

WATERnet



Final Report

University of Zimbabwe



Institute of Water and
Sanitation Development



A strategic programme of
the SADC Water Sector

Harare
April 2005

UNESCO-IHE
Institute for Water Education



THE STANDARD, 12-18 MARCH 2000

PAGE 6

Water programme launched

Staff Writer

TWELVE universities from nine southern and eastern African countries last week launched a cooperation programme for education and research in integrated water resources management which aims to advance the capacities of the region's water managers.

Launched in Victoria Falls, the project, known as WaterNet, is the first of its kind where universities will offer a joint masters degree in water resources. "Students taught at different universities in the masters degree will obtain modules of modules taught at different universities in the network. The comparative strengths of the institutions that contribute staff and expertise to the countries, while the Dutch government provides fellowships and staff development opportunities and the Swedish government supports research activities," said

Emiel de Bont, second secretary at the Royal Netherlands Embassy. The WaterNet is Professor Alaphia Wright of the University of Zimbabwe. The secretariat is based in Zimbabwe.

WaterNet members include institutions from Botswana, Kenya, Mozambique, Namibia, South Africa, Tanzania, Uganda, Zambia and Zimbabwe.

The members have complementary strengths in various aspects of water resources management, including water supply, sanitation, ground water, wetlands, irrigation, water law, water economics, flood forecasting, drought mitigation, water conservation and information technology. By pooling these strengths together, the network will be able to develop the required comprehensive programmes," said de Bont.

Netherlands, High Prince Willem-Alexander, tended the founding workshop of the Global Water Partnership in his capacity as patron of the regional initiative as the most powerful instrument of the Global

Water Partnership which can implement integrated water resources management.

At the meeting, regional institutions endorsed the Southern Africa Vision for Water that will be presented at the World Water Forum in The Hague, scheduled from 17 to 23 March 2000.



Prince Willem-Alexander



Building Capacity for Water Resources Management in Southern Africa

Vision

Equitable and sustainable utilization of water for social, environmental justice, regional integration and economic benefit for present and future generations in Southern Africa.

Mission

To enable the people of Southern Africa to efficiently and effectively manage their water resources, WaterNet seeks to enhance regional capacity in Integrated Water Resources Management through training, education, research and outreach by harnessing the complementary strengths of the region.

Victoria Falls, Zimbabwe, 4 March 2000

CUP SOUTHERN AFRICA
 Water Sector Coordination Unit.

[Signature]

UZ Faculty of Engineering.

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University of Dar es Salaam, Faculty of Engineering.
 Makerere University, Institute of Environmental & Natural Resources.

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UNIVERSIDADE EDUARDO MONDLANE, DECI, FE

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INSTITUTE FOR METEOROLOGICAL TRAINING & RESEARCH

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INSTITUTE OF WATER AND SANITATION DEVELOPMENT, ZIMBABWE

Achievements beyond expectations

The WaterNet concept was triggered in May 1997 by the SADC-EU conference on the Management of Shared River Basins in Maseru, Lesotho, where ministers of water of Southern Africa and Europe emphasised the need to 'level the playing field' between riparian countries and to develop capacity building programmes in order to achieve this goal. The University of Zimbabwe, the Institute of Water and Sanitation Development and then IHE Delft (now UNESCO-IHE) jointly developed the concept of pooling of expertise among universities in the region that would allow for the establishment of a broad and multi-disciplinary programme with specialisations tailored to a wide spectrum of postgraduate students. A regional network in Southern Africa would enhance access to education, training and promote research into integrated water resources management. This concept became the WaterNet programme that was subsequently endorsed by the then SADC Water Sector Coordination Unit and the Global Water Partnership (GWP). After extensive consultations in the region, eighteen institutions founded WaterNet in March 2000 in Victoria Falls, Zimbabwe.

Five years later it may be concluded that WaterNet is fulfilling the expectations that gave rise to its establishment: a joint curriculum in Integrated Water Resources Management (IWRM) has been developed; lecturers from member institutions have cooperated in education and conducting research; professionals and students from more than 10 southern and eastern African countries have been or are being trained in this interdisciplinary postgraduate curriculum and they actively generate new knowledge and insights through Masters dissertation research; and finally research findings are being disseminated and shared during the annual WaterNet/WARFSA/GWP-SA symposia, and the proceedings thereof are made available on the web and published in a scientific journal.

In addition to these achievements, WaterNet and its Masters programme in Integrated Water Resources Management appear to address issues that have since received increasing attention and gained in urgency due to important regional and global developments. Here three such developments are mentioned:

1. The formulation and adoption by the United Nations in September 2000 of the Millennium Development Goals (MDG's) has given a new urgency to proper water resources management, since most of the eight goals cannot be achieved without it:
 - Improved use of rainfall and irrigation water will increase crop yields and help to eradicate hunger; increase access to productive water will decrease poverty;
 - Improved operation and maintenance of existing water supply systems and sanitation and sewer infrastructure, and the construction of new infrastructure will significantly increase access and thereby reduce child mortality and the incidence of malaria and other waterborne diseases, and will have a positive effect on maternal health;
 - Inclusion of the environment as a legitimate water user, improved water quality management and watershed management will all contribute to reversing the current trend of environmental resource degradation.
2. During the World Summit for Sustainable Development in Johannesburg in August 2002, the implementation plan of Agenda 21 was agreed, and included a commitment of all countries to develop Integrated Water Resources Management/Water Efficiency Plans by the year 2005.

3. The commitments in Africa to prioritise water are demonstrated by the establishment of the African Ministerial Conference on Water (AMCOW) in 2002.

WaterNet member institutions and postgraduate students of the WaterNet IWRM Programme are currently involved in various activities related to all three mentioned developments. These activities are carried out on an individual basis, as well as in the context of larger programmes involving the Global Water Partnership-Southern Africa; the IUCN World Conservation Union; the Challenge Programme on “Integrated Water Resources Management for Improved Rural Livelihoods: Managing Risk, Mitigating Drought and Improving Water Productivity in the Water Scarce Limpopo Basin”; and the Small-holder System Innovations in Integrated Watershed Management Programme (SSI)”.

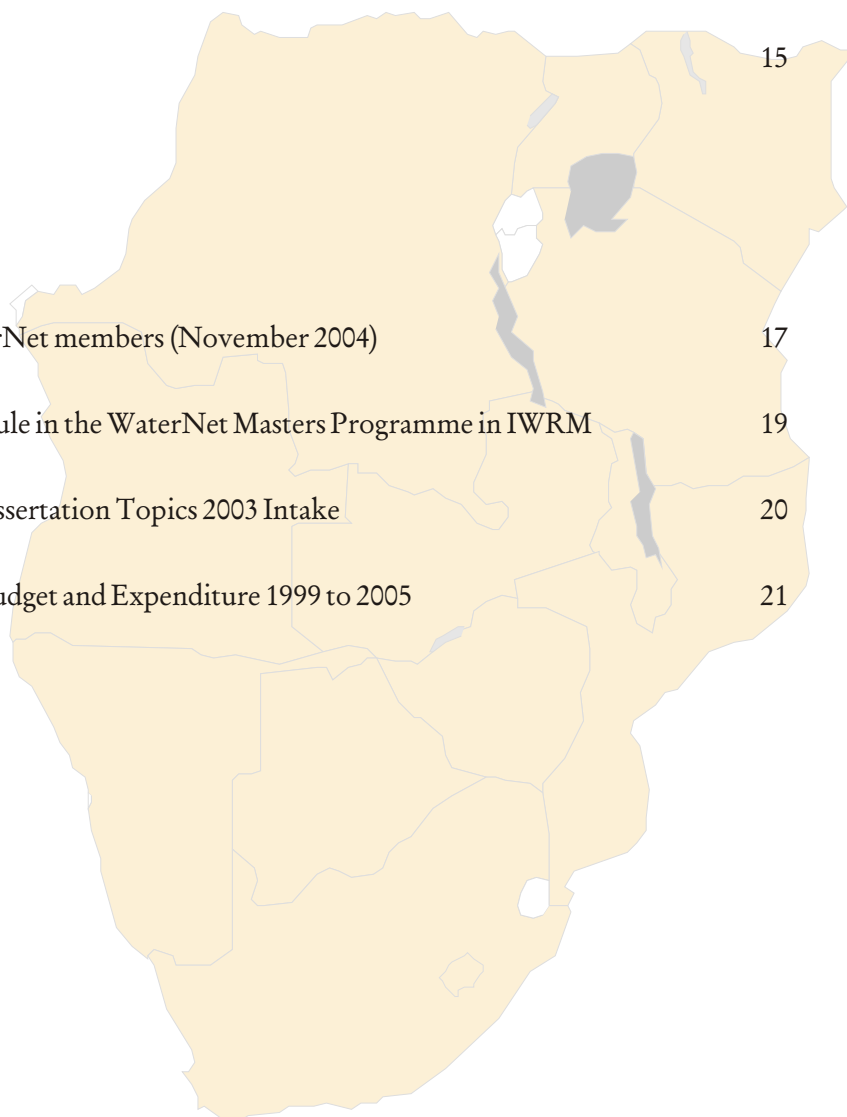
These developments demonstrate that WaterNet is responding to new demands that were not envisaged during its inception. WaterNet is already recognised as a capacity building partner for water resources management in Southern Africa.

