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## EXECUTIVE SUMMARY

<b>Full project name</b>	WaterNet: Forging the Network (initial phase) the Establishment of a Regional Network for Education, Training and Research on Integrated Water Resources Management in Southern Africa
<b>Acronym</b>	WaterNet
<b>Implementing institutions</b>	<ul style="list-style-type: none"> <li>• University of Zimbabwe, Harare, Zimbabwe</li> <li>• Institute of Water and Sanitation Development, Harare, Zimbabwe</li> <li>• International Institute for Infrastructural, Hydraulic and Environmental Engineering, Delft, The Netherlands (IHE-Delft)</li> </ul>
<b>Beneficiary countries</b>	Southern African countries: e.g. Angola, Botswana, Kenya, Lesotho, Malawi, Mozambique, Namibia, South Africa, Tanzania, Uganda, Swaziland, Zambia, Zimbabwe
<b>Short description</b>	The project aims at establishing a network for education, training and research on Integrated Water Resources Management (IWRM) in Southern Africa. The network - WaterNet - will be region-based and region-owned. One main activity is the establishment of a regional and modular MSc programme in IWRM. Core subjects are to be taught at UZ in Harare (the first network hub), while different modules will be offered at institutes spread over the region (the nodes). Emphasis is put on regionalisation. A Nodal Strengthening Fund will assist partners to set-up these modules. A WaterNet Research Fund, an exchange programme for lecturers and researchers and a fellowship programme will stimulate the mobility of professionals and students in Southern Africa. Dissemination of research outputs will be realised through short course, workshops and seminars.
<b>Location</b>	Southern Africa, with core activities in Harare, Zimbabwe
<b>Starting date</b>	July 1, 1998
<b>Completion date</b>	June 30, 2000
<b>Contribution by donors</b>	<ul style="list-style-type: none"> <li>• NEDA: WaterNet Secretariat, Nodal Strengthening Fund, Fellowship Programme, Modular MSc, Professional Courses Programme, WaterNet Association</li> <li>• SIDA: the WaterNet Research Fund</li> <li>• SADC Water Sector: facilitation in defining the requirements of the programme and contributing in building-up regional capacity in IWRM.</li> <li>• UNESCO: facilitate in curriculum development and validation procedures.</li> </ul>
<b>Contribution by Region (in kind)</b>	<p>Institutes in the network will make available:</p> <ul style="list-style-type: none"> <li>• educational and training materials</li> <li>• manpower for curriculum development</li> <li>• office facilities</li> <li>• liaison officers</li> </ul>

**LIST OF ABBREVIATIONS**

DCE	Department of Civil Engineering
DGIS	Directorate General for International Cooperation, Ministry of Foreign Affairs, the Netherlands
EIA	Environmental Impact Assessment
EU	European Union
GWP	Global Water Partnership
GWP-SATAC	GWP - Southern Africa Technical Advisory Committee
HRD	Human Resources Development
IHE	International Institute for Infrastructural, Hydraulic and Environmental Engineering, Delft, The Netherlands
ILRI	International Institute for Land Reclamation and Improvement, Wageningen, The Netherlands
IRC	International Reference Centre, The Hague, The Netherlands
ISS	Institute of Social Studies, The Hague, The Netherlands
ITC	International Institute for Aerospace Survey and Earth Science, Enschede, The Netherlands
IWRM	Integrated Water Resources Management
IWSD	Institute of Water and Sanitation Development, Harare, Zimbabwe
LUW	Wageningen Agricultural University
MSM	Maastricht School of Management, Maastricht, The Netherlands
NEDA	Netherlands Development Assistance
NGO	Non-Governmental Organisation
SAIL	Foundation for Cooperation between International Education Institutes in The Netherlands
SADC	Southern African Development Community
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Education, Scientific and Cultural Organization
UZ	University of Zimbabwe, Harare, Zimbabwe
WERM	Water and Environmental Resources Management
WMO	World Meteorological Organisation
WREM	Water Resources Engineering and Management
WRM	Water Resources Management
WSS	Water Supply and Sanitation
WWC	World Water Council

## 1. INTRODUCTION

Until recently, in Southern Africa, water development has been taken to mean engineering works, such as storage dams, river diversions, irrigation schemes, borehole drilling, drainage of swamps etc. Often such works were undertaken by governments as these works provided for certain societal needs, such as protection from flooding, food production, drinking water supply, electricity generation, and attenuating (seasonal and annual) fluctuations in river discharge.

Traditionally, the various works were undertaken by different ministries which were sectorally organised, such as around energy, agriculture, housing etc. A country's water development in effect was an "emergent" phenomenon, arrived at by simply adding up the sectoral works commissioned. The most important factor that somehow structured water development at an above sectoral level was the manner in which government set priorities and allocated funds to its various ministries. Finance appeared to be the (only) limiting factor in water development. As water was still abundant, one scheme developed in one sector did not necessarily had to affect another scheme from another sector.

The above obviously is a scenario of the past. Money is not any more the only limiting factor. Water itself is now the single most important scarce resource in Southern Africa. Any hydraulic scheme will largely affect other such schemes and preclude other developments. This holds for small sub-catchments but also for international basins.

Southern Africa has reacted to the need for a more integral approach to water management. Recent years have seen many promising initiatives and developments, both at the local, national and regional scales. During the SADC-EU conference on Management of Shared River Basins (Maseru, 1996) strong recommendations were made for regional capacity building and the associated "levelling of the playing field". "Levelling the playing field" implies that less well endowed riparians need to be strengthened to improve their negotiating position and hence enhance opportunities for agreements to be reached. The Maseru Statement is attached in Appendix VIII.

