accord and accordingly agree to explore specific participation of these institutions including conclusion of agreements between water users and these institutions.

Although the Accord focuses on improving water use efficiency on a volume basis, the parties recognise that in the future the need may arise for the parties to explore the development and implementation of additional water conservation instruments.

6.1 Aspirational Targets

The parties agree to explore the setting of aspirational targets for the reduction of water intensity in the various water use sectors within a period of 5 years.

6.2 Business

Business agrees to collaborate without contravening competition regulations and to work with Government to:

1. Implement national sector-specific water conservation strategies;
2. Develop and implement water conservation guidelines and auditing protocols in collaboration with Government;
3. Develop methodologies for determination of baselines and water use targets at site level;
4. Encourage establishment of site level water use targets;
5. Report on progress as regards water conservation annually;
6. Share improvements with other stakeholders in order to encourage water conservation;
7. Provide support to the implementation of the Accord.

6.3 Department of Water Affairs

The Minister of Water and Environmental Affairs, on behalf of Government, agrees to work co-operatively with Business to:

1. Ensure alignment amongst government institutions in support of the Accord;
2. Ensure that the Accord is aligned to current national water policy developments and that water policy reviews take into consideration learnings from the experiences gained from the Accord;
3. Promote water conservation through national and sector specific workshops and conferences;
4. Provide an enabling environment for the efforts of stakeholders to conserve water by assisting with the development of guidelines on water conservation and fostering technology development and transfer;

5. Promote the Accord to all water users, government stakeholders, internationally and the public.

7 Administration

7.1 Term and Review

The Parties agree the term of the Accord will be 5 years. The Accord will be reviewed every two years with a final review at the end of its term.

The Accord could be renewed at the end of its term or dissolved by the stakeholders.

7.2 Management Framework

The Parties agree that the Management Framework is an integral part of the Accord and commit to its implementation.

7.2.1 Institutional Arrangement (To be finalised by Government)

The institutional arrangement within which the Accord will be housed will be the National Cleaner Production Centre (NCPC). The Accord Governing Body, with representatives from the various stakeholders, will be constituted as a sub-committee of the NCPC Advisory Council. Engagement will be directly with users, organisations and industry sector bodies who have signed up as participants.

7.2.2 Reporting

The key performance indicators agreed for quantitative management and future reporting by water use sectors are as indicated in the table below:

TABLE 1: KEY PERFORMANCE INDICATORS FOR THE ACCORD

| SECTOR | PERFORMANCE MEASURES | |
|----------------------|--|--|
| | MEASURE | METRIC |
| COMMERCIAL | Absolute Volume | m ³ / annum |
| | Water Intensity | m ³ /m ² / annum |
| MANUFACTURING | Absolute Volume | m ³ / annum |
| | Water Intensity | m ³ / ton or m ³ /m ³ |
| MINING | Absolute Volume | m ³ / annum |
| | Water Intensity | m ³ / ton and/or m ³ / ounce |
| AGRICULTURE | SUBJECT TO FINALISATION PENDING THE OUTCOME OF A STUDY ON METERING IN THE AGRICULTURAL SECTOR BY THE DEPARTMENT OF WATER AND ENVIRONMENTAL AFFAIRS | |

8 Signatories

Signed at:

Signed on:/...../.....

Day/Month/Year

For the Government:

The Honourable Minister of Water and Environmental Affairs

For Business:

Organisation Represented:

APPENDIX 2: USE OF SIC CODES TO CATEGORISE WATER USERS**Table 18: SIC Codes of the Sectors Proposed for Inclusion in the Accord**

| PROPOSED SECTOR / SUB-SECTOR | MAJOR DIVISION | DIVISION | MAJOR GROUP | GROUP | SUBGROUP |
|--|----------------|----------|-------------|-------|----------|
| Growing of cereals and other crops | 1 | 11 | 111 | 1111 | 11110 |
| Growing of vegetables, horticultural specialities and nursery products | 1 | 11 | 111 | 1112 | 11120 |
| Growing of fruit, nuts, beverage and spice crops | 1 | 11 | 111 | 1113 | 11130 |
| Growing of crops combined with farming of animals (mixed farming) | 1 | 11 | 113 | 1130 | 11300 |
| Forestry and related services | 1 | 12 | 121 | 1210 | 12100 |
| Mining of gold and uranium ore | 2 | 23 | 230 | 2300 | 23000 |
| Mining of iron ore | 2 | 21 | 241 | 2410 | 24100 |
| Mining of chrome | 2 | 24 | 242 | 2421 | 24210 |
| Mining of copper | 2 | 24 | 242 | 2420 | 24220 |
| Mining of manganese | 2 | 24 | 242 | 2423 | 24230 |
| Mining of platinum group metals | 2 | 24 | 242 | 2424 | 24240 |
| Mining of other metal ore (except gold and uranium) | 2 | 24 | 242 | 2429 | 24290 |

