

# African Technology Policy Studies Network



## Science, Technology, Water and Environment in Africa

Report of the 2004 ATPS Annual Workshop and  
Conference held on November 29 - December 3, 2004

ADDIS ABABA  
ETHIOPIA

## LIST OF ABBREVIATIONS

ACTS	African Centre for Technology Studies
ATPS	African Technology Policy Studies Network
DFID	Department for International Development
DSS	Decision Support Systems
EIIPD	Ethiopian International Institute for Peace and Development
EPA	Environmental Protection Authority
HADAD	Horn of Africa Democracy and Development
IDRC	International Development Research Centre
ILRI	International Livestock Research Institute
MDGs	Millennium Development Goals
NBI	Nile Basin Initiative
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
R&D	Research and Development
SADC	Southern African Development Community
SME	Small and Medium Enterprises
SWCMTs	Sustainable Water Catchment Management Technologies
SWMT	Sustainable Water Management Technologies
TRIPS	Trade Related Aspects of Intellectual Property Rights
UN	United Nations
UNECA	United Nations Economic Commission Africa
UNESCO	United National Educational, Scientific and Cultural Organization
UNCTAD	United Nations Centre for Trade and Development
UNU/INTECH	United Nations University Institute for New Technology
WCMT	Water Catchment Management Technologies
WDDs	Water Development Domains
WTO	World Trade Organization

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## ABOUT THE AFRICAN TECHNOLOGY POLICY STUDIES NETWORK

The African Technology Policy Studies Network (ATPS) is a multi-disciplinary network of researchers, policy makers, actors in the private sector and other end users interested in generating, promoting and strengthening innovative science and technology policies in Africa. With a regional secretariat in Nairobi, the network operates through national chapters in 23 countries, with an expansion plan to cover the entire sub-Saharan Africa.

One of the objectives of the network is to disseminate research results to policy makers, legislators, the organized private sector, civil society, mass media and farmers' groups through publications, dialogue and advocacy. Among its range of publications are the Working Paper Series (WPS), Research Paper Series (RPS), Special Paper Series (SPS), Technopolicy Briefs and Workshop Reports.

ATPS is supported by a growing number of donors including the International Development Research Centre (IDRC), the Carnegie Corporation of New York, the Rockefeller Foundation, the World Bank, the OPEC Fund, Ford Foundation, Coca-Cola Eastern Africa, the African Development Bank, *infoDev* and the Royal Dutch Government.

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## TABLE OF CONTENTS

List of Abbreviations

Organization of Conference and Workshop	1
Background to ATPS' Mandate and Collaboration	3
Conference and Workshop Opening Ceremony	5
Conference Plenary Presentations	9
Panel Discussion on Science, Technology and Water Environment in Africa	23
Closure of Conference on Science, Technology, Water and Environment in Africa	26
The ATPS Workshop on Science, Technology, Water and Environment in Africa	27
The ATPS Annual General Meeting	30
Appendices	32
(i) Workshop Programme	
(ii) List of Participants	

# 1.0 ORGANIZATION OF CONFERENCE AND WORKSHOP

## VENUE, DATE OF CONFERENCE AND WORKSHOP

The 2004 Annual Conference and Workshop of an autonomous African Technology Policy Studies Network (ATPS) was held at the ILRI Campus in Addis Ababa, Ethiopia, from November 29 to December 3, 2004.

## SUPPORT FOR THE CONFERENCE AND WORKSHOP

The 2004 Conference and Workshop was organized by ATPS and hosted by the Ethiopian International Institute for Peace and Development (EIIPD).

## THEME OF CONFERENCE AND WORKSHOP

The theme of 2004 ATPS Conference and Workshop was “Science, Technology, Water and Environment in Africa”.

## OBJECTIVES OF THE CONFERENCE AND WORKSHOP

The objectives of the conference and workshop were:

1. To create a forum for science and technology policy scholars to interact and share ideas and knowledge with policy-makers and water administrators;
2. To provide conceptual and practical underpinnings to understanding water and environmental management with respect to behavioral change, resource-use and conflict, and how new knowledge can improve the situation;
3. To get a sense of the overall knowledge gaps in the sub-sector and how research and training can be used to address these gaps;
4. To share and learn how lessons from other regions of the world can be adapted in Africa;
5. To review funding proposals by researchers in the field of technology policy, water and environment;
6. To conduct an Annual General Meeting for ATPS.

## Expected Outputs

The expected outputs of the conference were:

1. An elaborate communiqué and plan of action;
2. Improved understanding of water-related issues among S&T policy scholars and policymakers in Africa;
3. Stronger partnership between researchers and policy-makers and administrators;
4. Edited conference proceedings with practical recommendations; and
5. An enriched ATPS program on water and environment.



## 2.0 Background to ATPS' Mandate and Collaboration

ATPS' programmatic focus is motivated by its mission to support research in science and technology, building capacity for research and policy analysis, and dissemination. However, in the current phase, the key concern of ATPS has been closing the loop through generation of new knowledge, outreach, knowledge brokerage, dissemination and advocacy in key thematic areas. This concern derived from both the evolution of Africa's development challenges as articulated in the Millennium Development Goals (MDGs), the resolutions of the World Summit on Sustainable Development (2000), the NEPAD framework and the belief that bridging the knowledge and technological gap between Africa and the rest of the world is key to Africa's global inclusion and prosperity. Similar concerns drive the program and agenda of EIIPD, and hence the auspicious collaboration.

One approach to meeting these development goals involves the use of science and technology to improve water and environmental management. This is particularly important because it has serious implications on food security, environmental health and common pool resource-use to resolve conflicts in Africa, all of which are prerequisite for growth and poverty reduction. Additional impetus for this has come from the Third World Water Forum in Kyoto (2003), the African Ministerial Council on water and from concerns expressed by senior policy-makers and development partners on the critical importance of improving water and environmental management in Africa.

The governance of science and technology is a critical area often ignored in the search for new knowledge in Africa. The assumption that new technology and new organizational forms will appear at the right time, at the right price and as preferred by stakeholders, may be misleading. In reality, market and institutional failure, inappropriate pricing, lack of knowledge, asymmetric information and risks affect the adoption of cost-effective technologies that are environmentally friendly.

Innovative science and technology policies are required to promote the generation, adoption, adaptation and use of environmentally friendly technologies that conserve water and improve economic activities that affect the quality of water catchments. In fact, Agenda 21 (1992 Earth Summit, Rio de Janeiro) stated explicitly that innovative technologies, including indigenous technologies, will be needed to fully utilize the limited water resources and to avert water pollution.

### THE ATPS PROGRAM ON WATER AND ENVIRONMENT

The ATPS program on water and environment is designed to utilize the Network's areas of expertise which are knowledge exchange, knowledge brokerage and advocacy. Emphasis is placed on knowledge sharing at various levels primarily through:

1. Joint research, training activities and deliberative workshops between African researchers, relevant government institutions and responsible water management authorities and international researchers and institutions involved in sustainable water catchments management.

2. Stakeholder and public participation events to share knowledge among researchers, government agencies and the public to encourage ownership of technology policies that result from the research and participatory exercises.

The main objective of the program is to enhance the generation, use and communication of knowledge in driving environmentally sustainable use of water resources in Africa. Pursuant to the main objective, ATPS brokers and enhances the use of knowledge from partners both in and outside Africa to meet Africa's and NEPAD's goals, and Millennium Development Goal 7 in pursuance of environmental sustainability and sustainable peace and security in the region.

The specific objectives are:

- i. To improve water management and conservation for poverty reduction;
- ii. To enhance the capability of the water and sanitation governance and delivery institutions in meeting their service delivery objectives in selected key countries;
- iii. To induce attitudinal and behavioral changes with respect to sustainable water and environmental management at various levels;
- iv. To harmonize national and regional water Acts and environmental Acts and policies to avert potential cross-border conflicts;
- v. To enhance knowledge exchange and collaboration between the different water stakeholders in Africa; and
- vi. To generate new knowledge and build capacity for efficient water management.

Exploring new technologies to manage non-point pollution from agricultural-production processes such as livestock to leather, horticulture, fishing and wood products, among others, are central to ATPS' Program on Water and Environment. It will also be necessary to examine the institutional arrangements set up to manage the water-environment nexus, the learning process in these institutions, and the role of ICTs in improving their effectiveness and delivery of services to the poor. An interesting and unique dimension to this work will be an examination of whether greater openness or democratic space affects the ability of African farmers, workers and civil society to influence the management of water and the environment, and hence the technology deployed in the process, and how the adoption or lack of adoption of simple water technologies by the farmers affects their capacity to, in turn, influence the democratic process.

### 3.0 CONFERENCE AND WORKSHOP OPENING CEREMONY

#### WELCOME ADDRESS BY THE NATIONAL CO-ORDINATOR, ETPSA

Dr Dejene Aredo, the National Co-ordinator of ATPS Ethiopia Chapter welcomed guests and participants to the talks, saying the conference was unique in its attempt to bridge the gap between technology and natural resources. The conference would be followed by capacity building efforts that would contribute to Africa's development. The scientists and scholars, he said, would enrich the deliberations and thus motivate young and upcoming scholars to find solutions to Africa's water management problems. He thanked members of his association and EIIPD for contributing enormously to the hosting of the conference. He also praised ILRI for support.