WaterNet is a direct response to this urgent need for regional cooperation on water management. The project idea was developed in the days following the EU-SADC conference in Lesotho. IHE took the initiative to draft a preliminary proposal in close consultation with the University of Zimbabwe (UZ) and the Institute of Water and Sanitation Development (IWSD), IHE's partners in Zimbabwe. After discussions with representatives from The Netherlands Embassy in Harare, it was decided to further develop the concept of WaterNet. A questionnaire was prepared so as to allow stakeholders to express their needs and recommendations.

WaterNet was then presented at the GWP meeting in Stockholm (14-15 August 1997). The initiative was welcomed as an important programme for regionalising education and research capacity in Integrated Water Resources Management (IWRM) and supported as a very useful instrument to facilitate the implementation of IWRM in the SADC region.

This final proposal has been prepared for submission to DGIS/DML and represents the views of the implementing institutes and a number of global and regional stakeholders.

It is believed that the initiative is both timely and highly relevant in addressing the key issues in IWRM. If implemented it would have an enormous impact on establishing regional expertise in IWRM and on building regional capacity to educate and train professionals in the water sector.

## 2 JUSTIFICATION OF THE PROJECT

### 2.1 What is WaterNet?

WaterNet is an initiative to establish a regional network for education, training and research on Integrated Water Resources Management (IWRM) in the SADC region. This network will consist of a number of participating institutions, including the relevant universities and training institutes in the region, the relevant major stakeholders (water authorities, water companies and water industry), IHE and other international institutes such as IRC, ITC and ILRI. The first hub of the network will be Harare where the University of Zimbabwe, the Institute for Water and Sanitation Development (IWSD) and IHE have established the first regional MSc and training programme in WREM. At present an inventory, financed by the Netherlands Embassy in Harare, is taking place which has shown a large regional training need and a keen interest from stakeholders in the region to set up such a network. Appendix VII lists potential participating institutions, while in Appendix XI a summary of the inventory of IWRM activities, gaps and training needs in the Southern Africa Region is presented.

This proposal is for an open ended stepped programme to establish such a network. In this proposal financing is proposed for the first three steps of the programme (lasting 2 years) with the main task of creating ownership of the network among the participating institutions through a communicative process. These first steps are worked out in chapter 4, with the first step being given in detail. The following steps are not yet filled-in into detail, since this should be done as a concerted effort by the participants in the network during the first step of the programme. The indicative budget presented in section 4.6 is merely meant to indicate the dimensions of the programme.

WaterNet is not exclusive. It is an open initiative which invites interested parties and other donors to join the programme, so that it can grow in response to the needs and demands for education, training and research in IWRM in Sub-Saharan Africa and be linked to similar global initiatives. As such, WaterNet aims at being an "Associated Programme" of the Global Water Partnership (GWP) to promote IWRM and implement related policies and practices in the SADC region through human resources development and the establishment of a network for technical cooperation and research. The Global Water Partnership is a network concerned about sustainable water management according to the Rio/Dublin principles and demand management. It provides information sharing, focused support and regional ownership of water and development. At the moment, a GWP Southern Africa Technical Advisory Committee is being formed (SA-TAC), consisting of eminent water specialists from the region in all major sectors and professions of water. The group will belong to and provide services to all those caring about good water management in southern Africa.

The SA-TAC is well placed to support the WaterNet in several ways. Its members could be appointed to serve in a WaterNet advisory or steering committee, provide expertise in specific fields, act as guest lecturers, and provide a coordinating and collaborating service to the WaterNet and its members through their extensive involvement in the region's water development.

UNESCO has shown keen interest to participate in WaterNet. It can make a contribution in education, curriculum development and validation procedures, where it can play a facilitating role. It supports the initiative and welcomes the modular structure of the educational programme. It is interested to establish a link with other IHP (International Hydrological Programme) activities in Europe and the region. The World Bank has expressed its interest in WaterNet for its potential to address the enormous training needs in water resources management in Sub-Saharan Africa.

In the setting-up of the network and the implementation of the programme, the SADC Water Sector is expected to play an important role, being the coordinating body between governmental organisations in the water sector. SADC Water Sector is expected to be a major player in indicating the requirements of the programme and the role it should play in building up regional capacity for IWRM. During the first step of the programme, the role of SADC Water Sector in the network should be established.

The following key words characterise WaterNet:

- **broadness:** a broad approach to the subject matter (integrated water resources management).
- **equality:** partners in the network have equal status, independent on the relative importance of their contributions.
- **region-based:** stimulating regional cooperation in education, research and information sharing.
- **region-owned:** full ownership of the network by regional partners, including a regional research fund.
- **gender balance:** aiming at establishing a gender balance in WRM, both with regard to the implementation of the WaterNet programme and the involvement of women in IWRM in general.
- **building capacity:** as important as the subject matter itself is creating stimulating conditions for research and education in the region.
- **inclusive:** the initiative is not exclusive, the network can grow over time as new participants and donors join the network.
- **transparent:** openness in allocating resources; transparent and based on merit.
- **innovative:** stimulating innovative approaches and techniques.
- **communicative:** emphasis on information sharing and exchange (including access to Internet).
- **dynamic:** open ended, programme approach which allows the initiative to grow over time.