Table 19: SIC Codes of the Sectors Proposed for Inclusion in the Accord (continued)

| PROPOSED SECTOR / SUB-SECTOR | MAJOR DIVISION | DIVISION | MAJOR GROUP | GROUP | SUBGROUP |
|---|----------------|----------|-------------|-------|----------|
| Slaughtering, dressing and packing of livestock, including poultry and small game for meat | 3 | 30 | 301 | 3011 | 30111 |
| Processing of fresh milk (pasteurising, homogenising, sterilising and vitaminising) | 3 | 30 | 302 | 3020 | 30201 |
| Manufacture of butter and cheese | 3 | 30 | 302 | 3020 | 30202 |
| Manufacture of ice cream and other edible ice, whether or not containing cream or chocolate | 3 | 30 | 302 | 3020 | 30203 |
| Manufacture of milk powder, condensed milk and other edible milk products, e.g. ghee, casein or lactose | 3 | 30 | 302 | 3020 | 30204 |
| Breweries, except sorghum beer breweries | 3 | 30 | 305 | 3052 | 30521 |
| Manufacture of soft drinks; production of mineral waters | 3 | 30 | 305 | 3053 | 30530 |
| Preparatory activities in respect of animal fibres, including washing, combing and carding of wool | 3 | 31 | 311 | 3111 | 31111 |
| Preparatory activities in respect of vegetable fibres | 3 | 31 | 311 | 3111 | 31112 |
| Spinning, weaving and finishing of yarns and fabrics predominantly of wool and other animal fibres | 3 | 31 | 311 | 3111 | 31113 |

Table 19: SIC Codes of the Sectors Proposed for Inclusion in the Accord (continued)

| PROPOSED SECTOR / SUB-SECTOR | MAJOR DIVISION | DIVISION | MAJOR GROUP | GROUP | SUBGROUP |
|--|----------------|----------|-------------|-------|----------|
| Spinning, weaving and finishing of yarns and fabrics predominantly of vegetable fibres | 3 | 31 | 311 | 3111 | 31114 |
| Finishing of purchased yarns and fabrics | 3 | 31 | 311 | 3112 | 31120 |
| Manufacture of pulp, paper and paperboard | 3 | 32 | 323 | 3231 | 32310 |
| Manufacture of corrugated paper and paperboard | 3 | 32 | 323 | 3232 | 32321 |
| Manufacture of containers of paper and paperboard | 3 | 32 | 323 | 3232 | 32322 |
| Manufacture of stationery | 3 | 32 | 323 | 3239 | 32391 |
| Manufacture of other paper products | 3 | 32 | 323 | 3239 | 32399 |
| Manufacture of basic chemicals, except fertilizers and nitrogen compounds | 3 | 33 | 334 | 3341 | 33410 |
| Manufacture of fertilizers and nitrogen compounds | 3 | 33 | 334 | 3342 | 33420 |
| Manufacture of plastics in primary form and of synthetic rubber | 3 | 33 | 334 | 3343 | 33430 |
| Manufacture of cement, lime and plaster | 3 | 34 | 342 | 3424 | 34240 |

Table 19: SIC Codes of the Sectors Proposed for Inclusion in the Accord (continued)

| PROPOSED SECTOR / SUB-SECTOR | MAJOR DIVISION | DIVISION | MAJOR GROUP | GROUP | SUBGROUP |
|--|----------------|----------|-------------|-------|----------|
| Basic iron and steel industries, except steel pipe and tube mills | 3 | 35 | 351 | 3510 | 35101 |
| Refining of precious metals, e.g. gold, silver, platinum | 3 | 35 | 352 | 3520 | 35201 |
| Manufacture of primary non-ferrous metal products, excluding precious metals | 3 | 35 | 352 | 3520 | 35202 |
| Hotels, motels, botels and inns registered with the SA Tourism Board | 6 | 64 | 641 | 6410 | 64101 |
| Caravan parks and camping sites | 6 | 64 | 641 | 6410 | 64102 |
| Guest-houses and guest-farms | 6 | 64 | 641 | 6410 | 64103 |
| Other accommodation n.e.c. | 6 | 64 | 641 | 6410 | 64109 |
| Restaurants or tearooms with liquor licence | 6 | 64 | 642 | 6420 | 64201 |
| Restaurants or tearooms without liquor licence | 6 | 64 | 642 | 6420 | 64202 |