#### REMARKS BY THE ATPS EXECUTIVE DIRECTOR

Dr Osita Ogbu, the Executive Director, ATPS, told the gathering the bane of Africa's developmental crisis is knowledge dependence. Africa's inability to act decisively led to pervasive poverty. Yet, the continent enjoyed a wealth of intellectual capital. African governments, he said, often lacked the will to deploy the intellectual capital of her people, and African intellectuals themselves are quick to overlook local problems. Many engage in knowledge generation that boosts their credentials internationally in response to an intellectual tradition that rewards conformity with the Western notions and knowledge standards. This worsens Africa's crisis as Africa's problems are tackled with ideas from Western capitals in the name of global knowledge. Dr Ogbu stressed that knowledge transfer could only be effective with the guidance of local intellectuals who must repackage knowledge to suit the socio-cultural environment.

He urged African experts working in the field of water and the environment to take charge when working with international partners to avert "a catastrophe" on the continent. The speaker conceded that science and technology advances local knowledge, improves capacity and enhances learning and called on Africans to address the knowledge-water-environment nexus as a way of addressing poverty on the continent. To succeed, a holistic approach to poverty reduction must be taken, situating water and environment management in the context of livelihood, economic, political and social security.

Dr Ogbu argued that in view of the cross-boundary nature of the issues, knowledge generation and transfer must also have a regional dimension using existing institutions to harmonize understanding and perspectives essential for mutual co-existence and peace. Knowledge transfer exercises targeted at both national and regional institutions will enhance capacity to learn and adapt to changes.

He thanked the management and staff of EIIPD for supporting ATPS in the organization of the conference and the Ethiopian people for warmly receiving the guests and participants.

## REMARKS BY THE CHAIRMAN, ATPS

Professor Norah Olembo, the Chairman, ATPS, underlined the importance of the conference, noting that water is key to life. Despite this realization, she pointed out, water resources in Africa were being recklessly destroyed, she said, predicting that the next wars would be fought over water because a major share of the continent's water resources are in a few large basins such as the Congo, Niger, Nile and Zambezi.

The 47 countries comprising sub-Saharan Africa depend more on their natural resource base for economic and social needs than any other region in the world. Two-thirds of sub-Saharan Africa's people live in rural areas and rely on agriculture and other natural resources for income. However, the environmental resource base is rapidly shrinking as a result of water pollution, deforestation, loss of soil fertility and a dramatic decline in bio-diversity in the region.

In Africa, long-term poverty reduction and sustainable economic growth are being undermined by the increasing scarcity of freshwater, the over-exploitation of coastal ecosystems and fisheries, the loss of forest cover, and loss of biological diversity. Other consequences are loss of genetic species and long-term changes in the earth's climate. Prof Olembo called on Africans to demand that their governments address the problems of environmental degradation and depletion of water resources as the leaders are already sensitized well enough.

Although the water sector requires significant attention because it is closely related to the environment and natural resource base, institutional, economic, legal capacities, and most importantly, the governance of science and technology of most governments in the region, remain ill equipped and under-funded to deal with environmental problems.

While strategies have been drawn, policies formulated and constraints identified on water management, more effort needs to be put on co-ordination. International and inter-sectoral approaches that recognize inter-linkages between nations, and between such sectors as land and water, agriculture and water, technology and water, health and water, gender and water need to be consolidated.

No single mechanism or fragmented approach will be enough. Policy packages using a mutually reinforcing matrix of institutional and policy reform and legal and economic management instruments are required. She stressed ATPS' commitment through its programme on water and environment to bridge the knowledge and technological gap between Africa and the rest of the world by "closing the loop through generation and advocacy in key outreach, knowledge brokerage, dissemination and advocacy in key thematic areas".

## KEYNOTE ADDRESS BY THE DIRECTOR GENERAL, EPA

*The keynote address was delivered by Dr. Tewolde Gebre-Egziabiher, the General Director of the Ethiopian Environmental Protection Authority (EPA) who also officially opened the meeting on behalf of Ethiopia's Minister for Water Resources, H.E. Mr Shiferan Jarso.*

In a paper titled "Genetic Engineering, Bio-diversity and Africa," the speaker discussed the elements that make genetic engineering appealing, particularly the imperatives of survival and reproduction for humans. He further raised the common reactions elicited by arguments on the potential of genetic engineering – including the awkward issues relating to the possibility of self-engineering as solutions to the poverty and death risks that men face today. Dr. Tewolde also discussed in significant detail the likely impacts of genetic engineering and observed as follows:

1. Research and development in modern biotechnology is associated with risks to health and to bio-diversity and the environment. Negative impacts may take decades or longer to be noticed.
2. Socio-economic impacts are, on the whole, long term, and predictions on the likely impacts of the young modern biotechnology necessarily lack empirical data. Some impacts, however,

can be felt in a few years. It has, for example, been reported that the introduction of GE crops into Argentina has pushed many smaller farmers out of agriculture altogether.

3. Research and development and modern biotechnology and bio-safety are not highly equipment-intensive. Thus modern biotechnology need not be very expensive. But it requires large numbers of well-trained scientists. As such, it is within easy reach of developing countries which have low capacity for capital-intensive innovations.
4. Developing countries have not taken seriously the training of bio-technologists and bio-safety experts.
5. Venture capital needed for research and development in modern biotechnology and in bio-safety, though not enormous, takes a long time before yielding returns. In developing countries, only public (government) funding can be expected to be available for it; the small private businesses are unlikely to make such long term investment.
6. The initial promoters of modern biotechnology in industrialized countries were public (government) institutions and small-scale enterprises.
7. In the industrialized countries, governments have been withdrawing from R&D in modern biotechnology and leaving it to the private sector. Oversight over the safe applications of biotechnology has been weakened now that governments leave biotechnology to the private sector.
8. The seed and chemical industries of developing countries have recently tended more and more towards being controlled by transnational corporations. To globalize this, patents and patent-like breeders' rights are being universalized through the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPs) of the World Trade Organization (WTO). Implementing TRIPs is expensive. Worse still, it means that developments in biotechnology in developing countries will also be controlled by the corporations that have already patented the promoters, terminators, vectors, constructs and even many of the genes used in genetic engineering R&D.
9. Biotechnology R&D has mostly focused on producing specified commodities, especially drugs for industry and for the health service through transgenic crops or even animals or through bioreactors, which use enzymes, tissue culture or transgenic microorganisms.
10. Some of the transgenic plants have been given the capacity to grow outside the environmental settings of their non-transgenic counterparts. When transgenic crops are produced outside the normal latitudinal environmental ranges of the species and exports are affected, the farmers in their areas of origin in developing countries may reduce, or even stop, cultivating the crops. This would result in severe genetic erosion. Besides, with the loss of their livelihood, these farmers will have no choice but to search for alternative incomes. This usually ends up in deforestation, over-fishing, over-hunting, and other types of destruction of bio-diversity and the environment.
11. Through the introduction of specific traits, any organism can be engineered to yield any biochemical products. The inevitable result would be globally scattered, living factories impossible to switch off. Through enzyme technology, many products can be changed to other products. This makes plants, animals, and microorganisms in the bioreactor interchangeable as commodities. This will blur the boundary between agriculture and industry, between the farm and the factory. As interchangeability of sectors and products increases, there could be an excessive presence of some chemicals and shortage of others in the biosphere. This could usher in a new form of pollution. It could, in particular, seriously disturb the balance of microorganisms in the environment and thus the whole of the biosphere. Coupled with the increasing human population and the transformation of a substantial component of the world's biomass into human biomass, the consequences could be disastrous for all life. How should we apply the Precautionary Principle?
12. This blurring of differences among commodities means a possible loss of market for traditional agricultural products, especially from the developing countries.

13. On the other hand, it gives developing countries, which have low labour costs, an advantage in producing in their farms as commodities, products which are now being made through complex chemical processes in capital-intensive factories in industrialized countries.
14. In industrialized countries, seed, chemical, and biotechnology companies have been merging or are being bought out and transnational corporations tend to have activities in all three sectors. In both developing and industrialized countries, transnational corporations, to the exclusion of both governments and national entrepreneurs, are controlling whole systems starting from the laboratory and leading to the retail floor. The impact is greater on developing countries. Neither national, nor international law seems willing or able to develop antitrust capacity to break up these trans-sectoral chain monopolies.
15. Attempts at correcting human genetic defects through genetic engineering (gene therapy) are increasing. This raises many questions on ethics and the future of human evolutionary trends. Can humanity really direct its own evolution?
16. Attempts at influencing the population dynamics of wild species are taking place. The ecological impacts, especially of transgenic long-lived trees, may take centuries to show. What should be our strategies of applying the Precautionary Principle? Or, should we give up the Principle?