Table of Contents

1. Basic Data	1
2. Context	1
3. General objective, target group and programme targets	1
4. Achievements	3
5. Conclusion	15

ANNEXES

1. List of WaterNet members (November 2004)	17
2. Course module in the WaterNet Masters Programme in IWRM	19
3. Students' Dissertation Topics 2003 Intake	20
4. WaterNet Budget and Expenditure 1999 to 2005	21



1. Basic Data

Country: Zimbabwe
Project name: WaterNet: Forging the Network; the establishment of a regional network for education, training and research on Integrated Water Resources Management in Southern Africa
Activity number: RF059301
Reporting period: 1 September 1999 to 31 March 2005

2. Context

The University of Zimbabwe (UZ), the Institute of Water and Sanitation Development (IWSD) and UNESCO-IHE (formerly IHE-Delft) have taken the initiative to establish a regional network for education, training and research on Integrated Water Resources Management (IWRM) in Southern Africa.

The role of the Institute of Water and Sanitation Development is to become a training hub for WaterNet, and to manage the Water Research Fund of Southern Africa (WARFSA). The role of the University of Zimbabwe is, apart from being a founding member, to host the WaterNet Secretariat and to be represented on the Steering Committee of WaterNet. The role of UNESCO-IHE is to facilitate the process of establishing the network, starting up the main activities, incorporating WaterNet as a legal entity, and ensuring that it becomes an efficient and transparent organisation that can stand on its own.

The WaterNet programme is endorsed by the SADC Water Division (then the SADC Water Sector Coordination Unit) as Project 23 of the SADC Regional Strategic Action Plan as well as by the Global Water Partnership Southern Africa (GWP-SA). The Project Proposal was approved and signed by the Dutch Minister of Development Cooperation in October 1999. The project was administered by the SAIL Foundation and started officially on 1 September 1999.

3. General objective, target group and programme targets

3.1 Development objective

WaterNet aims 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.

3.2 Immediate Project Objectives

The Immediate Project Objectives are as follows:

- to raise **awareness** with regard to the regional scale of IWRM among institutes and people active in this field;

- to stimulate regional cooperation in the field of **education** in IWRM by developing a modular Master Degree Programme to which several institutes in the region contribute;
- to increase the **accessibility** to training and education in IWRM for participants from the Southern Africa Region;
- to stimulate, regionalise and strengthen **research** in the field of IWRM in the Southern Africa Region by offering opportunities to perform joint research.

3.3 Target Group

WaterNet aims to improve the utilisation of water by all people in the region through educating the present and future water managers. Indirectly this will contribute to an improved quality of life for all.

3.4 Programme Targets

WaterNet is an open-ended and phased programme. The following phases are foreseen:

1. Creating ownership (12 months)
2. Building and strengthening educational capacity (12 months)
3. Operating WaterNet (24 months)

1. *WaterNet: a regional network for IWRM*

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. Initially the secretariat will be located in Harare at the UZ.

2. *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.

3. *Master Degree Programme in IWRM*

A new curriculum for a Master degree programme in Integrated Water Resources Management (IWRM) will be established. The curriculum will make maximum use of the existing Masters courses at the UZ in Harare and University of Dar es Salaam (UDSM), with certain modules being offered at other institutes in the region. Agreement will be reached on the compulsory integrative part of the programme. The full programme - including optional curricula - will be worked-out, and syllabi will be ready for each of the modules. Accreditation of each of the modules and a credit point system will be arranged and lecturers identified. After two years, up to 5 nodes in different countries will have been selected to contribute to the Master Degree Programme. At the end of the two-year project period, the Modular Master Degree Programme will be ready for launching.

4. *Research*

The Water Research Fund for Southern Africa will support (preferably joint) initiatives from researchers at institutions 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, possibly related to partners in Sweden and the Netherlands.

5. WaterNet Association and dissemination of information

The success of WaterNet will highly depend on the degree of exposure in the initial stage of the programme. The WaterNet Association will be instrumental in creating a stimulating professional environment and establishing contacts between water professionals and society through information dissemination. At the end of year 2, a workshop cum symposium will be held; the first will evaluate the programme and define the plan of operations of the following phases, the second will pay attention to the research performed under the Research Fund.

4. Achievements

4.1 Forging the network

4.1.1. Introduction

WaterNet, a network of higher education institutions active in water education and research was established at the founding workshop held in Victoria Falls in March 2000. Dr P van der Zaag was appointed Interim Manager with Professor E.A. Wright, Dean of the Faculty of Engineering at the University of Zimbabwe, as Chairperson of the Steering Committee.

In May 2003, Bert van Woersem and Jean Boroto conducted a mid-term evaluation of WaterNet. The main recommendations of the van Woersem/Boroto report were as follows:

(a) Module development and broadening towards other universities

- *Consolidation of the Masters programme in IWRM through the finalisation of at least 25 modules and 4 specialisations.*
- *Elaboration, approval and implementation of a socio-economic specialisation in IWRM with five modules to be delivered by the University of the Western Cape and others.*
- *Inclusion of the University of the Western Cape (UWC) as third core university for the Masters in IWRM and the start of discussions with other universities including Universidade Eduardo Mondlane in Maputo. In Maputo modules related to the specialisation "Water and Land" could be developed possibly to be integrated in the Masters programme on Rural Development at the Universidade Eduardo Mondlane.*



Founding members at Victoria Falls

(b) Institutional Issues

- *To conduct Peer Reviews and the publication of modules. To make these modules available to a larger non-academic audience and subsequently use these modules as an entry point for short professional courses to be conducted by IWSD and other non-academic organisations.*
- *Institutionalisation of WaterNet as a member organisation of higher learning institutes under the Educational Protocol of the Ministers of Education under SADC. This will be a major step to ensure sustainability.*
- *Strengthening of the external relations with the SADC water sector, with GWP-SA, with WARFSA and other organisations.*
- *Intensification of the relations regarding research between WARFSA, WaterNet and the non-academic stakeholders/organisations.*

At the end of Phase I, WaterNet has clearly accomplished the task of establishing itself as a relevant and important network in Southern Africa. This has been achieved by combining a strategy of progressively building a member driven network and adopting a delivery-based approach. The guiding vision is the transition from conventional to integrated approaches to water resource management.



Students attending English for Water Managers at Africa University

4.1.2. A Legal structure

WaterNet is governed through its Constitution, adopted by the member institutions. The members meet once a year at the Annual General Meeting (AGM). It approves work plans and budgets for activities for the next year, as well as elects representatives to the Steering Committee (SC). The SC appoints the Manager, who heads the Secretariat. This democratic and transparent governing structure has been put in place in the initial year of WaterNet Phase I, and is now a well functioning governance structure.