Note: 1. The commercial sector is very diverse and could include any of the activities in Major Division 8: Financial Intermediation, insurance, real estate and business services. It has therefore not been detailed in Table 18.

APPENDIX 3: SOURCES OF THE CONCEPTS ADOPTED IN THE ACCORD

| Concept | International Reference | National Reference | Where this is Reflected in the Accord | Comment |
|--|--|--|--|---|
| <p>Water resources are limited and are interconnected through the hydrological cycle</p> | <p>Dublin Statement 'Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment'</p> <p>Victorian Government waterMap programme' (Discussion Paper on Our Water Our Future strategies) 'water is a finite and valuable resource'</p> <p>Great Lakes-St Lawrence River Basin Water Resources Compact 'the waters of the Basin are interconnected and part of single hydrologic system'</p> <p>Alberta Water Council 'Fresh water is a finite and vulnerable resource, essential to sustain life, economic development and the environment'</p> | <p>White Paper on a National Water Policy for South Africa (1997) 'All water in the water cycle whether on land, underground or in surface channels falling on, through or infiltrating between such systems, will be treated as part of the common resource and to the extent required to meet the broad objectives of water management, will be subject to common approaches.'</p> <p>National Water Resource Strategy (NWRS, 2004) Chapter 1-1.1 'water will be regarded as an indivisible asset. National government will act as the custodian of the nation's water resources and its powers in this regard will be exercised as a public trust.'</p> | <p>Preamble: The Parties recognise that water is a limited resource vital for life and development.</p> <p>It is recognised further that South Africa is a water-stressed country, facing increasing levels of demand on these scarce resources and increasing competition between and within water use sectors.</p> | <p>This principle adds context to the need to conserve water.</p> |

APPENDIX 3: SOURCES OF THE CONCEPTS ADOPTED IN THE ACCORD (CONTINUED)

| Concept | International Reference | National Reference | Where this is Reflected in the Accord | Comment |
|---|--|--|--|---|
| <p>Water has economic value and is an economic good</p> | <p>Dublin Statement ‘water has an economic value in all its competing uses and should be recognized as an economic good’</p> <p>CEO Mandate on Water ‘virtually all business organizations utilize water in the production of services and goods, the extent of this varies across industrial and economic sectors’</p> <p>Great Lakes-St Lawrence River Basin Water Resources Compact ‘the Parties have a shared duty to protect, conserve, restore, improve and manage the renewable but finite resource for the use, benefit, enjoyment of all their citizens and generations to come’</p> <p>Alberta Water Council ‘Water has an economic value in all its competing uses’ ‘Water has non-monetary values that enhance the quality of life’</p> | <p>National Water Act (Act 36 of 1998) S2: the purpose of the Act is to ensure that the nation’s water resources are protected, used, develop, conserved, managed and controlled in ways which take into account amongst other factors: basic human needs present and future; promoting the efficient, sustainable and beneficial use of water in the public interest.....facilitating social and economic development’</p> <p>NWRS C1:1-4; ‘There is increasing understanding internationally that water resources can be successfully managed only if the natural, social, economic and political environments in which water occurs and is used are taken fully into consideration’</p> <p>National Water Conservation and National Water Demand Management Strategy Framework (NWC/WD SF, 2000) C4.4: Economic Efficiency ‘Economic efficiency needs to be looked at from the perspective of the various water institutions and from the perspective of society at large.’</p> | <p>Principles: Water is recognised as an economic good</p> | <p>It is recognised that water has different value to different users and there are economic considerations in all water use.</p> |