Dr Tewolde also attempted to answer the question whether or not products of genetic engineering are safe to use. He tended to conclude that they are not, going by the processes followed in genetic engineering and the nature of those behind the activity. The speaker also contested the commonly-held belief that genetic engineering produces more food, arguing that the assertion had not been proved. He blamed poverty and poor crop yields on unjust local and global governance, saying failure to adopt genetic engineering technologies had nothing to do with the problems. He quoted Martin Khor who estimated the flow of financial resources from the poor to the industrialized countries to be \$ 619.2 billion in 1992. In the same year, Agenda 21 estimated that developing countries needed an annual development aid of \$125 billion, i.e. less than one quarter of what flowed away from them.

If they had cut themselves off from the industrialized countries, the speaker argued, they would have been developing four times faster than Agenda 21 envisaged. They did not. In any case, they could not, and they should not. Said Dr Towolde: "The Earth belongs to us all, and making it more just is what is appropriate, not splitting it. The aid that Agenda 21 envisaged did not come to the developing countries. But, the money that flows away from them has continued to grow in the name of free trade. In current free trade, it is not the traders that are free to transact the trade; it is the abstraction called transaction that is free to land on them and force the money and the goods out of them."

Further, he said the mechanism for effecting free trade that directly affects genetic engineering and food production is the rule of patenting made compulsory by the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPs) of the World Trade Organization (WTO). Together, developing countries have only 0.2percent of the world's patents. Even these include patents protected in them by companies of the industrialized world. Africa has even fewer patents, amounting to a mere 0.02percent of the world total. Patenting living things, their parts or components is, in fact, detrimental to developing countries since it leads to the direct control of their agriculture by locally insensitive transnational.

### Issues Arising from the Keynote Address

1. Dr Osita Ogbu underscored the need to discuss genetic engineering more seriously than was happening in Africa. He pledged that ATPS would keep the debate on genetic engineering alive in order to raise and discuss the pertinent issues clouding it more exhaustively. He called for ways of indigenizing knowledge to make it relevant to African situations, arguing that knowledge, unlike information, could not be bought. He further underscored the

importance of understanding the culture and values of African peoples as a prerequisite to rooting development on the continent.

2. A Ghanaian participant pointed out that the keynote was pessimistic on the ability of genetic engineering to help solve Africa's problems. He argued, however, that genetic engineering could alleviate poverty if the continent's governments understood the role of GE and involved the private sector in it in the same way governments in the developed countries had done.
3. Chris Squire of Sierra Leone wondered from what point Africa would begin the fight that would make genetic engineering useful to the continent's development considering the region has just emerged from the slave trade.
4. Dr Kevin Urama from the United Kingdom conceded that genetic engineering tended to be a contributor to Africa's pervasive poverty. He tickled participants by suggesting that genetic engineering be carried out on human thinking to end the kind of problems currently facing Africa.

### Dr Tewolde's Response to Issues Raised

Dr Tewolde said in response that the starting point in making genetic engineering useful would be to make African governments listen to their own scientists and experts. This should be done with a view to promoting the African interest in much the same way developed countries have put their own interest to the fore when discussing or adapting genetic engineering technologies. However, more fundamental questions arose on how to deal with issues already in the ambit of an international regime. Some countries, he pointed out, were already contesting against WTO maneuvers that stifle trade from the poorer world.

On the issue of engineering human beings, the speaker called on participants to keep a "respectable distance. No, I would not want ourselves to modify ourselves."

## 4.0 CONFERENCE PLENARY PRESENTATIONS

### 1. KINFE ABRAHAM

#### *IMBALANCE IN WATER ALLOCATION, STABILITY AND COLLABORATION WITHIN THE NILE BASIN*

The paper was presented by Professor Kife Abraham, the President of the Ethiopian International Institute for Peace and Development (EIIPD) and the Horn of Africa Democracy and Development (HADAD) international lobby. He traced the imbalances in allocation and use of water resources among the Nile basin's riparian countries – Ethiopia, Kenya, Uganda, Tanzania, Rwanda, Burundi, the Democratic Republic of Congo, Sudan and Egypt and demonstrated the disproportionate allocation and use of the Nile resources by Sudan and Egypt and the almost insignificant exploitation of the resources by the Upper Nile riparian countries whose use of the river was confined mainly to hydro-electric generation. The speaker showed that Egypt had made greater use of the river than all other riparian countries combined in spite of the fact that 86 percent of the Nile waters originated from Ethiopia and the remaining percentage from the Upper riparian countries. Egypt's and Sudan's dominance in allocation and use of the Nile resources, he pointed out, is traceable to treaties spearheaded by Britain during the colonial era. The treaties excluded other countries despite the fact that they too would have benefited from the resources.

He traced the extent of exploitation of the Nile resources in each country, submitting that failure to reach an amicable solution to the use of the Nile by all riparian countries would lead to conflict between the main beneficiaries and the countries that had been left out. Efforts at resolving the potential conflict and possibly war over the Nile should be geared towards drafting an accord on allocation and use of the river predicated on international principles, the needs of the riparians and a sense of collaboration and mutual understanding.

Prof. Kife pointed out that at present, the hurdles to a negotiated agreement on the allocation of the waters of the Nile revolve around:

1. The mood of distrust and suspicion surrounding the allocation and use of the Nile.
2. The historical inability of Ethiopia and the Sudan to make credible commitments to Egypt due to their past domestic situations.
3. Sudan's problems of the recent past which deprived it of a competitive edge in negotiations.
4. Egypt's reluctance to make concessions without the assurance that such concessions are worth the domestic political price. These problems have prevented it from halting its desert reclamation program.
5. The capitalization of Egypt on its military power.
6. The lack of qualified hydrological experts in the upstream countries with knowledge and the technical knowhow relating to the Nile which are valuable for negotiations.



7. Lack of database on the above and fear of being outmanoeuvred by the Egyptian team of negotiators which include knowledgeable engineers and diplomats
8. Lack of dialogue among all riparian countries.
9. The adverse effect of propaganda on the mood of negotiations and
10. The conflict of interest stemming from other sub-regional issues and interests.

The presenter offered the following measures to offer a long-term solution to the Nile impasse:

1. Breaking the silence over the Nile by confronting the issue candidly, openly and with a desire to find a solution that takes stock of the needs and anxieties of all concerned. The magic words in such deliberations would be mutual trust, concern and transparency and experts would provide many insightful clues on how the issues of equity and efficient utilization should be addressed.
2. Availing water to countries that do not get any.
3. Considering equity in the distribution of the resources of the Nile. This should be augmented by other water management efforts endorsed by all riparian countries
4. Looking afresh at how a new Nile accord should look like. For instance, according to Dale Wittington, John Waterbury and Elizabeth McClelland, the future accord should be predicated on “expanding the usable yields, encouraging interdependencies and allocations of water rights.” This should also include, “provisions for apportionment of water, especially in times of scarcity and the establishment of principles to guide this.” The authors further argue, “Nile water management is not strictly a zero-sum game.”
5. Making efforts to increase the long-term yield of the Nile and drafting an agreement to ensure that such possibilities are fully exploited. The most promising possibility is the construction of the Blue Nile Reservoirs in Ethiopia. The cooperative venture should be based on comparative advantages of benefits to all riparian countries. For instance, one of the numerous advantages of such reservoirs is that they would enable over-year storage to be shifted from the Aswan High Dam Reservoir so that evaporation losses are significantly reduced. In the upper Blue Nile region, evaporation rates are approximately 50 percent of those in the Sudan and Egypt. Reductions in evaporation loss would be realized both through lower evaporation rates and lower surface-to-volume ratios in the canyon sites of the Blue Nile Reservoirs.