Much of Phase I has been used in efforts to establish a legal structure for WaterNet. The WaterNet Trust has been duly established in 2003. However, due to divergent opinion on the governance issues between the Board of Trustees and the Steering Committee, the Board of Trustees has decided not to take on any administrative responsibilities until these issues have been clarified.

The Secretariat commissioned PriceWaterhouse Coopers to investigate the basis of the disagreement and to make recommendations to resolve this matter. The main findings of the PriceWaterhouse Coopers report are that the WaterNet Deed of Trust conflict with the WaterNet Constitution. They recommend that the current Trust be de-registered and that a new Trust which is fully compatible with the WaterNet Constitution be created.

The PriceWaterhouse Coopers report made clear proposals for the way forward. These proposals will be implemented during the first year of Phase II of WaterNet.

4.1.3. Administration and Management

As far as administration and management is concerned, the Secretariat is in good stead. A manual of operations had been compiled for financial management, criteria and conditions have been formulated guiding disbursements of funds, as well as policies that guide other day to day operations. This should result in a seamless incorporation of any new staff that joins the WaterNet Secretariat.

The Secretariat is staffed by five persons (Manager, Advisor, Administrator, Secretary and Challenge Programme Coordinator). Four of the staff members are paid from the WaterNet core funding while the Challenge Programme Coordinator is paid from additional funds raised through a successful competitive bid for research funding.



Material development: IWRM Plans

4.1.4. Membership

The total membership at the end of Phase I is 45 institutions. These include engineering departments, agriculture departments, geography departments, social sciences departments and research institutes. Member institutions are from all SADC countries excluding Lesotho and Angola and including institutions from Kenya and Uganda. A full membership list is included as Annex 1.

4.2 To increase the accessibility to training and education in IWRM for Participants from the Southern Africa Region;



Dutch Ambassador, Honourable Heinsbroek and the Permanent Secretary of Higher Education, Dr Mbidzo, Zimbabwe

A notable achievement of this objective has been the offering of an English language course for Water Managers to participants from Mozambique and the Democratic Republic of Congo. The aim of the course is to facilitate the participation of water managers from these two countries in SADC activities. Feedback from the participants indicated that the course is very useful and that it should be offered on a regular basis.

Other efforts to increase access to education and training in IWRM have been ongoing in collaboration with Global Water Partnership - Southern Africa (GWP-SA). For example, the Institute of Water and Sanitation Development, together with GWP-SA and WaterNet put in a successful bid to the Gender Water Alliance to host a gender-mainstreaming workshop.



Guest at the Dutch Embassy's reception for IWRM students, Zimbabwe

WaterNet is also collaborating with GWP-SA and Cap-Net to facilitate training for GWP-SA's Country Water Partnerships in compiling IWRM plans. This is one of the major water related outputs of the WSSD action plan from Johannesburg, 2002, where countries committed themselves to preparing national IWRM plans.

Staff from WaterNet member institutions attended a Cap-Net organised Training of Trainer workshop on Legal Reform in the Water Sector in Brazilia in September 2004. A second workshop was organised by WaterNet and Cap-Net on Institutional Arrangements for Water Resources Management in Cape Town in December 2004.

4.3 To stimulate regional cooperation in the field of education in IWRM by developing a modular Master Degree Programme to which several institutes in the region contribute.

Already at its inception, in March 2000, the WaterNet Steering Committee conceptualised what would become the flagship of WaterNet; the Regional Master Programme in IWRM. The programme has been conceived out of a well-articulated need for a new generation of Water Managers (based on a Regional Survey Carried out by Dr Ndamba and Dr Van der Zaag, 1998). The programme would train Water Managers and Researchers that could answer to the new reality of water management in many countries of the World, where water increasingly is understood, in policy, legislation and management, as a corner stone of economic and social development, but also as a resource to be shared among multiple uses and users (society and nature), and between countries. To achieve this an innovative programme has been

designed, where WaterNet member institutions in 12 countries, combined comparative strengths to develop a modular programme with an inter-disciplinary core, 5 multi-disciplinary specialisations and elective modules (covering hard and soft science domains of IWRM (Water Resource Management, Hydrology, Water and Environment, Water for People and Water and Society). In total the programme includes 28 course modules (each with a duration of three weeks), of which 27 modules have been finalised during the course of the Phase I. (Annex 2 provides descriptions of all modules.) The structure of the WaterNet Regional Master programme in IWRM, as offered in 2004, which includes 27 course modules is shown in Figure 1.

Preparation Module				
English for Water Managers				
Core				
Principles of IWRM Principles of Hydrology Socio-economics of Water and natural Resources Principles of Aquatic ecology and environmental management Water Law and Institutions				
Specialisations				
Water Resources Management	Hydrology	Water and Environment	Water for People	Water and Society
Water Resources Analysis and Planning	Geo-hydrology	Environmental Water Requirements	Water supply and sanitation	Water and Security
GIS and Database Management	River Engineering	Environmental Impact Assessment	Utility Management	Water and Development
Catchment Management	GIS and Database Management	Water Quality Management	Waste Water Management	Environmental Education
Electives				
Any of the above from the specialisations plus Water Demand Management, Conflict Resolution, Early Warning for Droughts and Floods, Water Resources Modelling, Water Quality Modelling Groundwater Management				
Core				
Groupwork				
Dissertation				

Figure 1. Structure of the WaterNet Regional Master Programme in Integrated Water Resource Management, as offered in 2004.

As seen from the structure, the programme is multi-disciplinary, offering course modules in all aspects of water resources management, from socio-economics of water and environmental resources to water supply and sanitation. At the same time the programme is highly inter-disciplinary, offering state-of-the-art course modules on topical interdisciplinary subjects such as Principles of Integrated Water Resource Management, Policies and Institutions for IWRM, Environmental Water Requirements, and Water Demand Management. The modular Masters programme was launched at the University of Dar es Salaam (UDSM) in October 2002 and at the University of Zimbabwe in February 2003. During this first intake, only three Specialisations have been offered Hydrology at UDSM, Water Resource Management at UZ, and Water and Society offered at the University of the Western Cape (UWC). With the second intake, in February 2004, the full Masters programme has been offered to 30 WaterNet scholarship recipients from 11 countries. The full Masters programme is hosted at two member institutions (i.e. this is where student register and get the final degree), while 5 member institutions offer five specialisation programmes (University of Malawi Water and Environment, University of Western Cape Water and Society, Polytechnic of Namibia Water for People, UDSM Hydrology and UZ Water Resources Management).

The original Masters programme structure included 28 course modules. During the course of the development of the programme advancements in IWRM resulted in the addition of two course modules one on Water Demand Management (WDM) and one on Conflict Resolution and Cooperation in International Water Resources. Both these courses have been developed through externally financed partnerships between WaterNet and international institutions. The WDM module has been developed with Sida support through a partnership with IUCN's Regional Office in Southern Africa (IUCN-ROSA) while the Conflict Resolution module has been developed with support from UNESCO's PCCP Programme.

During the course of Phase I, WaterNet has awarded 83 full Master Scholarships to students in Southern Africa. These scholarships have been awarded in two sequences. The first generation of fellowships have been awarded to three intakes of the existing Water Resources Engineering and Management (WREM) and Water Resource Engineering (WRE) Master Programmes at University of Zimbabwe and University of Dar es Salaam respectively.