## 2.2 International Priority

The WaterNet programme is fully compatible with the Netherlands Development Assistance (NEDA) policy paper on IWRM, where *Capacity Building and in particular Human Resources Development* receives highest priority. At the same time, the importance of addressing regional and cross-border issues is emphasised and WaterNet is mentioned as one of the priority actions for the coming years.

In international meetings and conferences (Delft, 1993; Rome, 1993 and Paris, 1993) attention was further drawn to the fact that Africa suffers from an enormous lack of capacity to carry out research, studies and to develop policies for the region's development in general and in the water sector, in particular.

In Rome, at the Technical Consultation on Integrated Rural Water Management in 1993, African countries emphasized that there is large need for the exchange of experiences and knowledge between countries, and particularly among developing countries. In Delft, at the Conference on Water and the Environment: Key to Africa's Development, in 1993, African participants recognized in the published "Delft Agenda" the fact that lack of career opportunities and the occurrence of brain-drain are major constraints for development. The observation often heard is that there appears to be more knowledge on Africa outside the continent than inside. Representatives from African countries stated that this is an unfortunate situation, and that if Africa wants to take matters in its own hand, then the first problem to solve is the lack of a knowledge base and of study and research capacity.

A World Bank Staff Working Paper (1990) confirms these problems in its African-wide survey as follows:

- The share of scientific research, including the area of engineering and technology, in Sub Saharan Africa (SSA) is approximately 0.4% of the world's total publications, measured according to the Science Citation Index provided by the Institute of Scientific Information. Publications in the medical and biological fields have a lion's share while very few are in the physical and, especially, engineering sciences.
- The number of students in higher education at level 6<sup>1</sup> and 7 in SSA per 100,000 population in SSA compared to Latin America and OECD-countries are 49, 1428 and 1592, resulting in a ratio of 1:29:32. The ratio for natural science is 1:11:23, and for engineering 1:72:72. In Zimbabwe the proportion of Higher Education students enrolled in Science and Technology (e.g. engineering) disciplines was 10 in the period from 1986-1989, while Kenya, Ghana and Nigeria showed figures of respectively 32, 42 and 39.

These ratios show the high need for human resources development in the field of engineering. It promotes the improvement of the production capacity of the higher education institutes and research centres in SSA countries, even when knowing that the unit costs in the field of engineering are usually higher than in the other fields.

Many other international documents addressed the need for human resources capacity building in the water sector in SSA:

- **Agenda 21/Chapter 18 on Freshwater systems:** to achieve the goals as mentioned under Item A on Integrated Approach for the Development and Management of Water Resources, training of water managers at all levels, expansion of training and education facilities in the developing countries, exchange of knowledge and the conduct of techno-scientific research is highly needed.
- **UNDP/The World Bank, Global Consultation on safe water and sanitation for the 1990s, The New Delhi Statement:** "... Training of professionals, managers, technicians and extension workers builds competence and confidence. Information, education and communication strategies must be integrated within Human Resources Development (HRD) policies. Women must be trained and guaranteed equal employment opportunities at all levels of staff and management..... Education is a key part of the new approach...."
- **UNDPs Delft Declaration, A Strategy for Water Sector Capacity Building (1991):** ".....Countries and External Support Agencies recognize the importance of capacity building for sustainable development at national, sub-regional and local level. Capacity building consists of three basic elements: creating an enabling environment with appropriate policy and legal frameworks, institutional development, including community participation, and human resources development and strengthening of managerial systems."
- **An International Action Programme on WATER and sustainable agricultural development, A strategy for the implementation of the Mar Del Plata Action Plan for the 1990s (FAO):** "Particularly, training and human resources development should be actively pursued through assessment of current and long term human resources requirements and training needs...."
- **WMO/UNESCO Report on Water Resources Assessment, Progress in the Implementation of the Mar Del Plata Action Plan and A Strategy for the 1990s, Strategy Component 4 on**

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<sup>1</sup> Level 6 corresponds to a required minimum of 3 - 4 years post secondary education; level 7 entails at least one more year of study than level 6.

Human Resources Development, education and training, Actions International and Regional Organizations: ".....prepare appropriate materials, syllabi, and courses for use by national and regional organizations...."

IHE's own inventories in some SADC countries (e.g. Zimbabwe, Mozambique, Zambia, Tanzania, Malawi and Botswana) show that experts in the water sector are very supportive of this initiative, especially when it could contribute to the establishment of a Regional Network or Centre on water issues.

### 2.3 Regional Context

In January 1998, with the assistance of IHE, a new MSc curriculum started at the University of Zimbabwe in Water Resources Engineering and Management (WREM) which corresponds with the new requirements for water resources specialists that have been outlined above. In addition a training programme for professionals in the Water Sector has started in 1997 at IWSD. These activities are a clear response to the changing water sector in Zimbabwe where a new policy of decentralization and commercialization is in the process of implementation and where a shift has taken place from supply oriented engineering towards demand oriented inter-sectoral management of water resources.