The presenter further made proposals on the tone and spirit of a Nile accord, suggesting it should:

1. Recognize the characteristics of the Nile issue as part of the socio-political, cultural and emotional history of Egypt, Ethiopia and the Sudan;
2. Raise awareness of the Nile as the basis of the physical survival of Egypt;
3. Take cognizance of the Nile as the central symbol of Egypt’s national cohesion, particularly in times of conflict;
4. Realize the fact that the Nile is the key pillar of Egypt’s foreign policy;
5. Appreciate the positive achievements and measures taken by Egypt to improve the total water resources of the basin;
6. Free the Nile from becoming a hostage of short-term government policies and politics;
7. Create appreciation of the real issues at stake. This includes realizing that the bones of contention reside in the Egyptian assertion of “historical right” and Ethiopia’s demand for ‘equity’;
8. Recognize that neither the claim of historical rights nor arithmetic justice alone can be a good basis for compromise;
9. Seek a middle ground. From Ethiopia’s point of view, the rationale for this is that ‘bad justice is better than no justice’;
10. Recognize that environmental depletion in Ethiopia implies a reduction in the volume of Nile water. This will affect the proportion of water reaching Egypt;

11. Raise the awareness of all riparian states that too much 'short-termism' does not augur well for future collaboration. In fact, excessive short-termism could have dire future consequences;
12. Persuade international financial institutions to have a long-haul perspective which encourages investment in the environment, irrigation as well as soil and water conservation projects. Fortunately, this has already begun via the Nile Basin Initiative (NBI);
13. Convince financial institutions that loans destined for investment in less vital sectors in the riparian countries are counter-productive for all involved;
14. Jointly explore and identify mutually beneficial projects. This may include the production of hydro-power which is of great significance to meet the rising energy demands of all riparian states;
15. Make serious efforts to sensitize the riparian countries about the risks of unilateral action by any one of them;
16. Make attempts not to Middle-Easternize the Nile;
17. Consider the food security challenges of the different countries and look at the comparative advantages of each country for food production in the context of a basin-wide food security arrangement;
18. Realize that the Nile is an intensely emotional issue for Egypt, the Sudan, Ethiopia and the other riparian countries, though in varying degrees;
19. Make attempts to deal with the Nile with less passion and more rationality and balance;
20. Analyze the Nile issue and arrive at an honest recognition of the sticking points via the establishment of a regime of ownership, user rights and the balance between need and distributional justice;
21. Recognize that a prolonged impasse over the Nile is counter-productive to all riparian states. In this context, one should be aware of the fact that 'a problem postponed is not a problem solved';
22. Understand that in the long run the status quo is not tenable;
23. Realize that the Nile requires a sober recognition of the value of the peace dividends that can be derived from an early agreement by way of opening avenues of constructive cooperation;
24. Pursue the motto 'if you want to prevent war strengthen peace';
25. Recognize that the Nile is a case of latent conflict and not an active one. Thus, there is a reward to the foresight of making all attempts to prevent its escalation to an open conflict; and
26. Show all concerned that a protracted conflict over the Nile will only prove the medical dictum, "The operation was successful but the patient died." This also implies that the means do not always justify the end.

### Issues Arising From the Presentation

#### 1. Comments from the Discussant

The paper's discussant was Prof M. C. Madukwe who pointed out that the paper had clearly shown 86 percent of the Nile waters come from Ethiopia, which hardly benefits from the river's enormous resources. The paper also showed there were blatant imbalances in allocation and use of the Nile by, to a large extent Egypt, and to a lesser extent, Sudan, at the expense of other Nile riparian countries. He noted treaties enacted by Britain in the colonial era had put the upper Nile riparian countries in a disadvantage and pointed out that the paper had identified such issues as population size and growth as important bases for addressing the imbalance. The paper had also strongly called for a new agreement and a partnership on the sharing of the Nile resources in order to end the monopoly of the use of the Nile by the lower Nile riparian countries. He observed that Prof. Kinfe had underscored the use of diplomacy, consultation and collaboration in order to avoid unilateral action by any country. The speaker, the discussant said, had further maintained that any conflict on

the ownership of the Nile would adversely affect the environment whose consequences would be reduced rainfall, among others. He noted the speaker had advocated a peaceful resolution of the conflict.

2. Comments from participants

- i. A participant said Egypt's unilateral decision to use the Nile to irrigate the Sinai smacked of arrogance and that it displayed a lack of respect for other riparian countries. He proposed the invocation of an economic principle where Egypt pays for what Ethiopia loses, considering the latter contributes 86 percent of the volume of the Nile. "There should be compensation for what we are losing".
- ii. A participant cautioned against banking on "collaboration", arguing it had led countries such as Ethiopia nowhere. He submitted that the term was a diplomatic nicety used to pay lip service to the potential conflict surrounding the Nile resources.
- iii. (Another participant wondered what harm dams build in Egypt caused to the upper Nile riparian countries.
- iv. Yet another participant sought to know what incentives were being offered to Egypt to agree to discussions on an equitable distribution of the Nile resources.
- v. A participant submitted that all indications were that no meaningful discussions had taken place between Egypt and other Nile water stakeholders. He proposed involvement of the African Union or the International Court of Justice.
- vi. Still a contributor sought to know how Ethiopia and other upper Nile riparian communities were obliged to honor treaties that were signed without their involvement or approval.

3. Responses from the Presenter

- i. The speaker stressed the importance of pricing water in the world, especially in areas where water had become scarce. A critical point to consider at all times, he said, is the centrality of livelihoods. Once the issue of livelihoods is addressed, exportation of the commodity may be considered. The more scarce the water, he said, the higher its value.
- ii. The Camp David Accord had led to the development of the Sinai desert as a way of creating an economic buffer that would stem the war in the Middle East, he said.
- iii. The waters of the Nile should be apportioned with justice, he further said. Diplomacy is the certain course for a win-win situation.
- iv. There is anxiety, often unfounded, that if water is harnessed at the source of the river the volume going down may be reduced. Apportionment agreements would dispel such anxieties and lead to improved use of the resources, he submitted.
- v. The incentive to Egypt to agree to discussions on the sharing of the Nile water resources with other riparian countries, he said, would be apportionment.
- vi. The United Nations, he said, is working on conventions that would support protection of water resources and the environment
- vii. Previous Egyptian governments have been unwilling to discuss the equitable sharing of the resources of the Nile. The critical challenge has been to change the mindset of people and governments to see that an amicable solution to the latent conflict would benefit all.
- viii. There is an urgent need to demystify the problem of the Nile by bringing it to the table for discussion and resolution, he said. Diplomacy, he submitted, is the way out.

2. KRISHA PRASAD AND SELESHI B. AWULACHEW

*MANAGING CONFLICTING PRIORITIES THROUGH COLLABORATIVE DECISION-MAKING FOR INTEGRATED RIVER BASIN MANAGEMENT: APPROACHES AND CHALLENGES*

This paper was prepared by Krishna Prasad and Seleshi B. Awulachew of the International Water Management Institute and sought to address the principles and methodologies to be used for integrated river basin management. The paper offered a methodological approach for integrated river basin management for Africa, drawing on lessons and experiences from the Olifants River Basin in South Africa. They said in the last decade the management of water resource development in Africa had tended to focus on meeting human needs, distribution equity, sustainable use of water, facilitating social and economic development and protecting ecology and biodiversity. The focus also was on preventing pollution and environmental degradation, meeting international obligations on water sharing, enhancing safety of water infrastructure, managing water crises and institutional development of stakeholders, among other concerns.

The central concern, they said, has been maximizing economic and social development through improved management of water resources, without compromising the sustainability of vital ecosystems. The presenters observed that any water management activity has major social, development, ecological, biodiversity, environmental and economic impacts on other directly or indirectly related activities – and a holistic approach must, therefore, be taken on resource.

To address the challenges, water resource managers use computer-based tools, including databases and geographical information systems and simulation modeling technologies. There are also decision support systems (DSS) to support decision-making in complex situations. The DSSs are useful in integrating state information on water at all times, in processing of information showing, for example, the principles governing water behavior, and evaluating plans on water management. The presenters gave six types of DSSs in water resource management: watershed models, surface water quantity models, surface water quality models, ground water models, economic models, and social models.

Use of DSS for integrated water resource management, it was pointed out, is common in successfully managed water basins in the world such as the Murray-Darling river basin in Indonesia, and the Colorado river basin in the United States. The system was being given attention in South Africa, Botswana, Tanzania, Kenya and the Nile Basin countries.

The presenters noted that several decision support systems developed in Africa and elsewhere had failed to address the social-economic effects of water management efforts. To address the shortcomings the Olifants River Basin, South Africa developed a methodology for improved decision-making in the context of IWRM, which seeks to identify the best water management alternatives against the country's socio-economic objectives.

3. KEVIN C. URAMA

*UNDERSTANDING THE WILLINGNESS AND ABILITY TO ADOPT SWCMTS: THE ROLE OF ECONOMICS, ETHICS AND SOCIAL PSYCHOLOGY*

Dr Kevin Urama, a research fellow at the Macaulay Institute in Aberdeen, UK, delivered the presentation. He examined what drives the public to adopt sustainable water catchment management technologies, looked at the views of economists on drivers of behavior, and the emerging views from environmental ethics. The presenter also discussed the views of social psychology on drivers of behavior and attempted to offer an integrated value-mapping model as the way forward. The speaker submitted that humans adopt what they value and value what they adopt because they are rational beings. People seek gains and avoid losses, a streak that is fundamental in human behavior.

Dr Urama raised the issue of value of catchment, saying the value of its services falls into infinite total value, arguing, therefore, that adoption of sustainable water catchment management technologies may not be defined by economic preferences. The speaker concluded that human valuation of biodiversity is significantly influenced by factors including formal education, environmental ethics, attitudes, social norms, and perceived behavior control factors. He offered an integrated model allowing inclusion of wider perspectives to environmental choices. Behavior adoption is also influenced by education, age, income and gender.