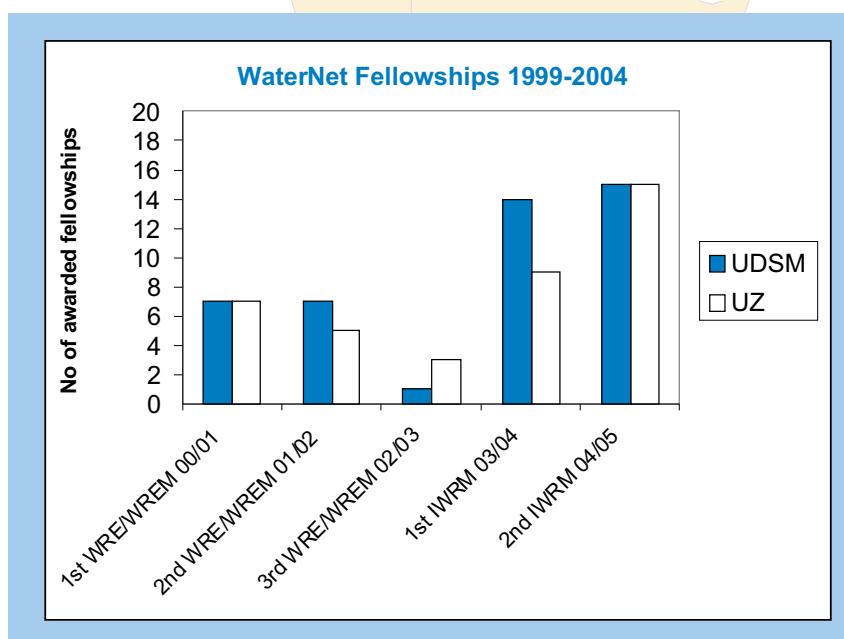


Figure 2.
WaterNet fellowship awards in Southern Africa during 1999-2004. WRE/WREM refers to the existing Master programmes at UDSM and UZ, respectively, and IWRM is the newly developed WaterNet Masters programme.

Thirty (30) fellowships have been awarded to the WREM/WRE programmes from 1999-2002 (see Figure 2). Twenty-nine have graduated from the WRE/WREM programmes and one student sadly passed away before completing the Programme.

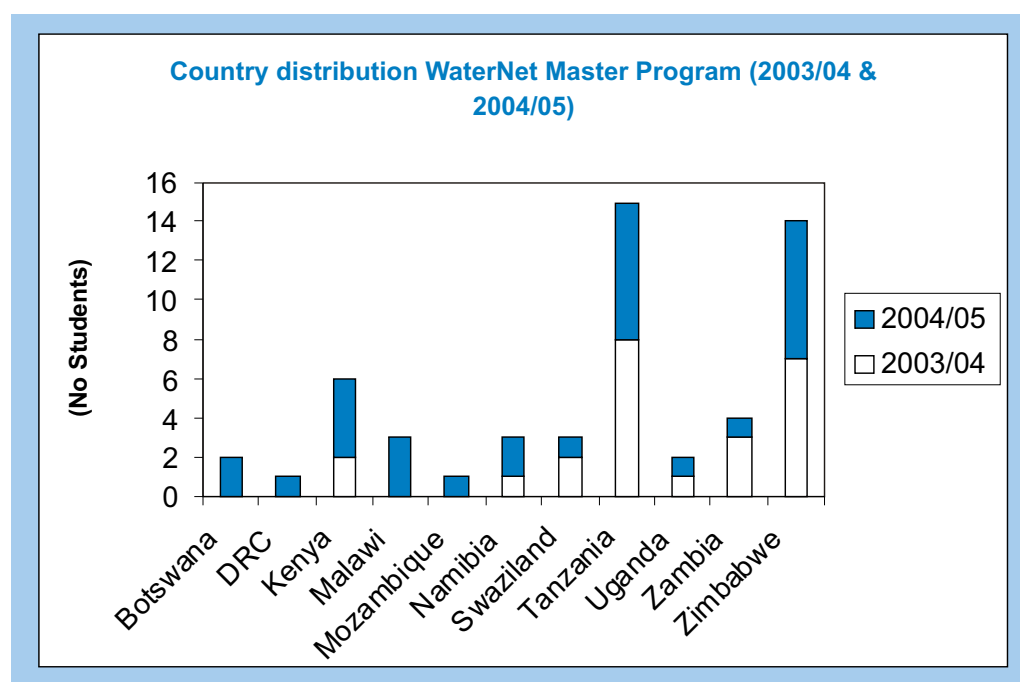


Figure 3. Geographical distribution of WaterNet students. Differentiation is made Between the 2003/04 and the 2004/05 intake.

The second generation of WaterNet fellowships have been awarded to the WaterNet IWRM Master programme. In total 53 fellowships have been awarded in two intakes 2003/04 and 2004/05.

Not surprisingly, the largest number of students on the WaterNet IWRM programme comes from the two host countries Zimbabwe and Tanzania. The geographical distribution of students is relatively satisfactory though, as seen from Figure 3, which shows the geographical distribution of students in the two intakes to the WaterNet programme 2003/04 and 2004/05.

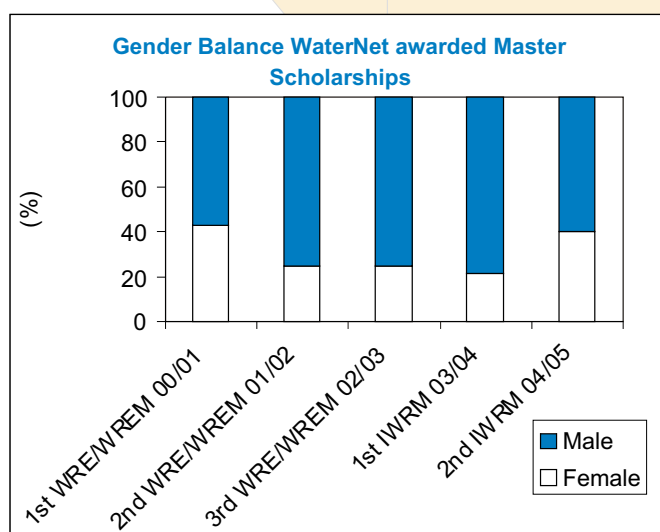


Figure 4. Gender balance among the WaterNet supported Master scholarships 1999 - 2004

The gender distribution among the WaterNet awarded fellowships and on the WaterNet IWRM programme is not satisfactory, but still higher than what is normally observed on management and science oriented programmes (Figure 4). The second intake to the WaterNet Masters programme, when WaterNet offered for the full spectrum of “hard” and “soft” science specialisations, attracted 40% women among 30 fellowships. Despite the progress, there is still a lot of work to be done to attain a 50/50

balance in gender on the WaterNet programme. Even though the Masters programme has been offered twice during WaterNet Phase I, much work remains to be done in consolidating both structure and quality of the programme. Furthermore, the programme requires continuous evaluation, quality control, staff development, and scientific backstopping. UNESCO-IHE has played an important role in scientifically supporting the development of the Masters programme thus far.

The names and research topics of the students at the University of Dar es Salaam and University of Zimbabwe is attached as Annex 3.

4.4 To stimulate, regionalise and strengthen research in the field of IWRM in the Southern Africa Region by offering opportunities to perform joint research

WaterNet, together with the Water Research Fund for Southern Africa (WARFSA) has throughout Phase I stimulated research and research collaboration through its Symposia, staff exchange between institutions in the region, and the Master thesis research projects that have been supported from the WaterNet Fellowship Fund. However, this area has not received systematic attention during the initial period of Phase I, but has received increased attention during the final two years of Phase I. Despite the late start, there have been some successes. These are:

4.4.1. The Challenge Programme on Water for Food

The WaterNet Secretariat, together with seven WaterNet members namely, the departments of Civil Engineering, Soil Science and Agricultural Engineering, Centre for Applied Social Science, Mineral Resources Centre (all from the University of Zimbabwe), University of Eduardo Mondlane (in Mozambique), National University of Science and Technology (Zimbabwe), the University of Natal and International Water Management Institute in South Africa as well as UNESCO-IHE, together with other partners in Mozambique, South Africa and Zimbabwe (17 partners in total), wrote a research proposal on implementing IWRM in the Limpopo Basin, through the Challenge Programme on Water for Food. This four-year research project was approved in October 2003, and started in February 2004.