It is realized both in Zimbabwe and the region that water managers should be proficient in the basic physical processes involved. They then must have a good understanding of engineering options. Finally, they must be conversant with the managerial dimension. In Appendix IX details of the modular curriculum of this MSc programme are provided. The curriculum can be briefly summarized as:

#### Managerial:

- Water Resources Management, Concepts & Tools, Demand Management, Ground Water Management
- Water Resources Planning and Analysis, Planning Economics, EIA
- Water Quality Management, Pollution Control, Health, Environmental Quality
- Water Law, Institutions, Utility Management, Community Participation
- Decision Making and Communication, Conflict Mitigation, Decision Support Systems
- Modelling of Water Resources Systems, Hydrological Modelling

#### Engineering:

- Water Supply, Sanitation, Water Treatment, Re-use and Wastewater Treatment
- Irrigation Systems Design, Design at Tertiary Level
- Water Distribution and Sewerage, Storm Drainage, Pumping Stations

#### Basics:

- Hydrology, Hydrometeorology, Data Processing and Analysis
- Advanced Hydrology, Stochastic Hydrology, Engineering Hydrology
- Hydrogeology, Ground Water Flow, Ground Water Quality
- Applied Hydraulics, Dam construction, Reservoir Operation
- Soil-Water-Plant Relations, Soil Water, Irrigation Requirements, Crop Yield
- Ecology, Water Chemistry and Microbiology, Environmental Process Technology, Laboratory
- Data Information Systems, Remote Sensing, GIS

This curriculum is open for participants from the region. It is however widely realised that in the region the demand for more broadly oriented engineers is even larger, and that the Zimbabwe initiative should be further regionalised, building on existing capacities and needs of the region, leading to a network of institutions where students, modules, lecturers and researchers can be exchanged. This would lead to the establishment of a regional capacity for water resources management, not in the least place to enhance the management of international rivers such as the Zambezi, the Limpopo, the Orange, etc.

It would appear that this is the appropriate time to consolidate some of these efforts by investing in capacity building in the human resources of the region with a specific focus on education and research in integrated water resources management. By setting up a regional educational facility a double-edged aim is achieved. First, to create regional capacity to deal with the issues at hand. Second, to establish an informal network of professionals that is built on mutual trust and a common "language".

#### 2.4 Needs for Education, Training and Research in the Water Sector

The word 'water development' itself may need to be overhauled. Development of the water resource is not any more a physical engineering intervention. Water development may also mean the deliberate reduction of the withdrawals from an (over-exploited) aquifer, or policies aimed at enhancing its replenishment. In contemporary water development, non-structural measures are as important as engineering works, with due attention to economic and legal incentives as tools to implement water policy. In short, we are talking about Integrated Water Resources Management (IWRM).

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##### INTEGRATED WATER RESOURCES MANAGEMENT:

- Considers the hydrological cycle in its entirety and in connection with ecosystems; including all water resources and their quality: surface water, ground water and, most importantly, rainfall; paying attention to upstream-downstream relations and interactions (basin-wide, also across national borders).
  - Considers the full range of sectoral interests, including environmental interests; allocation decisions entail a process whereby all relevant objectives and constraints of society are considered, and, if necessary, priority-setting is made by weighing the objectives in an informed and transparent manner. Integrated management implies, among other things, close coordination between institutions that are often sectorally defined, the involvement of stakeholders in decision-making, and taking into account those stakeholders without a voice (such as the environment);
  - Considers the needs of future generations as legitimate claims to the water resource.
- 

The key questions arising are: How are we going to balance the manifold interests involved in water? On what basis are we going to decide in favour of certain developments at the expense of others? How are we going to coordinate between ministries? What are possible institutional and legal set-ups? What kind of data sets do we need, and what type of plans? And, importantly, which type of experts are required to set up monitoring systems, compile reports, make assessments, and decide which information our policy makers need to make balanced decisions? Will the public accept these? How are we going to ensure that the public owns the problems related to water such that they may identify with the difficult decisions that have to be made? These are some of the questions which are now being asked in many regions of the world, not the least in Southern Africa.

#### need for capacity building

It follows from the above that the efficient and equitable use and management of the water resource depends on:

- the understanding of the physical processes involved;
- the understanding of the variety of societal needs for water;
- the decision-making processes involved in influencing demand for and supply of water, as well as in allocating the water.

These three conditions are not impossible to meet. What is needed is:

- a conducive policy environment and related institutional and legal settings;
- an appropriate mix of staff trained in relevant fields;
- meaningful information exchange among staff, and between staff, stakeholders and policy-makers.

The latter two requirements can be partly addressed by investing in human resources through carefully designed capacity building programmes.

### **need for broadly trained professionals**

Any intervention in the water resource will increasingly require detailed, up-to-date, state-of-the-art, specialist expertise. This expertise will include the 'traditional' disciplines such as hydraulic engineering, hydrology, geology, chemistry, etc., while advantage should be taken from the rapid developments during recent years with regards to pc-based modelling. However, expertise should be widened to include disciplines such as natural resource economics, ecology, and law.

Apart from the urgent need for superior specialists, there is a need for generalists. These generalists should be the 'brokers' within the water sector (here understood in its broadest sense), and establish the links between on the one hand the specialists from their home department, and their generalist counterparts from other departments involved in water. These generalists thus occupy the 'middle-ground' in integrated water resources development and management. They should first of all have a global understanding of central concepts of the variety of disciplines involved, including not only engineering, hydrology, hydrogeology, chemistry etc., but also ecology, resource economics, law and management science. These generalists would furthermore be able to translate these into denominators in common with the other players. Here reference can be made to 'umbrella' concepts such as 'virtual' water, 'green' and 'blue' water. Such and other new concepts may prove important integrating devices that may help pull different sectors together into one common understanding of the multi-farious nature of the water resource.

In addition, the generalists will have the demanding task to prepare and support the decisions to be taken at the policy level. Some of these generalists may thus have to specialise in the emerging field of decision support systems.

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Which training needs should be addressed to meet the present and future demands of the water sector?