#### Issues Emerging from the Presentation

1. A participant said water resources are scarce, a development that had given rise to the Addis Ababa conference. He pointed out that the presenter sounded negative about using economic measures to gauge the value of water and wondered how else its worth would be established. The contributor argued that since 86 percent of the Nile's waters comes from Ethiopia it should be necessary to set aside land in the lower Nile and use money generated from the land to compensate the country of the water's origin. However, if water was given a zero value it would be difficult to compute the amount of compensation to be demanded.
2. The presenter said even in situations where one was able to come up with a monetary tag to the value of water such value was always an underestimate for it was difficult to ever give water its real value. Economic measures work only to a given limit, he said. He further said it would be difficult to deal with the power factor. Assessing Egypt's behaviour in relation to the need to equitably apportion Nile resources purely in terms of power relations would give the wrong assessment, he submitted.
3. Dr Osita Ogbu cautioned conference participants against focusing primarily on the Nile and the river's riparian countries, but conceded allocation and use of the basin's resources could be used as a model that would inform similar problems elsewhere on the continent. He stressed that economics alone would not give answers to the problems of water management. There is a need to examine the social, economic and cultural dimensions pertaining to water management.

#### 4. CHRIS HUGGINS

#### *WATER MANAGEMENT AND CONFLICT IN AFRICA: THE ROLE OF KNOWLEDGE AND TECHNOLOGY*

Chris Huggins, a research fellow at the African Centre for Technology Studies (ACTS) based in Nairobi, Kenya, presented the paper. He traced the discourse on "water wars" from one fought some four-and-half thousand years ago in Mesopotamia (now Southern Iraq) over disputed water supplies and indicated the focus of attention in more recent years in the Middle East, particularly in relation to Israel and her neighbors. Of 17 basins identified as being at risk of "political stresses" over water resources, eight are African, including Lake Chad, Incomati, Kunene, Limpopo, Okavango, Senegal and the Zambezi basins. The Nile is considered a major "political stress" and efforts to address the issue are underway through the Nile Basin Initiative.

He also examined the characteristics of water as a resource, noting its importance in agriculture, transport, in disposing off waste products, in lubricating the wheels of industry as well as in forming district or international borders.

Owing to its mobility, water is also used for generation of power. However, water is prone to unavailability for diverse reasons, to fluctuations in its levels, and to divergent uses. A major characteristic is that of scarcity.

The presenter further examined at length the typology of conflicts, some being violent and others non-violent. Water conflicts tend to be non-violent, which leads to the underestimation of their impact, especially on people and their livelihoods. Water conflicts may be seen according to the different *uses* of the water, the *geographical location* of the water mass, the actors involved and the *inter-generational* aspect that exists when environmentally unsustainable activities prevent future generations from using natural resources.

Mr Huggins further presented a number of case studies, examining first, the interstate water conflicts in Africa, the state-community conflicts, with examples from Tanzania, and the inter-community conflicts, with a case also from Tanzania at Arusha. He also looked at knowledge, technology and institutions and their role in water management, looking first at the legal and normative frameworks governing water management. In this regard, water is viewed as an economic good that must be given true economic value. This argument could also lead to the levying of fees from water that could be used in protection of the environment. In this realm, the right to water is also discussed.

An aspect that is often raised with regard to water conflicts is technological adaptation, suggesting that water scarcity and attendant risks of conflict can be mitigated if relevant institutions have sufficient capacity for ‘adaptation’ or ‘innovation’.

The presenter concluded that while shared water resources are associated with a higher risk of some kind of international conflict, much of the popular discourse is influenced by sabre-rattling and unsanctioned threats.

Further, he argues that Africa is at a higher risk of international conflict over water than other areas. In addition, he stresses that shared water resources may offer important opportunities for international co-operation, and that at the local level violent conflicts over water and water-related conflicts are fairly common.

#### Issues Arising from the Presentation

A Kenyan participant clarified that in his country the government had embraced ‘commercialization’ of water rather than ‘privatization’ of it. Commercialization, he explained, meant making water available to people at a price.

A contributor wondered who really should be in charge of water in any country given its multifaceted nature and use. He said governments were often not seen to intervene in finding solutions to water problems because such issues often cut across all sectors of society.

A participant noted that water had also been viewed as a social good in which case, he said, privatizing it would lead to conflicts.

#### Response from the Presenter

1. The solution to water problems lies in negotiations in which all stakeholders are enjoined.
2. People ought to be cautious about solutions to problems offered by donors – as they could lead to throwing away the baby and the birth water.
3. Water systems should be sustainable in order to make water free.

## *INVESTING IN WATER TO SUPPORT LIVESTOCK SECTOR GROWTH IN SUB-SAHARAN AFRICA*

Dr D. Peden of the International Livestock Research Institute (ILRI) delivered the presentation. It was prepared in collaboration with the International Water Management Institute and the Challenge Program on Water and Food. The presenter examined the reasons for investing in water for livestock and the principles governing such investments. He identified areas fertile for investment in water for livestock, looked at investment options and the technology, and policy lessons to be learned.

The speaker pointed out that few irrigation schemes planned for livestock despite the fact that agricultural water attracts animals. There also is a commonly held belief that overgrazing is the main cause of land degradation in Africa and elsewhere. He cited examples from Ethiopia showing there was a 45 percent soil loss on the 13 percent annual cropland and a 21 percent soil loss on 51 percent of grazing land. The reasons to invest in water for livestock, he said, include helping achieve the Millennium Development Goals by 2015, safeguarding assets such as livestock, enabling improvement of nutrition for physical and mental growth and expanding urban markets for high value animal products. The reasons for investing in water for livestock also include protecting water resources through better husbandry, supporting animal power, increasing water productivity and reducing potential for conflict.

The principles for investing in livestock sector growth include promotion of benefits such as milk, meat, wealth, power and cultural values. They also include consideration of spatial variability such as pastoral, mixed crop-livestock, urban, rain-fed and irrigated production systems.

Another principle is the promotion of animal management to reduce degradation of water and land. There is also the increase in livestock, water productivity, and the integration of the assessment of demographic and market trends, production systems and available water to determine where best interventions can be made.

The policy options raised include encouraging collective and joint management of water and grazing resources, and developing institutions that accept the legitimacy of livestock production. Options also include water pricing and managing demand, zoning for animal keeping and market development.

The speaker identified the lessons learned as follows:

1. Opportunities are lost because of lack of integration of livestock into water planning and development.
2. Investing in water for livestock reduces poverty and overcomes vulnerability of the poor.
3. There is a need for a multi-sectoral and regional approach, for a balanced mix of supply and demand management, for effective use of technology and knowledge, for inclusion of communities and all stakeholders and for gender and ethnic equity.
4. Setting priorities that do not necessarily respond to increasing meat consumption to the level of Western diets.
5. Increases in water productivity is possible.

### Issues Raised by the Paper's Discussant

The discussant, Professor Zacharia Matsela, observed that the paper was well thought out, and had examined the myths, reasons and principles relating to investments in water for livestock. He commended the identification in the paper of 15 livestock water development domains (WDDs) saying they provided challenges for Sub-Saharan states, especially in water harvesting, pathways out of poverty and policy options.

Prof. Matsela called for a thorough examination of what ‘investing’ in water for livestock actually means and involves. He also called for a study into the implications of the concerns and issues raised in the paper, particularly in relation to the water development domains, to community-owned and managed land and utilization common in many parts of Africa.

#### Issues Arising from the Presentation

Dr Kevin Urama from Aberdeen, UK, commended ILRI’s programme which, he said, was set to create an integrated livestock development system. “Your findings point to this trend. This is great.” He noted the presenter recommended collaboration with communities to ensure ILRI programmes were successful.

He urged ATPS to come up with a study that would integrate ethics, cultural values and community norms and relate them to sustainable livestock management practices.

The participant said the presenter’s indicators on the amounts of water for livestock were quantitative and urged him to develop qualitative models as well. Quantitative indicators would lead to poor livestock health, Dr Urama argued.

A Nigerian participant said a tendency to keep livestock in African urban areas had arisen and sought to know how the matter should be addressed.

Professor Oliver Saasa said a lot more attention should have been given to resources required to develop water systems. The role of the private sector, NGOs, governments and big enterprise should have been addressed. Information, generation and dissemination are crucial to the success of the envisaged water development systems, he said, but sought to know at what level ATPS would step in to facilitate dissemination.

A participant from Tanzania asked whether there were indigenous innovations that could be integrated with the modern ones for improved water production and management.

Prof Lynn Mytelka said modern technology involved building reservoirs that were very costly. She sought to know how such costs would compare with those of indigenous technologies.

#### Responses from the Presenter

1. The study by ILRI focused on the Nile Basin and international water management. ILRI had become involved rather late; while \$30 billion was being injected in agricultural water annually no money was earmarked for livestock water.
2. In livestock management one must consider the best places to feed animals and the best at which to give water.
3. ILRI is keen to collaborate with scientists at the conference in order to share knowledge and experiences.
4. Water quality is important and cannot be downplayed. Water pollution, for example, should be viewed as degradation.
5. Land tenure is an emotive and controversial issue. However, its concern is leading people and governments to seek solutions.
6. The keeping of large animals in urban areas is an issue related to pollution. It also has other dimensions: In most of Africa large animals are taken care of by young boys.