Participants in a field workshop of The Challenge Programme on Water for Food, Mozambique

4.4.2. Smallholder System Innovations (SSI)

The four-year SSI research programme (2003-2007) is an associated programme of WaterNet. The regional research programme is carried out by WaterNet members, with funding from WOTRO, Sida and DGIS and administered through IWMI and UNESCO-IHE. The programme has six research components focusing on two river basins in Tanzania and South Africa and aims to deliver 6 PhD studies.

4.4.3. Other projects in the process of being developed

Other collaborative research projects are at the proposal stage. One such project entitled “Eco-technologies for Sustainable Wastewater Treatment and re-use in Southern Africa” concerns the use of Eco-technologies in wastewater treatment for small municipalities. Another project proposal entitled “Towards best practice: The Political Ecology of River Basin Governance in Southern Africa” is seeking to understand the phenomenon of “progressive policy and regressive practice”. A third project entails communicating with the TIGER Project. The TIGER Project is an initiative of the European Space Agency and UNESCO to make satellite data available to institutions working in Water Resources Management in Africa.

4.5 To raise awareness with regard to the regional scale of IWRM among institutes and people active in this field

4.5.1. The WaterNet/WARFSA Symposium

Through its annual symposia, WaterNet has contributed to raise awareness about the multiple facets of IWRM. The WaterNet/WARFSA symposia (co-convened between WaterNet and the Water Research Fund for Southern Africa, WARFSA) have grown from humble beginnings of mainly WaterNet members to a significant gathering of educationist, researchers, water professionals, the private sector and other interested persons. Attendance at the symposia increased from approximately 45 participants in Maputo in 2000 to an estimated 180 in Windhoek in 2004. This growth in the popularity and size of the WaterNet/WARFSA Symposium was largely unplanned and is an indication of the visionary project that WaterNet is.

The WaterNet/WARFSA annual scientific Symposium has been held 5 times (Maputo, Mozambique in 2000, Cape Town, South Africa, in 2001, Dar es Salaam, Tanzania in 2002, Gaborone, Botswana, in 2003 and in Windhoek, Namibia, in 2004

IUCN realising the significance of the event, hosted a special Session at the 2003 Gaborone symposium dedicated to Water Demand Management. The potential of the symposium as an awareness raising occasion and an educational event has also been recognised by GWP-SA and a new symposium programme has been negotiated between WaterNet/WARFSA and GWP-SA to broaden the reach of the symposium in 2004 and onwards. The 2004 symposium has been organised with GWP-SA as a partner in order to bridge science, policy and implementation of IWRM. Furthermore, the 2004 Symposium included a workshop on “Prediction in Ungauged Basins” (PUBs) in collaboration with the International Association of Hydrological Science (IAHS) as well as a workshop on wetland management.

The number of scientific papers presented at the Symposia has increased steadily over the years, from some 30 papers in 2000 to 140 papers in 2004. Participants at the Symposia are not exclusively WaterNet members, but include WARFSA supported researchers, as well as scientists from Africa and beyond (Figure 5).

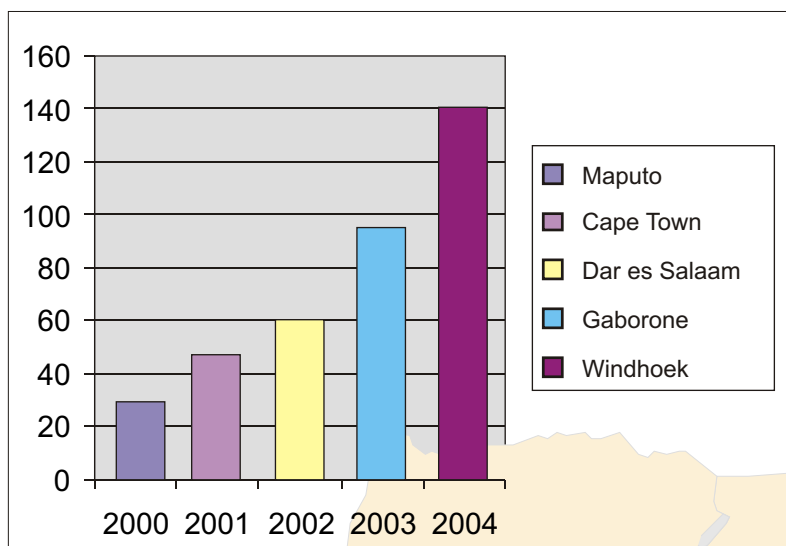


Figure 5. Increase in scientific paper presentations at the WaterNet/WARFSA Symposia from 2000 to 2004.