"We need more engineers, scientists with applied skills like ecologists, hydrologists, chemists, limnologists, aquatic ecologists, resource economists, environmentalists et cetera."

(An official of a water department in a SADC country)

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What do you consider the most important missing elements of IWRM in your country?

"The creation of a regulatory agency/body."  
(An official of a water department in a SADC country)

"Co-ordination between the various stakeholders."  
(An official of a water department in another SADC country)

"Institutional system for implementation."  
(A researcher of a university institute in a third SADC country)

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Appropriately trained water experts may not succeed in their demanding task if no adequate institutional and legal frameworks exist that structure their activities. Most individual SADC countries are presently engaged in wide-ranging institutional and legal reforms. It will be crucial to learn from these experiences and select the best possible alternatives, keeping the different country contexts in mind.

#### **need for region based, demand driven research**

The implementation of a new policy on IWRM clearly requires a re-orientation of the research activities done both by universities and research institutes. In the past research has been too much supply driven and too much aimed at typical engineering solutions. Research for IWRM should be demand-driven, interdisciplinary and region based.

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Which new areas of research should, in your opinion, be developed?

\*\* Decision support

\* Resource economics"

(A researcher of a university institute in a SADC country)

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Research should also provide an interesting and conducive environment for top researchers, that provides them with incentives to develop a regional research career, and prevents brain-drain abroad and to other, more attractive but not water-sector related, jobs. The establishment of a regional research fund for IWRM, which is regionally managed and implemented, and which facilitates both south-south and north-south cooperation, is an important mechanism to build regional research capacity.

### 3 CONTEXT

#### 3.1 WaterNet: a Stepped Programme

As mentioned in section 2.1, WaterNet is an open ended stepped programme. At this stage, five essential steps are foreseen, leading to a sustainable network. It is noted that this proposal seeks financial support for the three first steps only. However, to give a complete picture of the whole programme, all steps are briefly described in this section. The logical framework for the WaterNet programme is presented in Appendix IV.

The five steps are:	duration
step 1: Inception phase to create ownership and commitment	8 months
step 2: Forging the network and a modular educational structure	4 months
step 3: Strengthening educational capacity	12 months
step 4: Start of the modular MSc programme with external support	12 months
step 5: Programme with sufficient momentum to warrant sustainability	12 months
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	4 years

Appendix I presents the general phasing of the 4-year programme, together with the staffing schedule. A more detailed time - activity bar chart for step 1 & 2 is shown in Appendix II.

##### **Step 1: Inception phase**

Preliminary discussions with possible partners. Publicity and public relations on the new initiative. Establishment of a preliminary network of interested parties (nodes). Organizing of the founding workshop. Inventory of education and research interests leading to the identification of possible educational modules. Seeking commitment for the shared regional initiative. Create ownership. Establishing the WaterNet secretariat as a corporate body. Establishment of WaterNet Research Fund.

##### **Step 2: Forging the network and a modular educational structure**

Formal launch of WaterNet. Building the network through accreditation of MSc course modules (building blocks, based on credit points) between participating universities. Forging the modular structure of the MSc programme, allowing for optional curricula. Begin with upgrading of syllabi. Establishing database of potential lecturers. Start with training of trainers within the region or at IHE Delft. Establishment of the WaterNet Association. Start of the research activities.

##### **Step 3: Strengthening educational capacity**

Training of trainers through the current UZ/IWSD/IHE Capacity Building Programme. Formalizing accreditation and mutual recognition of degrees and courses. Exchange of educational staff and researchers. Continuation of research activities.

##### **Step 4: Start the MSc programme with external support**

Start of the regional education programme for regional students, with support from external lecturers. Training of trainers (on-the-job).

##### **Step 5: MSc Programme with sufficient momentum to warrant sustainability**

Programme fully operational. A system of nodes in the southern and east African region with Harare as the first hub in the network. European institutes (IHE, ITC, IRC, etc.) may participate as nodes in a self-sustaining regional network. Evaluation.

### 3.2 Components of the WaterNet programme

The WaterNet programme has the following components:

- Modular MSc programme distributed over the network
- Professional Courses Programme offered at different locations in the network
- Staff development programme to allow for staff development of participating institutions
- Exchange programme to allow experts from the region to participate in teaching and training at other institutions in the region
- WaterNet Research Fund to stimulate water related research activities
- WaterNet Association, a regional society of water research
- Nodal Strengthening Fund to increase the educational capacity of the nodes

#### Modular MSc programme

The idea behind the modular programme is that participating universities (network nodes) provide those modules to the network for which they have the capacity and a comparative advantage, or which are of particular national importance (such as for instance the national water legislation and institutional framework). The network would consist of a selection of universities and research institutes that can contribute modules to the programme (a preliminary long list of institutions is presented in Appendix VII). Since the University of Zimbabwe already has a fully-fledged MSc programme in WRM, Harare is the most logical place to function as the first hub of the network, where participants can graduate and to which the participating nodes attach their specific modules. This requires a mutual accreditation process. As the network develops, it is envisaged that more hubs will establish themselves within and outside the SADC region.

In the coming years WaterNet would develop into a network of universities and research institutes centred around Harare as the first hub, with a range of modules distributed over, and run by, participating institutions which exchange lecturers, researchers and participants.

The modular MSc programme will permit the implementation of certain modules in the home-country of a participant, at a participating university, the collection of subsequent modules in other nodes and the completion of the programme at a hub in the network. This is both efficient, since it would not require fully fledged MSc programmes in all participating countries, and it enhances regional cooperation through the creation of a generation of professionals that speak the same professional language and have common experiences.