## 6. YACOB ARSANO

### *STRATEGIES FOR CO-OPERATION IN THE NILE BASIN: SECURITY, ENVIRONMENTAL, ECONOMIC AND INSTITUTIONAL APPROACHES*

Yacob Arsano of Addis Ababa University delivered the paper. He said the Nile water system consists of numerous tributaries and headwater lakes. In addition, there are 10 riparian countries sharing the Nile, 86 percent of whose water originates from Ethiopia while 14 percent originates from the Equatorial lakes region. The speaker said unlike the Danube, Rhine, Senegal or Niger river basins, the Nile basin has no regulatory or institutional mechanisms, neither does it have “mutually acceptable” water utilization and management practices. Efforts to enhance co-operation on the sharing of the Nile resources or to reach an amicable agreement on the use and management of the river’s resources are hampered by unilateral positions and selfish national interests.

He contended that “anarchic” approaches have in the past been followed on the sharing of the lake. This has tended to aggravate the unregulated competition and interstate rivalry between upstream and downstream nations. The presenter strongly argued that a lasting solution to the sharing of the Nile basin could only be reached if cooperation was sought on the basis of common security, environmental, economic and institutional concerns. Mutual security, he argued, should be seen as a function of gain that is in the national interest. Negotiations would lead riparian communities from a sense of insecurity and formal agreements and institutional mechanisms would lead to long-term security for all parties involved.

He said the Nile Basin Initiative (NBI) would likely lead to co-operation which, in turn, would foster common security. The current effort is, however, hampered by the low level of economic development and lack of institutional capacity to carry the process forward in the riparian states as well as the use of contested agreements in defence of the national interests of individual countries.

The speaker observed the realization among the riparian states that environmental security would not be achieved through military action. Such security can only be achieved through the collaborative efforts of states by sharing. Efficient utilization of water resources that decreases evaporation prevents erosion and minimizes flood occurrences, silt accumulation and soil salinization should be the guiding criterion.

He said at the regional level, the riparian states will have to address the issue of efficient water development, as economic use of water at the national level would benefit the entire region. The speaker, however, decried the fact that an economic-oriented approach was not being followed.

He stressed that legal and institutional frameworks were crucial to regulating use of the shared water, arguing that the existing agreements should be negotiated to establish the basis for co-operation.

#### Discussion of the Presentation

The discussant of the paper was Dr Joseph Obua, the National Co-ordinator, ATPS Uganda Chapter. He said the paper tended to discuss water purely as resource without placing it in the context of the environment. He also was critical of the presenter’s optimism on the security approach to sharing the Nile resources, arguing that stakeholder states had unclear policies on the sharing of the resources. In addition, there is blatant unsustainable use of the Nile basin resources as well as the existence of weak sharing governments. The discussant pointed out a contradiction in the speaker’s assertion that conflicts would arise from the sharing of the Nile resources and that cooperation too would be achieved. He argued the paper should have focused on the challenges posed by the river with respect to the sharing of its basins resources.

The strategies that can effectively be used to manage the rivers resources should also have given greater attention, as should have been the work being carried out by the Inter-University Council of East Africa. Such focus, he argued, would have shown the way forward.

He further faulted the presenter on the economic approach, saying he had not shown how such a strategy would enhance regional co-operation. The presenter had also not shown any practical institutional strategies but had plenty of details on regulatory mechanisms. He submitted that a primary strategy should ensure there is adequate information flow on the Nile, its environment and natural resources as well clear networking and advocacy on the river.

Comments from Dr Arsano

The presenter agreed with most of the issues raised by the discussant.

## 7. KEVIN C. URAMA

### *SUSTAINABLE WATER CATCHMENT MANAGEMENT TECHNOLOGIES: WHY SHOULD WE CARE?*

The paper was presented by Dr Kevin C. Urama of the Macaulay Institute, Craigiebukler, Aberdeen, UK. He examined the need for sustainable water catchment management technologies (SWCMTs) in Africa, focusing on the role of water bodies and the land devoted to use and the sustainability of socio-ecology systems. The presenter looked at the complex images between water ecosystems, socio-ecological systems and human well being using examples from Africa and elsewhere, arguing that a holistic and integrated approach to sustainable management of water catchments is a necessary condition for poverty alleviation in Africa.

The presenter noted that water catchments are sources of marketable commodities including food, medicine, hydropower, industrial goods, and aesthetic non-market goods and services, including environmental modulation and other ecosystem functions: they also have existence and intrinsic values. He said sustainable water catchment management is particularly relevant in Africa because of its serious implications for food security and human environmental health. He stressed that the ability of African countries to mitigate the effects of the increasing pressures on water resources from population growth, agricultural intensification and urbanization, and the emerging global climate change depends on how well Africa's river basins are managed.

He strongly argued that the development of sustainable water catchment management technologies is a prerequisite to growth and poverty reduction in Africa. Global threats, such as climate change and associated impacts are predicted to worsen the already declining state of Africa's social, economic and biophysical resources. The levels of poverty, population and urban growth rates in Africa indicate that Africa is more vulnerable to the emerging global threats than any other continent. The increasing food insecurity, droughts, and diseases show that Africa needs a sustainable approach to the management of her natural resources, particularly water bodies.

The presenter argued for the need to adopt an integrated approach to WCMT development, to public participation, information sharing and capacity building, and to considerations for cost-effectiveness of available alternatives as a first step towards SWMT development on the continent. He said piecemeal and sectoral approaches to water catchment would fail.

### Discussion of the Presentation

The paper's discussant was Ms Bitrina Diyamett, the National Coordinator, ATPS Tanzania. Taking a programmatic approach to the issues raised, the discussant said the paper ought to have examined water catchment management technologies that had worked for Africa, clearly showing why and how. She stressed that this would be an important step in making the continent move forward, and underscored the need for research into such technologies if information and literature on them are lacking.

Ms Diyamett further said the paper should have addressed the issues of vertical and horizontal technology transfer. She said vertical transfer involved local sectors but the paper failed to address the matter exhaustively. She further faulted the presenter on the way technology is adopted, saying technology develops as it is adapted and adopted, a link the presenter did not clearly show.

### Issues Emerging from the Presentation

1. The chairman of ATPS, Professor Norah Olembo, expressed support for Dr Urama's holistic approach to water catchment management technologies. She also called for efficiency in water management, arguing that Africa needs to develop its own technologies and to keep improving them. Development, she stressed, is the product of innovation, not holding on to old and moribund technologies.
2. A participant disagreed with the presenter's pejorative reference to technological "copying" as a "malpractice" contending that literature is replete with examples of countries that learnt from others but still developed their own technological capabilities. The participant argued that in technological development "copying" and "pasting" would greatly improve technological capacities.
3. Another participant agreed that "copying" can help boost local technologies. He underscored the need for Africa to start off with what is available locally before moving on to adopt foreign technologies that may be out of step with local conditions. "Copying" is important, he stressed, as long as it is not done for the sake of doing it. "Copying" is legitimate, he argued, as long as it did not lead to re-inventing the wheel. He also faulted African leaders for failure to assess science and technological capacities in their countries.
4. A participant argued that adoption of new technologies goes hand-in-hand with the development of indigenous technologies.
5. Dr Urama, the presenter, clarified that he was not opposed to "copying" of technologies. Rather, he was against copying and pasting" as that tended to supplant foreign technologies to new environments where they did not fit the conditions. "Learning and improving knowledge," Urama said, "is part of technology development."
6. Dr Urama further said Africa needs to accommodate and make use of what she has—since that is already available and belongs to the continent. Efficacy and sustainability must be priority issues because ignoring them would lead to degradation of the environment.
7. Mr Chris Squire the National Coordinator, ATPS Sierra Leone, said Dr Urama's integrated approach to sustainable water catchment management technologies must be taken seriously if Africa is to develop. "Is anyone listening to you, Urama?" he posed.
8. A participant called for a way forward, considering that the presenter had laid the facts bare.
9. Dr Osita Ogbu, the Executive Director of ATPS, observed the danger posed by developed countries where patenting was often done after a minor improvement to an already existing or developed product. Such patenting was done in the context of property rights, thus disqualifying many from using, enjoying or developing a product or an innovation that was traditionally their own. He conceded, however, that there is need to augment local knowledge with new foreign knowledge for technological improvement.
10. A participant cautioned the conference to be clear whether they viewed water as a source or as a renewable source. Dr Urama, in response, said whether water is seen as a renewable or as a non-renewable source depends on the way one looks at it.