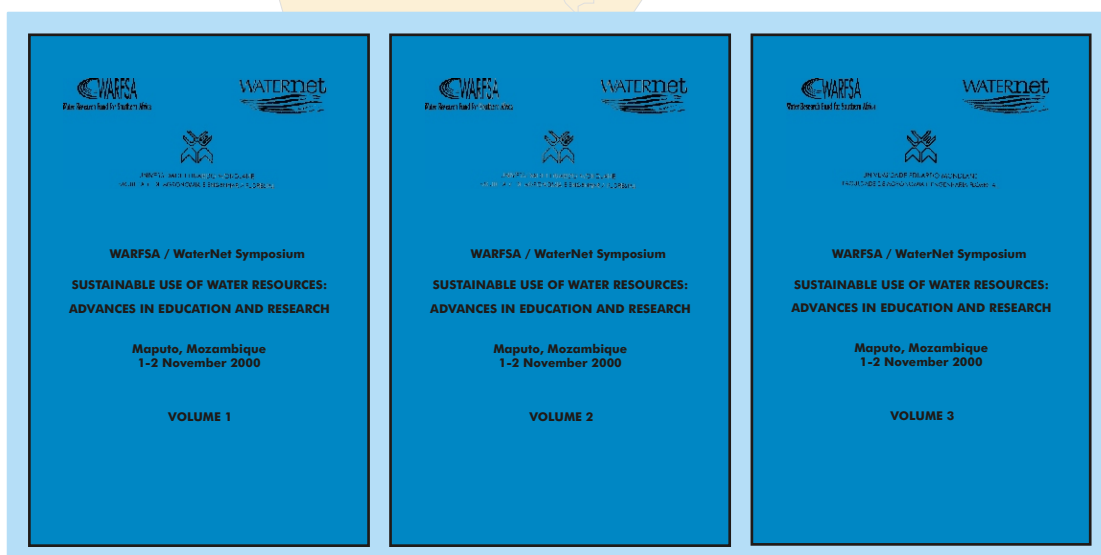
4.5.2. General outreach

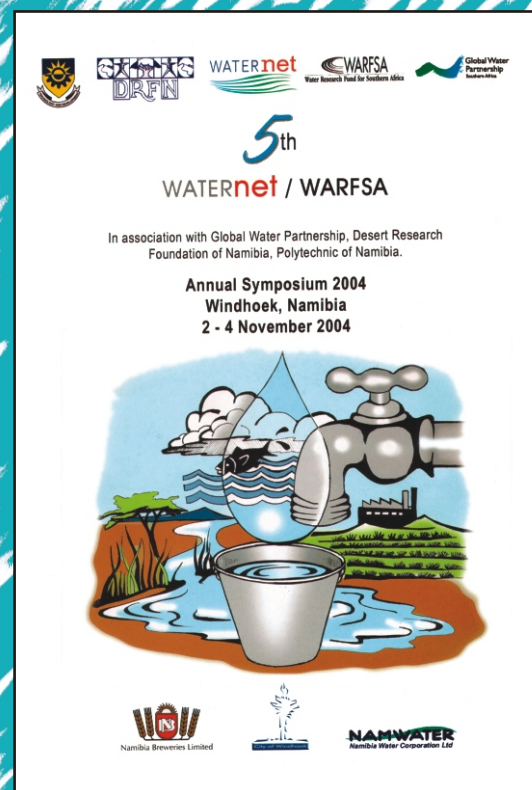
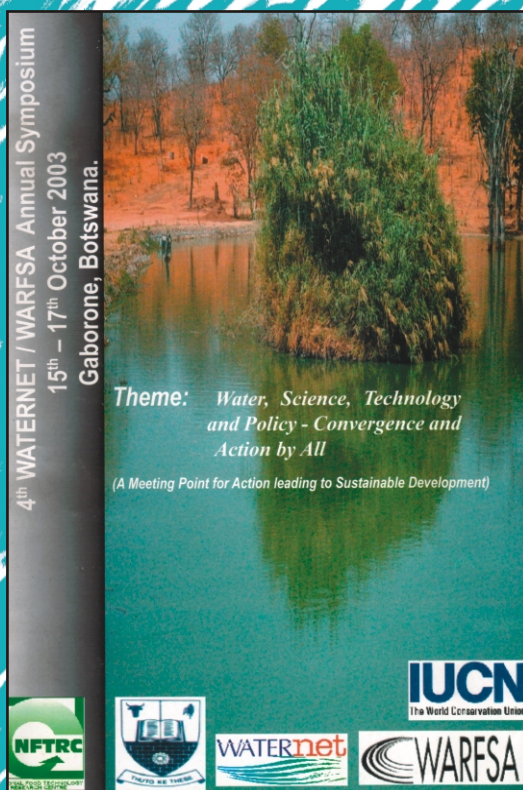
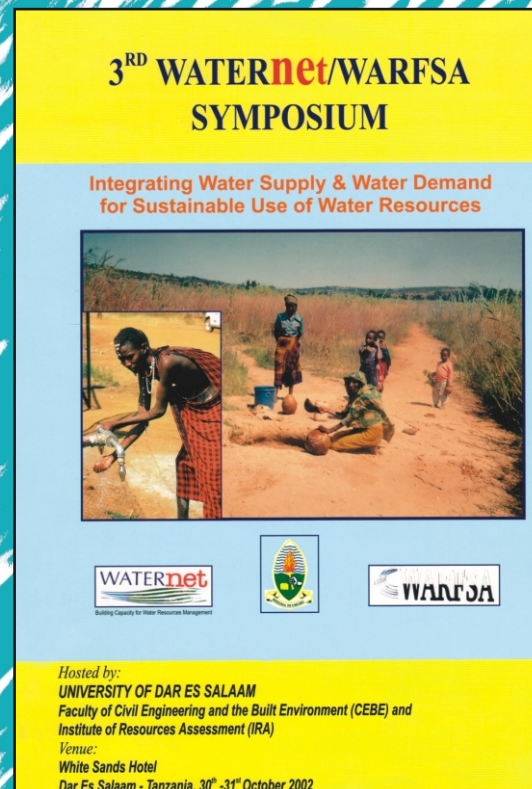
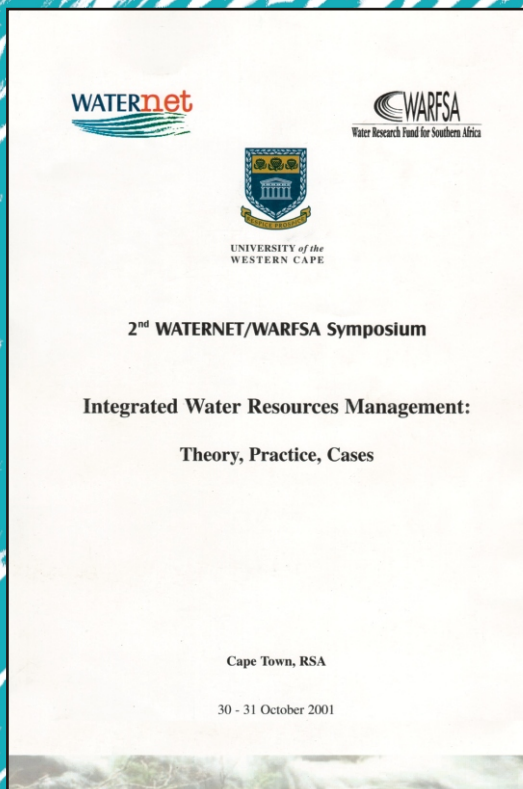
While WaterNet, in its core, is a network of higher learning institutions, it aims at being closely linked to the water sector in its widest context; professionals, scientists, managers, policy makers, and government institutions involved in water management. The key strategy to achieve this is through the close links to SADC Water Division and GWP-SA. Both these organisations serve on the WaterNet Steering Committee. GWP-SA, which is an association of stakeholders in IWRM in Southern Africa, constitutes a critical WaterNet partner, with which strong synergies are achieved (in linking the client side of water management with the supply side). Much remains to be done here though, in order to further improve on WaterNet capability to address the demands of the region.

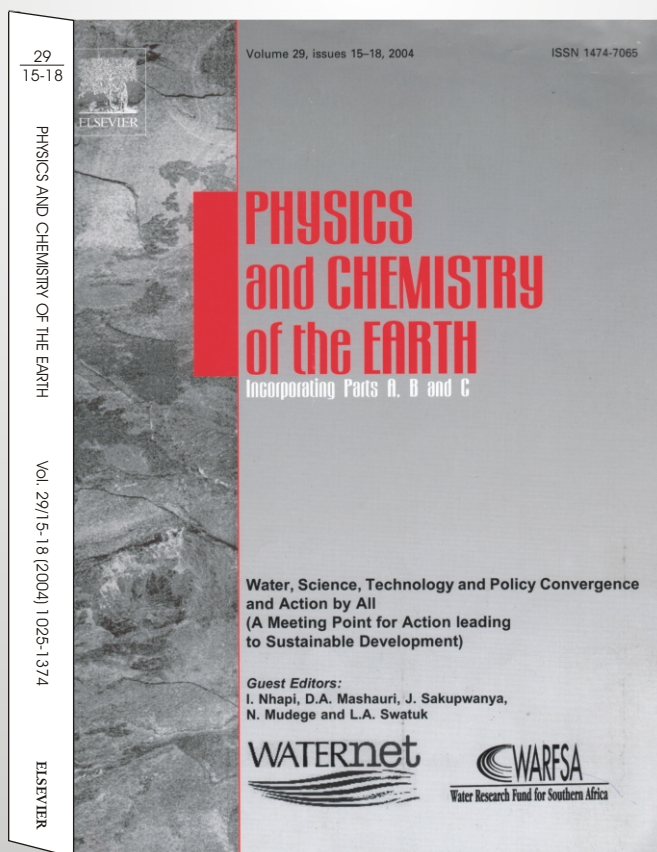
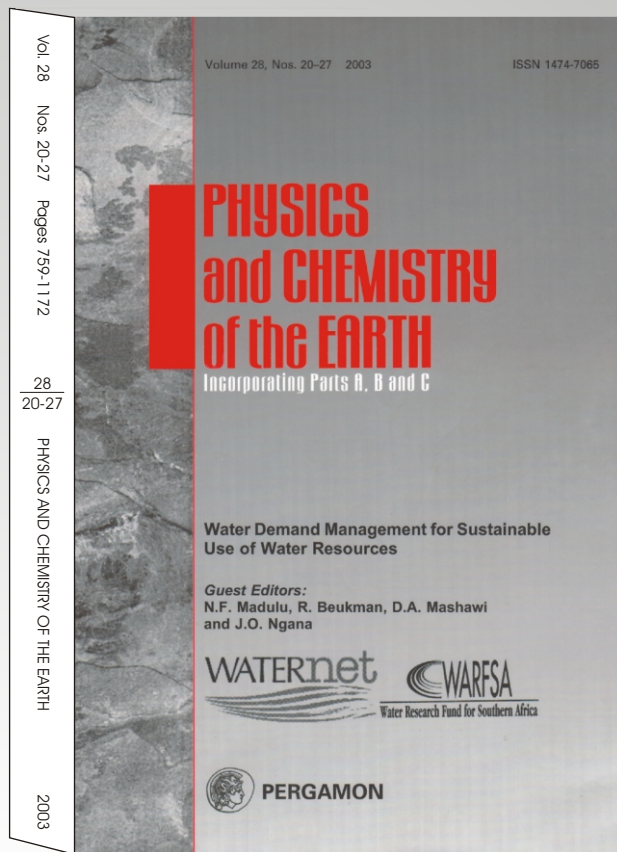
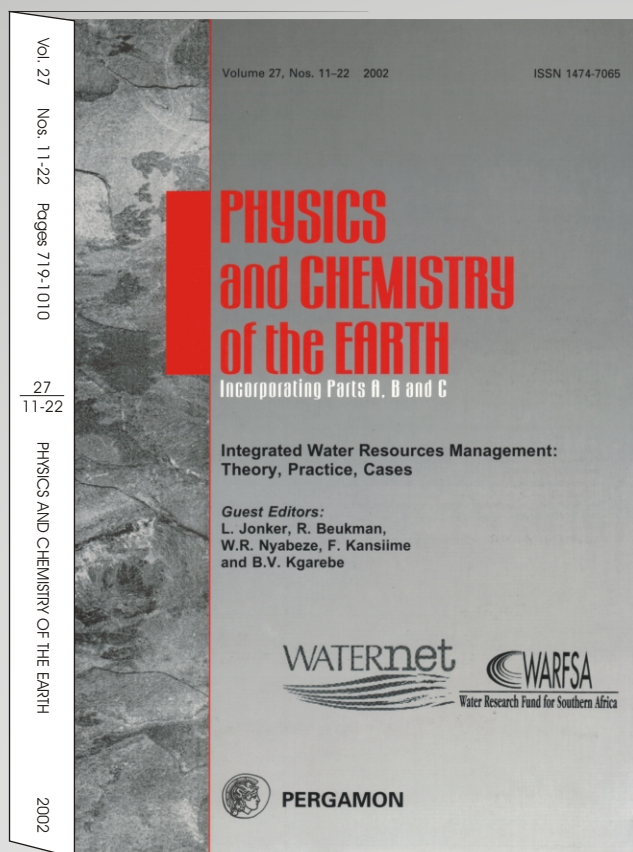
4.5.3. Information dissemination