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#### Definitions of Network Components:

##### Node

An institution that participates in the network and that supplies an essential component to the network in the form of one or more MSc modules or training courses. It can also be a research institute that merely participates in the research activities of WaterNet..

##### Hub

A university which offers a full MSc programme in the field of IWRM in modular form and where participants who have collected modules in participating nodes can complete their MSc programme and graduate.

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#### Professional courses programme

The same applies to short courses, aimed to introduce concepts and tools of IWRM to professionals who are already active in the water sector. In most SADC countries water policies, water legislation and the institutional framework are under revision. This requires a considerable re-orientation of professional staff. Short courses with the objective to prepare professionals for this changing environment and for their different tasks are in high demand.

Bringing together professionals from the region to discuss new policies and approaches is both useful for their professional development and for network building. The logical place to start

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**Criteria for funding research proposals form the WaterNet Research Fund**

- |                          |    |                            |                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|----|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Academic quality:</b> | a) | Methodology                | <ul style="list-style-type: none"> <li>- clarity of research question</li> <li>- clarity of objectives</li> <li>- clarity of approach</li> <li>- feasibility of time-frame</li> <li>- appropriateness of research equipment</li> </ul>                                                                                                       |
|                          | b) | Innovation                 | <ul style="list-style-type: none"> <li>- relation to (and reference to) relevant recent literature</li> <li>- contribution to bridging a knowledge gap</li> <li>- contribution to enhanced understanding of processes</li> <li>- contribution to development of new tools</li> </ul>                                                         |
| <b>Funding criteria:</b> | c) | Relevance                  | <ul style="list-style-type: none"> <li>- Can the research contribute to more sustainable water resources management?</li> <li>- Does it fit within the concept of IWRM?</li> </ul>                                                                                                                                                           |
|                          | d) | Candidate                  | <ul style="list-style-type: none"> <li>- research grants are given out to individuals</li> <li>- candidate should be from the region</li> <li>- preference is given to women</li> </ul>                                                                                                                                                      |
|                          | e) | Regional capacity building | <ul style="list-style-type: none"> <li>- at least 80% of the time should be spent on research in the region</li> <li>- to promote regional (south-south) cooperation at least two institutes from different countries in the region should be involved; cooperation with an institute in The Netherlands or Sweden is recommended</li> </ul> |
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building-up the network is at the IWSD, which has run short courses in the field of IWRM since 2 years.

The possibility to use modules of the MSc programme as training courses is particularly powerful in this respect. Also the possibility for senior professionals to collect credit points over a longer period of time by participating in modules and short courses, to eventually obtain a degree, should be considered.

**The WaterNet Research Fund and WaterNet Association**

With regard to research, there is a need to anchor relevant research in the region, to build up a knowledge and experience base in the region and to create an enabling environment for researchers. The programme should be such that it promotes south-south cooperation, but not so that it excludes north-south cooperation. Much experience on the region is with northern universities, including in The Netherlands. This knowledge should be tapped and exchanged in an environment of equality and mutual benefit. Tools for the strengthening of regional research are the establishment of a water research society and a research fund.

The WaterNet Research Fund is an important facility meant to stimulate relevant research for individual researchers from the region. The Fund is an instrument which will add substance to and enhance ownership of the programme. There are two sets of criteria: those related to academic quality and the ones that embody the objectives of the fund (see box). The research fund should be administered by WaterNet. An independent scientific committee, consisting primarily of

scientists from the region should evaluate research proposals and recommend them for financing to the secretariat.

The WaterNet Association is seen as an important mechanism to establish a journal, a newsletter, a network of researchers and regular seminars and workshops to facilitate research. The association should be supported by the SADC Water Sector, GWP and WWC and will be an important tool to create regional research capacity and to support regional initiatives.

Through the establishment of a regional journal on water, the association would create a forum which would ensure the dissemination of regionally created relevant knowledge and information, while enhancing the opportunity of local researchers to get their research findings published in a recognised scientific format. At present such opportunities are severely constrained.

#### **Nodal Strengthening Fund**

In forging the network some nodes may require financial support to initiate or strengthen educational modules. For this purpose a special Nodal Strengthening Fund is envisaged. In addition nodes can make use of the fellowship pool for "training of trainers" and draw on the budget for guest lecturers and short term staff in strengthening their educational capacity. In the operational phase, nodes can make use of the pool of regional MSc fellowships and the researchers exchange programme.

### **3.3 Modality of Implementation**

#### **WaterNet Secretariat**

WaterNet should operate as an autonomous non-governmental body that facilitates research and educational institutions and governmental organization to enhance their capacities for education, training and research. WaterNet will provide the linkages between these parties and will sustain these through its services, facilities and funds. An autonomous WaterNet Secretariat will be established in Harare that will administer the networks funds and services. This secretariat will remain very modest in size (a manager, an advisor and an administrator) since the mass of the network resides in the nodes.

#### **WaterNet Advisory Board**

WaterNet should be strongly anchored in the Technical Advisory Committee of the Global Water Partnership for Southern Africa (SA-TAC). Members of SA-TAC are independent professionals and scientists in the water sector, which mainly stem from the private and non-governmental sector. SA-TAC should play an important role in the WaterNet Advisory Board and in the administration of the WaterNet Research Fund. Moreover, the SADC-Water Sector should be involved, being the regional representative of governmental organizations, which would bring in the education and research needs into the WaterNet Advisory Board from the governmental perspective. Furthermore some additional representation from private, non-governmental and governmental organizations may be considered.