*WASTE WATER AND IRRIGATED AGRICULTURE: LESSONS, KNOWLEDGE TRANSFER AND POSSIBLE APPLICATIONS FOR AFRICA*

This paper was delivered by Frans Huibers, Associate Professor, Health and Environment Irrigation and Water Engineering Group, Wageningen University, The Netherlands. The speaker defined sewage as the wastewater generated by a community. The main pollutants to water, he said, include suspended solids, soluble organic compounds, pathogens and nutrients. In wastewater treatment the preliminary process involves elimination of coarse materials and sand as well as screening the water whereas the secondary process involves elimination of suspended solids and floatation and settling of the water. The speaker cited cases of wastewater treatment in Colombia, Palestine and Jordan. Tertiary treatment of wastewater is concerned with elimination of pathogens and nutrients; chemical, photochemical and biological action – for purposes of protecting public health and water bodies and produce reusable efficient. He conceded, however, that tertiary treatment was not affordable in most countries.

The presenter said wastewater had become increasingly important to irrigation as it was reliable. Further nutrients in wastewater could often replace chemical fertilizers. Irrigation with wastewater could also be an excellent treatment system, he said, adding many poor farmers were benefiting from wastewater. The typical issues to deal with in waste water irrigation include designing choices in sanitation and treatment, resolving the mismatch between supply and demand for water; the employment of different irrigation, water and nutrient management technologies; and different ways of crop handling. The issues also include dealing with such economic aspects as equity costs, benefits and efficiency.

The two basic lessons learnt are that illegal and unguided or unplanned use of wastewater is carried out in many parts of the world and that wastewater production from urban areas will double, possibly triple, in most cities of the world in the next 20-25 years. Food requirements will also go up.

The other lessons learnt are that wastewater irrigation has great potential, that to achieve results a system of different disciplines is required and adequate nutrient management is necessary. In addition, it is important to use proper irrigation techniques, to strike a balance between the objectives, costs and risks. Information must also be available to all stakeholders.

#### Issues Arising from the Presentation

Participants raised a number of issues, among them a concern that the paper had not addressed the hazards associated with use of wastewater or the stigma arising from its use. Concern also was raised on whether farmers really knew the benefits of using wastewater. Health concerns related to the use of wastewater were also raised. In Ghana, for example, it was reported wastewater flowed from a hospital to a river and farmers downstream used the water on their farms, thus posing serious health risks. Participants also called for the setting up of a reliable data based on wastewater and its management.

Prof Huibers, in response to some of the concerns raised said it had become practice in urban areas to grow vegetables using wastewater. Pathogens were often outside of the crop, he explained, thus allowing washing of such vegetables to stem any health risks. But he stressed industrial and hospital waste should not be used. He acknowledged that the use of wastewater carried a stigma, a problem that was likely to persist, as people generally preferred using clean, fresh water.

Prof Norah Olembo underscored the need to study traditional water management systems and technologies in a significant number of African countries and to use such technologies as the basis for Africa's development of her wastewater management systems.

## 9. FEMI OLOKESUSI

### *A SURVEY OF INDIGENOUS WATER MANAGEMENT AND COPING MECHANISMS IN AFRICA: IMPLICATIONS FOR KNOWLEDGE AND TECHNOLOGY POLICY*

The paper was delivered by Professor Femi Olokesusi, the Associate National Coordinator, ATPS Nigeria. He said despite its endowment with impressive water resources, Africa lags behind other continents in people's access to water. The reasons for this range from a rising population, massive environmental degradation, lack of adequate rainfall, recurrent droughts and low scientific and technological development. He observed that traditionally water has been managed for agriculture and domestic consumption and that on the continent innovative indigenous water management techniques have been developed more in the drier as well as in the mountainous regions. For agriculture, traditional African farmers have, over time, devised such techniques as terrace building, fitting systems, drainage ditches and small earth dams. Such techniques are generally cheap and largely depend on local materials.

The presenter discussed various water management and coping techniques in different African countries including Mali, Niger, Burkina Faso, Tanzania and Egypt. The presenter also discussed strategies for integrating new knowledge water management and coping mechanisms. The first step would be the development of a symbiotic relationship that builds synergy between indigenous and Western knowledge. Second, stakeholders in the two knowledge systems should create partnerships through joint actions, participatory research, joint ventures and capacity building and co-management approaches. Further, Western science stakeholders should establish the veracity of indigenous knowledge from local stakeholders using the local community. In addition, trust should be built recognizing the importance and legitimacy of both Western and indigenous knowledge and recognizing that both systems are desirable in designing effective strategies to solve the continent's water resource problems, the presenter also underlined the need to respect the intellectual and traditional resource rights of the people.

#### Issues Emerging from the Presentation

Participants raised a number of issues on the presentation, one being that the servicing of indigenous knowledge appeared to be lacking. Also raised was a concern that Africa must re-orient its attitude and begin to appreciate and develop products indigenous to the continent,

Professor Oliver Saasa decried the fact that experts in Africa tended to talk to themselves, an indication of their "academic arrogance." He stressed the need to talk to the grassroots, contending that if that did not happen experts might later discover they were the hindrance to the continent's development.

Borrowing from the European Union, Dr Urama said scientists are in water technology in any part of Europe. Similarly, Kenyan scientists could work in Nigeria and vice versa in order to promote integration. "We must learn how to do knowledge sharing," he declared.

Prof Olokesusi, in response, said indigenous knowledge is dynamic but there is a tendency to view it as static. He also sought not to emphasize the role of colonialism in the destruction of indigenous knowledge and technologies, saying the destruction was total and cut across all facets of human life. "It is not just in technology where destruction occurred...We cannot communicate because of language barriers as a result of colonization."

## 5.0 Panel Discussion on Science, Technology, Water and Environment in Africa

Close to the end of the conference, a panel discussion on science, technology, water and environment in Africa was held, comprising policy-makers, and water administrators from selected African countries and key resource people. Prof Oliver Saasa, a member of the ATPS Board, moderated the discussion. The countries on the panel were Kenya, Ethiopia, Lesotho, Nigeria and Cote d'Ivoire. The moderator recapped the highlights of the conference, pointing out that the aim was to find out how water resources in Africa should be managed by examining the current status and charting out the way forward.

Prof Saasa underscored the centrality of a hospitable environment for good water management practices in Africa. "You cannot talk meaningfully about development in the absence of security," he stressed. The panel discussion, he pointed out, was to act as a gauge to show the conference organizers and experts whether learning from one another had taken place, whether what was being done was useful, whether policy-makers were receptive to the conference ideas, and whether experts and policy-makers were committed to putting in practice what had been agreed upon.

The moderator emphasized that any action in respect of water resource management is interdisciplinary. The contributions from the different countries were as follows:

### Kenya

Kenya's panelist said his country had riveted concentration on poverty alleviation, fighting ignorance and disease, among other problems. He said Kenya does not enjoy adequate water but the commodity was often viewed as an infinite resource. The water management and monitoring systems in the country are weak, a reflection perhaps of the weak financial support. The government, however, had recently woken up to the need to regulate water and develop a water policy. The need for regulation had led to the enactment of Water Act 2002 as an enabling organ.

The panelist reported that a Water Appeals Board had been set up outside the ambit of the minister to arbitrate water conflicts.

### Ethiopia

Ethiopia's panelist informed the conference that his country has a water policy. The government deals with rural and urban water supply. Rural water is used primarily for purposes of irrigation while urban water is for domestic use. Three rivers, apart from Nile, are important.

The Omo, he pointed out, starts from Ethiopia and ends up in the Indian Ocean. Ethiopia is keen to use it but that could affect the Lake Turkana community. He sought ATPS assistance on the matter. A second river passes through Somalia which is using the water even without a formal agreement from the states through which the river traverses. The Juba also goes into Kenya and

then Somalia but the three countries through which the river flows have no agreements on the sharing of its resources. The panelist called on ATPS to conduct research on the three rivers with a view to advising the relevant governments on the use and sharing of the resources of the rivers. Ethiopia and Somalia have fought in the past and for this reason an amicable solution to the sharing of their water resources should be sought.

## Lesotho

Lesotho's representative came from the Ministry of Natural Resources and was involved in water policy and management for the country. In Lesotho, the water policy issues include supply, management and regulation. It was reported that Lesotho's Hydro Electric Project is a major stakeholder in water resource management. Lesotho exports large quantities of water from the country's highlands to South Africa.

The majority of the people live in the lowlands, however, and they too need water. The need to develop an infrastructure that can take water to all who need it is a real one and a major concern for the government. Government policy on water guides regulation and distribution besides access.

Sustainability of the environment, however, is a major problem for Lesotho because while water is a readily available resource in the highlands, pollution is a great concern. Dealing with water is a big challenge for the country. The River Basin Commission takes most responsibility for water resource management, guided by SADDC.

## Nigeria

A number of structures are responsible for water issues in Nigeria. The Federal Ministry of Water Resources takes part of the responsibility, including construction of dams and boreholes. Construction of boreholes is, indeed, a priority for the government. There is also a waterbus that is responsible for distribution of the commodity and for ensuring that it is safe. It was reported that Nigeria has a well-defined system for collection of water bills, used for maintenance of water systems.

The government is also fighting against pollution. The severity of this problem, particularly in Lagos calls for greater attention. The county also has collaborative policies with neighbors, a good example being links with the Chad Basin Authority.