APPENDIX 3: SOURCES OF THE CONCEPTS ADOPTED IN THE ACCORD (CONTINUED)

| Concept | International Reference | National Reference | Where this is Reflected in the Accord | Comment |
|---|---|---|--|---|
| <p>Equitable and affordable access to water is important in water provision</p> | <p>Dublin Statement ‘managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging and protection of water resources’</p> <p>Great Lakes-St Lawrence River Basin Water Resources Compact (Article 1) ‘the Parties have a shared duty to protect, conserve, restore, improve and manage the renewable but finite resource for the use, benefit, enjoyment of all their citizens and generations to come’</p> <p>Alliance for Water Stewardship ‘equal respect for every legitimate stakeholder’ ‘objectives: economic equity, environmental equity and social equity’</p> | <p>Constitution of SA: S27(2); S24(b),(i),(ii) ‘right to access to sufficient water’ ‘take reasonable measures to progressively grant this right’ ‘all citizens can expect that the environment to be protected and for measures to promote conversation’</p> <p>NWA Purpose of Act: S2(1) d: ‘promoting the efficient, sustainable and beneficial use of water in the public interest’ S2(1)b: ‘promoting equitable access to water’</p> <p>NWRS C1-S1.1; ‘ to achieve equitable access to water’ ‘ to achieve efficient and effective water use’</p> <p>NWC/WDMSF (1999) C1-1.3 Pg 8: ‘The cornerstone principles underlining this strategy framework are those governing the NWA and WSA; these are Equity, Optimal Use and Sustainable Use.’</p> | <p>Preamble: Water conservation has a role to play in the equitable and affordable provision of water.</p> | <p>This statement recognises that in an environment where water resources are limited, conservation will enable more equitable access to water.</p> |

APPENDIX 3: SOURCES OF THE CONCEPTS ADOPTED IN THE ACCORD (CONTINUED)

| Concept | International Reference | National Reference | Where this is Reflected in the Accord | Comment |
|--|--|---|---|--|
| <p>Water conservation should be carried out within the framework of integrated resource management</p> | <p>Dublin Statement ‘effective management links land and water uses across the whole of a catchment area or groundwater aquifer’ ‘ the effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems’CEO</p> <p>Mandate on Water We pledge to undertake the following: ‘ build capacities to analyse and respond to watershed risk’ ‘ being an advocate for water sustainability in global and local policy discussions, clearly presenting the role and responsibility of the private sector in supporting integrated water resource management’</p> <p>Victorian Government waterMap Programme (Sustainability Policy) ‘Implementing the principles of environmental sustainability. These principles are: - Resource efficiency; - Biodiversity protection; - Minimising ecological impact; - Intergenerational equity.’</p> <p>Alberta Water Council ‘Sector plans will make every reasonable effort to protect and enhance aquatic ecosystems and meet ecosystem objectives’ ‘water users should re-use and recycle water to reduce diversions’</p> | <p>NWA S6(1) Contents of NWRS (h): set out principles relating to water conservation and water demand management</p> <p>NWRS C1-S1.4 ‘ IWRM therefore aims to strike a balance between the use of resources for livelihoods and conservation of the resource to sustain its function for future generations, and promotes social equity, environmental sustainability and economic efficiency’</p> <p>NWC/WDMS ‘water conservation should be an integral part of the planning processes for water resources management, water supply and the provision of water services (NWRS C-3, P-3)</p> <p>C8-1 Pg 25: Objective E: Enable water mgt and water services institutions to adopt integrated resource planning (IRP)</p> | <p>Background The National Water Resource Strategy highlights the importance and relevance of water conservation as a key facet of integrated water resource planning</p> <p>Principle: Water conservation is an important component of integrated water resource management and needs to be promoted and implemented by all water users;</p> | <p>This acknowledges water conservation as an important facet of the integrated water resource planning process. In addition, water conservation activities should not result in negative impacts on other water uses.</p> |