The WaterNet website has until recently been the primary medium for the dissemination of information in electronic form. Since beginning 2004, three electronic newsletters has been compiled and circulated to members.

Since the Symposium held in Cape Town, the best papers of the previous year's symposium has been published in a special issue of an international peer-reviewed journal, *Physics and Chemistry of the Earth*. This is a highlight for WaterNet.







4.5.4. Participation in Workshops and exhibitions

To raise awareness regarding the regional scale of IWRM, the Secretariat participated in a number of workshops and exhibitions. The Manager attended two workshops hosted by the SADC Water Division, one on the midterm review of the Regional Strategic Action Plan and the other on the harmonisation of SADC country water policies. In both these workshops WaterNet could emphasise the regional nature of IWRM and through this support SADC in implementing the Regional Strategic Action Plan.

In August 2003, WaterNet shared a platform with the Institute for Water and Sanitation Development and GWP-SA at the Zimbabwe International Agricultural Show. In September 2004 Zimbabwe hosted the WARSH Fair, an exhibition and conference on Water Resources, Sanitation and Hygiene from 23 to 25 September in Harare. WaterNet presented papers and participated in the debates. Furthermore it was a useful platform for networking with a range of people from the region.

5. Conclusion

5.1 WaterNet A partner in Regional Development

WaterNet plays an important role in promoting IWRM in Southern Africa. WaterNet forms part of the SADC initiatives on capacity building in water management, and figures prominently among the Capacity Building and Training programs presented in the Southern African Sub-regional Action Plan to respond to the Millennium Development Goals (MDGs) and the outcome of the World Summit on Sustainable Development (WSSD) (Johannesburg, August 2002). This Sub-regional Action Plan on Water forms the sub-regional contribution to the initiatives of the African Ministerial Council on Water (AMCOW). The sub-regional action plan, in turn, has been developed from the SADC Regional Strategic Action Plan for Integrated Water Resources Management and Development (RSAP/IWRMD). The RSAP/IWRMD, which has been formulated through a consultative process, presents WaterNet as the SADC initiative on Capacity Building and Training in IWRM.



WaterNet displays at the WARSH Fair, Zimbabwe

5.2 WaterNet a Partner in Global Development

WaterNet is the first regional capacity building network in IWRM in the world. As such, Southern Africa has become something of a learning ground for similar recent efforts in West Africa, Latin America and Asia. WaterNet's close links to research, through the collaboration with its sister, the Water Research Fund for Southern Africa (WARFSA), and through own initiatives in research capacity building, has further strengthened WaterNet's regional and global reputation as an important vehicle to advance knowledge on policy and management in IWRM. WaterNet has been represented at the World Summit on Sustainable Development (WSSD) in Johannesburg, as an example of how to design and implement capacity building in water for sustainable development. WaterNet similarly has been part of the capacity building presentations in both the 2nd (the Hague, 2000) and the 3rd (Kyoto, 2003) World Water Forum. WaterNet is a co-convenor of sessions for Young Water Professionals at the Annual Stockholm Water Symposia in Stockholm, Sweden. WaterNet has similarly supported young water researchers from Southern Africa to present papers at the Annual European Geophysical Society (EGS) General Assembly in Europe.

5.3 WaterNet a partner in capacity building

The core initiative is WaterNet Masters programme in IWRM, where WaterNet through its Fellowship Fund (FF) has supported 83 students from 11 countries in the region. The additional WaterNet capacity building funds; the Nodal Strengthening Fund (NSF), the Staff Exchange Fund (SEF) and the Staff Development Fund (SDF), all offer staff at WaterNet member institutions a unique opportunity to build delivery capacity on IWRM (Annex 4, WaterNet Budget and Expenditure 1999 to 2005)). The jointly organised WaterNet/WARFSA Symposia (together with the Sida and Danida supported Water Research Fund for Southern Africa and Water Consultancy Fund for Southern Africa respectively, where researchers in the region are given the chance to share research advancement in various aspects of water resources management, is an additional key network quality.

While all of the envisaged WaterNet capacity building activities as described in the original plan are fully up and running, much work remains to be done. The Master programme, which has been offered twice in the Phase I (2003/04 and 2004/05), still requires substantial development. Course modules need continuous improvement, the overall programme requires a stronger quality control mechanism, mutual recognition of courses among host member institutions needs to be formalised, and capacity built among more member institutions in order to widen the institutional base. The professional training programme needs a concerted effort to be fully functional and collaborative research needs to be vigorously pursued.

These weaknesses will be addressed in Phase II since WaterNet is not a conventional network like among other networks that primarily focused on sharing information and network. WaterNet has instead put its emphasis on being a true partner in capacity building and development by establishing several windows of action deliverables.

Annex 1

List of WaterNet members (November 2004)

	Country	Institute	Member
1	Botswana	University of Botswana	Dept. of Geology
2		University of Botswana	Harry Openheimer Okavango Research Centre
3	Democratic Republic of Congo	National Centre for Research in Natural Science	National Centre for Research in Natural Science
4	Kenya	Institute for Meteorological Training and Research	Institute for Meteorological Training and Research
5		Jomo Kenyatta University	Department of Biomechanical & Environmental Engineering
6		University of Nairobi	Department of Meteorology
7	Malawi	University of Malawi Chancellor College	Dept. of Geography and Earth Sciences
8			Dept. of History
9			Dept. of Civil Engineering
10		Mzuzu University	Dept. of Geography
11	Mauritius	University of Mauritius	University of Mauritius
12	Mozambique	University Eduardo Mondlane	Dept. of Civil Engineering
13			Faculty of Agriculture
14	Namibia	Polytechnic of Namibia	School of Engineering
15			School of Natural Resources and Tourism
16		University of Namibia	Faculty of Agriculture
17		Desert Research Foundation of Namibia	Desert Research Foundation of Namibia
18	South Africa	International Water Management Institute	International Water Management Institute
19		University of Cape Town	Freshwater Research Unit
20			Centre for Conflict Resolution
21		University of Kwazulu-Natal	School of Bioresources Engineering and Environmental Hydrology
22		University of the Free State	Dept. of Soil, Crop & Climate Sciences
23		University of the Western Cape	Centre for Southern African Studies
24			Dept. of Earth Sciences
25			Integrated Water Resources Management Programme
26			Programme for Land and Agrarian Studies
27		University of the Witwatersrand	School of Civil and Environmental Engineering
28			School of Law
29		University of Zululand	Dept. of Hydrology
30	Swaziland	University of Swaziland	Dept. of Geography and Environmental Sciences
31	Tanzania	University of Dar es Salaam	Institute of Resource Assessment
32			Dept. of Civil Engineering
33			Dept. of Geography
34		Sokoine University of Agriculture	Sokoine University of Agriculture