#### **External Support Agencies**

The Netherlands Development Assistance (NEDA) has expressed its interest to finance WaterNet, starting with the first step of 1 year to establish the network, the secretariat and to create ownership of the network. It also has expressed its interest in supporting the programme in following steps. The support of NEDA, however, is not exclusive. It aims at joining forces with other interested donors, within the framework of the Global Water Partnership, build on the network and to expand the network in response to regional needs and demands. SIDA has expressed interest in the programme and particularly the WaterNet Research Fund.

A system of mutual accreditation of MSc modules should be set-up. UNESCO has shown interest to assist in setting-up such a system and to facilitate the process of curriculum development and

mutual accreditation. In this, UNESCO can draw on its extensive international experience in the field of hydrology and water resources engineering.

### **Staffing**

The WaterNet Secretariat will be headed by a Network Manager who is responsible to the WaterNet Advisory Board and to the donors. This Network Manager should be a regional expert with a solid experience in education and research. In the inception phase of the programme (during 1 year) in which the WaterNet Secretariat and the preliminary network of nodes need to be established, the programme will be managed by an Interim Network Manager, who will be an educational expert from IHE. During the following stage, the Interim Network Manager will hand over the responsibilities to the Network Manager and continue to support WaterNet as a Network Advisor. The Management of WaterNet will be supported by a Network Administrator and modest secretarial support.

During the first phase, a Legal Advisor will be needed to establish the WaterNet Secretariat as a corporate body and to work out the institutional modalities and alternatives, in communication with the envisaged network participants (nodes) and stakeholders. Job descriptions of this key staff are presented in Appendix X.

### **North-South cooperation**

Although WaterNet is primarily aimed at stimulating south-south cooperation, links with Dutch, Swedish and other European institutions in the field of IWRM will be stimulated. In this respect the Dutch institutes for international education (IHE, ITC, ISS, IHE, MSM, IRC, ILRI) have many years of experience in education, research and capacity building, and an impressive network of alumni. Some of these institutes have worked in the region for many years and have established long-standing relations with regional institutes and organizations. WaterNet will facilitate this cooperation where necessary and where it strengthens the regional capacity to perform education and research independently.

## 4 PROJECT DESCRIPTION

This chapter deals with steps I, II and III of the WaterNet programme, the steps for which financial support is sought at this stage.

### 4.1 Developmental Objective

To strengthen the overall human and institutional capacity of the Water Sector in Southern Africa in order to contribute to the wise use of water resources. The wise use of water can be translated in technical terms (efficient use), in socio-political term (equitable use) and in environmental terms (ecologically sound use). This wise use of water resources, and more in general of the environment, will improve the quality of life of the people in Southern Africa.

### 4.2 Immediate Project Objectives

- to *raise awareness* with regard to the regional scale of IWRM among institutes and people active in this field.
- to regionalise and further strengthen the *research* on IWRM performed by HRD institutes in the Southern Africa Region by offering opportunities to perform joint research.
- to stimulate regional cooperation in the field of *education* in IWRM by developing a modular MSc programme to which several HRD institutes in the region will contribute.
- to increase the *accessibility* of MSc-level education in IWRM for students from the Southern Africa Region.

### 4.3 Project Output

The major output of this two-year project will be the establishment of the WaterNet Secretariat and the creation of conditions to implement the different components of the programme, such as the Research Fund, Staff Development Programme, Exchange Programme, Modular MSc Programme, Professional Courses Programme and Nodal Strengthening Fund. The implementation of these programmes will start during in the second year.

#### A. WaterNet: an operational network:

WaterNet activities will be coordinated through a secretariat based in the Southern Africa Region. The secretariat will be hosted by one of the members of the network. In the first year, the secretariat will be located in Harare, the first hub in the network. Characteristics of WaterNet are:

- equally owned by network members.
- staffed by one Network Manager, one Network Advisor and one Network Administrator.
- legal status.
- adequate office facilities, communication and transportation equipment.

There are several categories of WaterNet members:

- category A: institute offering modules for the regional MSc programme.
- category B: institute participating in the research programmes and exchange programme for lecturers and researchers.
- category C: institute receiving information on network activities and interested in sharing expertise through the network.

**B. Modular MSc Programme in IWRM**

This two-year project will deliver a new curriculum for a regional MSc in IWRM. The curriculum will be based on the existing MSc course in WERM at UZ, with certain modules being offered at other institutes in the region. The course programme - including optional curricula - will be worked-out, and syllabi will be ready for each of the modules.

Also will accreditation of each of the modules be arranged and have the lecturers been identified. At this stage, some 5 nodes in different countries will have been selected to contribute to the regional MSc programme. At the end of the two-year project period, the Modular MSc Programme will be ready for launching.

**C. Professional Courses Programme**

WaterNet will facilitate the operation of a professional courses programme by providing fellowships to regional candidates for attending short courses at training institutes in the network. The IWSD will play a leading role in this programme as the training hub. For the first year short courses will be limited to IWSD's basis in Harare. In the second year the network may be expanded. The institutes providing training may benefit from the nodal strengthening fund as well.