APPENDIX 3: SOURCES OF THE CONCEPTS ADOPTED IN THE ACCORD (CONTINUED)

| Concept | International Reference | National Reference | Where this is Reflected in the Accord | Comment |
|---|---|--|---|---------|
| <p>The regulatory framework is an important guide to water conservation efforts</p> | <p>Victorian Government waterMap Programme waterMap embedded in legislation:</p> <p>Permanent Water Savings Plan for City West Water</p> <p>Water Industry Act 1994 (Australia)</p> <p>Alberta Water Council 'Alberta's existing water licence and authorizations, based on 'first in time, first right' will be respected'</p> | <p>NWA S3(3) 'The minister is ultimately responsible to ensure that water is allocated equitably and used beneficially in the public interest while promoting environmental values.'</p> <p>NWRS C-3 P-2 'many of the Acts sustainability and efficiency related measures will be applied by means of conditions of use imposed when water use authorizations are granted'</p> <p>3.2.3.8. Compliance with conditions of use 'All water users are required to adhere to the conditions of use attached to general authorizations and licences, and the responsible authorities are required to ensure that they do so.'</p> <p>NWC/NWDMS C7-1 Pg 22: ' all water services institutions are required to develop conditions for the provision of water services that must include measures to promote water conservation' C7-4 Pg 24: b 'the Act makes provision for the Minister to make regulations limiting or restricting the purpose, manner and extent of use' d: the Act makes provision for a water authority to attach conditions to every general authorization or licence relating to the protection of water resources'</p> | <p>Principles Voluntary commitments in terms of this accord will not be in conflict with statutory water use licence conditions and;</p> <p>Any future regulations that may be promulgated will take experience with implementing the Accord into account.</p> | |

APPENDIX 3: SOURCES OF THE CONCEPTS ADOPTED IN THE ACCORD (CONTINUED)

| Concept | International Reference | National Reference | Where this is Reflected in the Accord | Comment |
|--|---|--|--|---|
| <p>Collaboration and communication in an open and transparent manner assists the efforts of water conservation initiatives</p> | <p>CEO Mandate on Water we pledge to undertake the following actions: 'share water sustainability practices- established and emerging- with suppliers' 'publish and share our water strategies in relevant corporate reports, using where appropriate the water indicators found in the GRI Guidelines we pledge to undertake the following actions: 'Be transparent in dealings and conversations with governments and other public authorities on water issues'</p> <p>Victorian Government waterMap Programme We will provide: 'promotion of customer achievements. Case studies will be developed and promoted for your use.' Undertaking a benchmarking of Best Practice for Water Use in the Commercial and Industrial sectors (completed Oct 2006)</p> <p>Great Lakes-St Lawrence River Basin Water Resources Compact (Article 1) 'to act together to protect, conserve, restore, improve and effectively manager the waters and water dependant natural resources of the Basin under appropriate arrangements for intergovernmental co-operation and consultation'</p> <p>Alberta Council on Water 'All stakeholders will work collaboratively, resolve differences through consensus processes, and support Best Management Practices'</p> | <p>NWC/NWDMSF Pg 26</p> <p>Goals of objective C & E: Create a culture of WC/DM for all consumers and users</p> <p>C1: Create an ongoing awareness on the value of water and the need for water conservation for all consumers</p> <p>C2: Facilitate education strategies on water conservation</p> <p>C3: Enable consumers and users to understand how, where, quantity and impact of water they use.</p> <p>E5: Ensure the co-ordination and co-operation of planning between all stakeholders in the water value chain.</p> | <p>Background: The parties to this Accord seek to voluntarily collaborate to advance water conservation initiatives in South Africa.</p> <p>Purpose: This Accord provides a collaborative framework for action to promote water conservation in water use sectors in South Africa. Principle: Co-operation, openness, and transparency are important to meet the agreed objectives of the Accord;</p> <p>Parties Commitments The parties recognise that various opportunities exist for an improved national effort in water conservation, and co-operation amongst the parties would be required to realise voluntary improvements in water use efficiency.</p> | <p>The Accord acknowledges collaboration as an important factor to achieving its goals.</p> |

APPENDIX 2: SOURCES OF THE CONCEPTS ADOPTED IN THE ACCORD (CONTINUED)