List of WaterNet members (November 2004) (continued)

	Country	Institute	Member
35	Uganda	Makerere University	Institute of Environment and Natural Resources
36	Zambia	University of Zambia	Dept. of Civil and Environmental Engineering
37	Zimbabwe	Africa University	Faculty of Agriculture and Natural Resources
38		Chinhoyi University	Dept. of Environmental Science and Technology
39		Institute for Water and Sanitation Development	Institute for Water and Sanitation Development
40		National University of Science and Technology	Dept. of Civil and Water Engineering
41		University of Zimbabwe	Centre for Applied Social Sciences
42			Dept. of Civil Engineering
43			Dept. of Geography and Environmental Science
44			Dept. of Geology
45			Dept. of Soil Science and Agricultural Engineering

Supporting Members

1	Regional	Southern African Development Community	SADC Water Division
2	International	Global Water Partnership	GWP-SA
3	International	UNESCO	UNESCO-IHE Institute for Water Education
4	Netherlands	Netherlands Government	DGIS
5	Sweden	Swedish Government	Sida

Annex 2

Course modules in the WaterNet Masters Programme in IWRM

Preparation module	
1	English for Water Managers
Core modules	
2	Principles of IWRM
3	Principles of Hydrology
4	Socio-economic aspects of Water and Environmental Resources
5	Principles of Aquatic Ecology and Environmental Management
6	Water Laws and Institutions
7	Project
Specialisation 1: Water Resources Management	
8	Water Resources Analysis and Planning
9	GIS and Database Management
10	Catchment Management
Specialisation 2: Water and Environment	
11	Environmental Impact Assessment
12	Water Quality Management
13	Environmental Water Requirements
Specialisation 3: Hydrology	
14	Hydro-geology
15	Remote Sensing and GIS
16	River Engineering
Specialisation 4: Water for People	
17	Water Supply and Sanitation
18	Utility Management
19	Wastewater Management
Specialisation 5: Water and Society	
20	Water and Security
21	Environmental Education
22	Water and Development
Electives	
23	Conflict Resolution
24	Water Demand Management
25	Early Warning for Droughts and Floods
26	Groundwater Management
27	Water Resources Modelling

Annex 3

Student's Dissertation Topics 2003 Intake

University of Dar es Salaam

1. **Aliba Joseph:** Investigating the Impacts of Rainfall Variability on Water Resources Management in Usangi Catchment
2. **Chunda Chiluba:** The Potential for Area Performance Contracts Arrangements in the Context of Public- Public Partnerships in Zambia's Water Utilities. The case of Southern Province.
3. **Fredius Joseph:** Water Quality Management: A Preliminary Evaluation of Water Quality of the Thigithe River.
4. **Haidari Kassim S:** Effectiveness of Community Involvement in Management of Rural Water Supply and Sanitation Systems in Tanzania. The Case of Kasulu District Tanzania.
5. **Macharia Peter:** Characterization of Nairobi Industrial Discharges and Management Options.
6. **Masanja Chendela:** Water Management in Usambara Mountain Ranges.
7. **Mbuliro Milly:** Demand Responsiveness as an Approach Towards Sustainable Rural Water Supply in Uganda.
8. **Shayo Ezekiel:** Assessment of Community Participation and Legal Instruments in Conflict Management of Trans-boundary Water Resources. A case study of Lake Jipe in Pangani River Basin.
9. **Wachana Calistus:** Attaining Sustainable Urban Residential Water Use Through Water Demand Management. A case study of City of Nairobi in Kenya
10. **Yesse Simon:** Private Sector Participation (PSP) in Water supply and Sanitation Services in Dar es Salaam.

University of Zimbabwe

1. **Guzha Edward:** Community attitudes to ecological sanitation and effect of human excreta use on soil fertility, maize production and water productivity.
2. **Marisa Lovemore:** Reconciling traditional and modern institutions in water and environmental management: A case of Budzi Subcatchment Council.
3. **Mhangami Manager:** An investigation into the integration of water education into the environmental science curriculum at primary school level.
4. **Mthimkhulu Sindy Nkosisiphile:** Biological Assessment of the state of the water quality using the South African Scoring System (SASS): A case of the Mbuluzi River, Swaziland.
5. **Murata Rosemary T:** Access to water for Improved Rural Livelihoods: An investigation of the perspectives, experiences and strategies of orphans and other vulnerable children, OVCs. A case study of Insiza District Mzingwane Catchment.
6. **Mwale Juliet:** Gender mainstreaming in integrated water resources management: An assessment of decision-making processes in the Lower Manyame subcatchment, Zimbabwe.
7. **Nare Lerato:** Involvement of stakeholders in the water quality monitoring and surveillance system: The case of Mzingwane Catchment.

Annex 4

WaterNet Budget and Expenditure

September 1999 to March 2005

(in 1,000 Euro)	Budget	Spent					Total spent	End balance
		9/1999-8/2000	9/2000-8/2001	9/2001-12/2002	1/2003-12/2003	1/2004-3/2005		
Staff costs								
Interim manager/network advisor	654	137	168	218	147	155	825	
Experts and scientific backstopping	445	44	36	102	93	127	402	
Mid-term evaluation	18	0	0	0	2	0	2	
Network manager	116	0	0	0	50	68	118	
Network administrator	44	0	6	15	6	8	36	
Members conducting curriculum dev.	210	0	12	8	62	62	144	
Members to workshops	81	22	49	81	39	55	246	
SADC PCN23 Elaboration	0	0	0	19	0	0	19	
PCCP	0	0	0	5	0	0	5	
Reporting costs	9	0	0	1	0	0	1	
subtotal staff costs	1,577	204	272	448	400	474	1,798	-221
Investments								
Machinery & communication equipment	24	3	5	7	12	15	42	
Means of transport	25	0	0	17	8	0	25	
subtotal investments	49	3	5	24	20	15	67	-18
Consumables								
Nodal Strengthening Fund	136	0	20	11	40	49	120	
Motor car expenses	11	0	0	2	6	10	18	
Office costs WaterNet secretariat	185	6	8	10	13	30	66	
WaterNet brochures and newsletters	12	0	0	1	6	3	10	
Notary; chamber of commerce etc.	2	0	0	0	1	8	9	
subtotal consumables	346	6	29	23	66	100	223	123
Training and fellowships								
Staff Development Fund	468	0	0	48	10	0	58	
Staff Exchange Fund	295	0	35	26	38	36	136	
Fellowship Fund I (30 MSc)	272	60	112	52	5	0	229	
Fellowship Fund II IWRM taught part (45)	306	0	0	51	160	319	530	
Fellowship Fund III IWRM dissertation (30)	102	0	0	0	52	160	212	
Fellowships short courses	0	0	0	16	22	0	38	
Workshops (founding wsh and 4 symposia)	38	10	27	53	28	39	157	
subtotal training and fellowships	1,482	70	174	246	315	554	1,359	123
Total (excluding contingencies)	3,454	283	480	741	802	1,143	3,448	7
Contingencies	103	0	0	2	1	3	6	98
Grand total (including contingencies)	3,558	283	480	743	803	1,145	3,453	104

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