**D. Research Fund:**

The Research Fund supports joint initiatives from at least two members in the Southern Africa region to carry-out regionally relevant research in the field of IWRM. It is believed that joint research will naturally contribute to increased cooperation and information exchange between IWRM institutes in Southern Africa. The following will have been achieved:

- modalities for implementation will have been defined. This includes selection criteria and procedures for appraisal, financial flows, reporting obligations, etc.
- a call for proposals will have been announced.
- some NLG 360,000.- will have been allocated to research projects.

**E. Nodal Strengthening Fund:**

This fund will support member institutions in upgrading facilities where required for a better functioning in the WaterNet programmes. Funds will further be allocated for the development of joint facilities, mainly through the use of Internet. Some NLG 50,000.- will have been made available during the project. Rules and regulations for allocation of funds will have been defined.

**F. Staff Development Programme:**

An essential step in building capacity in education, training and research is the availability of highly qualified staff to implement the programmes in the target region. Thereto, staff of WaterNet members (lecturers, researchers) will have been trained both in Europe and Southern Africa:

- 3 staff members have completed an MSc course in The Netherlands, while 4 are still engaged in the MSc programme.
- 2 staff members have completed the MSc course on WERM in Harare, while 5 are still engaged in the programme.
- 10 lecturing staff will have received training in didactics and educational management in The Netherlands.
- 10 staff members will have received training in short specialized courses in the Southern Africa Region.

- G. Exchange Programme: Exchange of lecturers and researchers:  
To stimulate South-South cooperation, some NLG 200,000.- will have been allocated in the first year of WaterNet for:
- contributions by lecturers/researchers in workshops, seminars and congresses organized by one of the network members.
  - visits of researchers to member institutes to share data and perform part of laboratory or field work.
  - contributions by regional experts from member institutes in regular education programmes offered by one of the WaterNet nodes.
- H. Dissemination of information:  
The success of WaterNet will highly depend on the degree of exposure in the initial stage of the programme. This to attract the attention of potential members of the network and donor organisations. The following will have been achieved:
- database and mailing list of stakeholders in the water sector of Southern Africa.
  - a brochure presenting the WaterNet initiative.
  - 4 newsletters with the latest news on WaterNet developments.
  - a workshop for the appraisal of the WaterNet programme (after 8 months).
  - a seminar combined with the official founding of WaterNet (after one year).
  - at the end of year 2, a symposium will pay attention to the research performed under the umbrella of WaterNet in general and the Research Fund in particular.

#### 4.4 Project Activities

- A. WaterNet: creating a structure:
- first, the WaterNet secretariat will be staffed and equipped for optimal efficiency.
  - HRD institutes in Southern Africa will be identified and information concerning their capacities, needs and interests will be analysed. To a large extent this will already have been done before the start of this project through a Netherlands sponsored programme performed by IWSD and IHE.
  - selected nodes will be visited by the Interim Network Manager, together with a local expert. Facilities will be inventoried and possible contributions to the network and MSc programme will be discussed.
  - prospective nodes are invited to participate in a workshop in Harare to establish the preliminary network.
  - a legal / institutional adviser will investigate how WaterNet can best be embedded in existing institutional and legal structures and how joint ownership can be realized. He will further advise on internal organisational structures and lines of command and advise.
  - Selection of Network Manager
  - rules and regulations for the management of the programmes coordinated by WaterNet secretariat will be drafted.
  - re-assembling the partners and defining the legal structures of WaterNet will eventually lead to the official founding of the Network.
- B. Modular MSc Programme in IWRM
- a preliminary curriculum for the modular MSc programme will be designed and used as starting point in discussions with possible partners.
  - after selection of nodes, modules will be defined, course contents will be detailed and course syllabi will be prepared with assistance of foreign experts.
  - in a parallel process, steps will be made for the accreditation of each module and the endorsement of the programme.
  - optional curricula will be discussed and conceived.

- lecturers will be identified.
- C. Professional Courses Programme
- regional training needs and training capacity assessment.
  - expansion of the IWSD programme for training courses in the field of IWRM with attention to regional issues, approaches and new technologies.
  - identification of additional training partners in the network, possibly in cooperation with in-house training facilities of ministries responsible for water resources management.
  - setting up a training network with IWSD as the hub.
- D. Research Fund:
- precisely define the objectives of the programme and design procedures along which applications, awarding, monitoring and financing should work.
  - announce a call for proposal.
  - start the programme modestly by sponsoring joint (South-South and North-South) research initiatives with focus on regional issues.
- E. Nodal Strengthening Fund
- after inventory of the existing facilities at member institutes (with regard to their role in the network), small funds will be made available for upgrading these facilities.
  - the WaterNet secretariat will further investigate to which degree certain facilities can be shared by members (mainly via Internet).
- F. Staff Development Programme
- develop criteria for awards
  - training 7 future lecturers in the regional MSc programme at Masters level in the Netherlands.
  - training of 7 staff of member institutes at MSc level in Harare.
  - training of future lecturers in the regional MSc programme in didactics and educational management in The Netherlands.
  - Post-Doc research in the framework of the Research Fund activities for staff of member institutes.
- G. Exchange Programme: Exchange of lecturers and researchers
- design procedures along which applications and financing should be handled.
  - announce opportunities in the WaterNet newsletter.
  - start the exchange programme by sponsoring South-South research initiatives with a focus on regional issues.
- H. Dissemination of information
- production and mailing of WaterNet brochure;
  - production and mailing of 3 newsletters;
  - organisation of a workshop with participation of nodes and potential donor organisations for appraisal of the WaterNet programme.
  - organisation of a seminar for stakeholders in the water sector of Southern Africa, during the official founding of WaterNet.