| Concept | International Reference | National Reference | Where this is Reflected in the Accord | Comment |
|--|--|--|---|--|
| <p>The promotion of water conservation to the public and improving the body of knowledge on water conservation</p> | <p>CEO Mandate We pledge to: 'Undertake water resource education and awareness campaigns in partnership with local stakeholders' 'be active members of the local community and the encourage or provide support to local government, groups and initiatives seeking to advance the water and sanitation agendas'</p> <p>Victorian Government waterMap Programme ' We will provide promotional signage (stickers and posters) 'Presentations and workshops'</p> <p>EPA Water Alliances for Voluntary Efficiency: 'partners promoted through public service magazine advertisements;' 'right to use EPA and WAVE logos on stationery, advertisements and displays with certain limitations' 'partners must educate both customers and employees on benefits on water use efficiency'- designated EPA WAVE partner liaison develops and provides outreach materials' 'supporters promote water efficiency within the industry, help to publicise WAVE, recruit partners and work with EPA to improve market infrastructure for water efficient equipment'</p> | <p>NWC/NWDMS Pg 26 Goals of objective B &C: Create a culture of WC/DM for all consumers and users</p> <p>B1: Develop a database and library of knowledge, information and case studies and ensure easy access to all interested parties</p> <p>B4: Promote the development of new technologies that promote</p> <p>C2: Facilitate education strategies on water conservation</p> | <p>Parties Commitments</p> <p>Furthermore, the parties recognise that a range of water service institutions could have a role to play in the implementation of the Accord and accordingly agree to explore specific participation of these institutions including conclusion of agreements between water users and these institutions.</p> <p>Business</p> <p>Report on progress as regards water conservation annually;</p> <p>Government</p> <p>Promote the Accord to all water users, government stakeholders, internationally and the public</p> <p>Promote water conservation through national and sector specific workshops and conferences;</p> | <p>This provides for the promotion of the Accord to stakeholders and the public.</p> |

APPENDIX 3: SOURCES OF THE CONCEPTS ADOPTED IN THE ACCORD (CONTINUED)

| Concept | International Reference | National Reference | Where this is Reflected in the Accord | Comment |
|--|--|---|--|--|
| <p>Awareness and capacity building in the area of water conservation</p> | <p>Dublin Statement ‘research and analysis techniques applied on an interdisciplinary basis, permit the understanding of these data and their application to many uses’</p> <p>‘the implementation of action programmes for water and sustainable development will require a substantial investment, not only in building the capacity of people and institutions to plan and implement those projects’</p> <p>CEO Mandate We pledge to: ‘partner government, business, civil society and other stakeholders to advance the body of knowledge, intelligence and tools’</p> <p>Victorian Government waterMap Programme</p> <p>‘Our research and development program is helping industrial, commercial and institutional customers investigate barriers to water conservation and reducing the discharge of contaminants’ ‘comprises customer-specific, metropolitan-wide and industry sector-based projects’ ‘provide access to cutting-edge research opportunities normally beyond the reach of all but the largest companies.’ ‘done in conjunction with industry bodies, research agencies, universities and customers;</p> <p>EPA Water Alliances for Voluntary Efficiency: ‘provide support through WAVE Saver Program’ ‘ technical support through training, workshops and nationwide member help-line’</p> | <p>NWC/NWDMS Pg 26</p> <p>Goals of objective F: To promote social development and equity</p> <p>F5: Promote the involvement and recruitment of women in water supply decisions and job opportunities</p> <p>F8: Ensure the development of skills for previously disadvantaged communities through the implementation of water conservation initiatives.</p> | <p>Not specifically reflected in the Accord itself but in the tools and standards proposed</p> | <p>Aspects involving training e.g. input to the development of water conservation unit standards are deemed to be outside the scope of the Accord for now.</p> |

APPENDIX 3: SOURCES OF THE CONCEPTS ADOPTED IN THE ACCORD (CONTINUED)

| Concept | International Reference | National Reference | Where this is Reflected in the Accord | Comment |
|---|--|---|--|--|
| <p>Individual users have unique opportunities to implement water conservation. A “one-size-fits-all” approach is hence undesirable.</p> | <p>Alberta Water Council</p> <p>‘sectors have different opportunities for making progress in conservation, efficiency and productivity, and are not necessarily comparable against other sectors’</p> | <p>NWRS</p> <p>C3-2.37</p> <p>‘each water use is unique and the (licensing guidelines) must not be regarded as a rigid prescription’</p> <p>NWC/NWDMS Pg 26 C.4</p> <p>‘enable consumers and water users to understand, how, where, quantity and impact of water they use</p> | <p>Principle</p> <p>Opportunities to effect water conservation improvements differ within and between the various sectors.</p> <p>Commitments</p> <p>Business</p> <p>Develop methodologies for determination of baselines and water use targets at site level;</p> <p>Encourage establishment of site level water use targets;</p> | <p>This principle aims to convey that financial, technical and operational constraints exist for each water user in exploiting water conservation opportunities.</p> |

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