## Cote d'Ivoire

The panelist said there are five main actors in the field of water resource management in his country. The government is first and the main actor. There is also the Centre for Water and the Environment. A third is the Centre for Anti-pollution. There also are training institutions, and finally, universities. The conference also heard that a number of private organizations are involved in water distribution. There also are individual water suppliers. Participants also learnt that problems of water management and distribution remain as the structures are weak and thus perform poorly. The panelist called on ATPS to support the country in setting up sound water resource management programmes – in view of the fact that Cote d'Ivoire is an agricultural country whose reliance on water is central to its development. There is also need to clean up forests – an area the panelist called ATPS to step in.

## Areas of Concern

The moderator asked panelists to point out areas they thought the conference had not addressed well enough.

## Kenya

The panelist expressed the view that water catchment and protection and water treatment problems had not been covered adequately.

#### Ethiopia

The panelist said small-scale irrigation should have been addressed. Biodiversity of the rivers and small water bodies required greater coverage and attention

#### Lesotho

The panelist said water catchment management should have been given greater attention in the conference.

#### Nigeria

The panelist said making wastewater work for African countries is of paramount importance and needed better treatment.

#### Cote d'Ivoire

The panelist faulted the conference and experts on what he viewed as their failure to demonstrate any traditional technologies that people from other African countries could adopt.



## 6.0 Closure of Conference on Science, Technology, Water and Environment in Africa

### THE WAY FORWARD

Professor M.C. Madukwe made the conference concluding remarks, and noted as follows:

1. Sound water resource management is key to the realization of the United Nations Millennium Development Goals (MDGs).
2. For knowledge to be sustainable it must be contextualized – a lesson that had emerged clearly from the conference.
3. Democratic and diplomatic solutions should be sought in Africa to alleviate situations that could degenerate to wars for water.
4. Integrated water resource management approaches to water problems are central to effective and sustainable water preservation and management.

### Comments on the Way Forward

Dr Osita Ogbu, the Executive Director, ATPS, said his network would, in future, redouble efforts to bring to such conferences as many policy-makers as possible to ensure decisions made were implemented. He said at times there were perceptions that experts tended to talk to each other. He defended the hosting of such conferences, saying tremendous learning always took place. “A conference like this can be regarded as training for trainers. Let’s not slight the meetings. We learn.”

In future more interaction with policy-makers would be sought, he said, to add value to the conference. Dr Ogbu paid special tribute to the government of The Netherlands for financially supporting the mounting of the conference and workshop. He also lauded ILRI Ethiopia for playing host to the conference and workshop and especially in playing the role of partner in the execution of the meeting.

The chairman of ATPS, Professor Norah Olembo, commended participants for “capturing the gist of the presentations,” saying the range and variety of the contributions was wide and thus informative and knowledge yielding. The theme of the conference was timely, Prof Olembo noted, saying it demonstrated ATPS’ sensibility to development issues in Africa. Expounding on the complexity of water resource management problems on the continent, the chairman said whenever there was more water it led to flooding and death and whenever there was inadequate water it led to drought. She said she had personally paid a lot of attention to the issues raised, and observed that most concerns required policy thinking. “This has been time well spent,” declared the chair. “It is now upon us to do something in the area of water.”

She commended ATPS Ethiopia Chapter and ILRI Ethiopia for their role in organizing the conference and workshop.

## 7.0 The ATPS Workshop on Science, Technology, Water and Environment in Africa

### REVIEW OF RESEARCH PROPOSALS

On Wednesday December 1, 2004 participants went into workshop groups to listen to presenters of research proposals sent to ATPS, review the proposal, guide researchers and recommend those that could be funded. The proposals fell into four main categories as follows:

Group A. Water and Environment Proposals from Francophone Africa.

Group B: Water Quality and the Environment.

Group C: Water Policy and Institutional Management.

Group D: Rainwater Harvesting and Technology Transfer.

Group A was chaired by Professor Lynn Mytelka and the resource persons were Dr Roch Mongbo, Dr Benoit Kabore and Dr Sidiki Dembele

Group B was chaired by Professor Norah Olembo, with Dr Kevin Urama as a resource person.

Group C was chaired by Professor Oliver Saasa, with Dr Joseph Obua as a resource person.

Group D was chaired by Dr Osita Ogbu and the resource persons were Mr Chris Squire and Prince R. J. Ihenacho.

The proposals were as follows:

#### Group A – Water and Environment Proposals from Francophone Africa

1. La Problematic de la Gestion de la Mangrove en Cote d'Ivoire: Le Cas d'Assinie- Mafia by Mlle Maiga Mariame, Mme Djedji Catherine, Mr Anon N'Guessan.
2. Developpment d'un Procede e Zone Humide Simulee Plante avec Amaranthatceae, Cappaidaceae, Tiliaceae pour le Traitement des Eauz Usees Domestiques by Dr Lacina Coulibaly
3. Towards Effective and Sustainable Water Management Policy in Cameroon by Dr Ngwa Alfred, Dr Jane-F Akoachee, Dr Bunah Violet and Dr Ndeso Atanga
4. Gestion Integree des Ressources eau du Bassin Versant du Bandama Cote d'Ivoire by ATPS Cote d Ivoire Team.

#### GROUP B – Water Quality and the Environment

1. *Impact of Water Catchments Degradation in Urban areas of Tanzania* by Dr Neema Ngware, Mr Riziki Shemdoe, Ms Bitrina Diyamett et al.

2. *Distribution and Bio-Availability Assessment of Heavy Metals in Sediments from Lake Naivasha, Kenya* by Dr M. C. Moturi and Mr F. L. Polong.
3. *Reducing Water Pollution in Lesotho* by Deepa Pollanikkatil Sajith.
4. *Mining Effects on Water Quality and Yield of River Nyamwamba, Western Uganda* by Abraham R. Mwesigye and Kaye Emmanuel.

#### GROUP C – Water Policy and Institutional Management

1. *Using Information and Communication Technologies to Improve the Management and Sustainability of the Densu River* by Kwasi M. Setsoafia.
2. *Assessment of Rural Supply Management in Ibarapa Area of Oyo State, Nigeria*, by Prof A. S. Gbadegesin.
3. *Policy Gap Analysis: The Case of Community Water and Sanitation in Ghana* by Rose Mamaa Entsua Meansah and Charlotte Engmann.
4. *Access to Fisheries and Issues of Sustainability and Collective Action in Ethiopia: The Case of Lake Tana* by Dejene Aredo and Sewmehon Demissie.
5. *The Role of Institutions in Water Management in Nigeria* by Prof Michael Madukwe, et al.

#### GROUP D – Rainwater Harvesting and Technology Transfer

1. *Comparative Performances & Environmental Impacts of different Water Harvesting Technologies in Ethiopia* by Yusuf Kedir, Yilma Seleshi and Dejene Aredo.
2. *Socio-Economic Factors Influencing Rainwater Harvesting in Chingale Extension Planning Area in Malawi* by Dr Julius Mangisoni.
3. *Ability and Willingness to Adopt Ecological Sanitation as a Water and Environmental Conservation Technology: The Case for Peri-urban Communities in Kampala* by James Kakooza and Dave Khayangayanga.
4. *Small Scale Rainwater Harvesting for Combating Water Deprivation in orphaned Households in a peri-urban Area of Lilongwe city, Central Malawi*, by Henry Raphael Mloza-Banda.
5. *Understanding Gender Roles in Technological Innovations and Practices for Integrated Water Resource Management in Rural Settlements. A Case of Usambara Highlands, Tanzania*, by Riziki S. Shemdoe and Rukia Kitula.

#### TRAINING WORKSHOP

A writing skills improvement workshop was conducted for participants by Mr Magayu K. Magayu, a lecturer in journalism at the University of Nairobi. In a paper titled “Publishing Research Work: The Dos and Don’ts” the resource person took participants through the most common mistakes found in documents and research work intended for publication. The problems include spelling mistakes, use of titles and designations, use of punctuation marks, poor and cluttered writing as well as formatting and packaging material for publication. The paper also dealt with the proper ways of doing citations, and the use of tables and figures to illustrate or support arguments. He also demonstrated problems relating to poor grammar and took participants through a list of “wasteful” words, clearly showing the alternatives. He also took participants through a list of words and terms that are often used wrongly and demonstrated their correct use and context.

As in such other workshops held elsewhere in such places as Abuja, Harare, Nairobi and Maseru, the participants called on ATPS to support additional research and publication of the paper to benefit the science and technology fraternity in Africa.

## UNESCO PRESENTATION ON SMALL-SCALE ENTERPRISES

Dr Peggy Oti-Boateng from the Kwame Nkrumah University of Science and Technology, Ghana made a presentation on Technology Issues for Activities Financed by Micro Finance Institutions and sought comments from participants on how to improve the UNESCO funded initiative. She also presented a framework to be used in assessing the impact of policy on technological capability of small-scale enterprises. On ways to improve the initiative participants proposed as follows:

- I. That there is need to look at the literature in the 1970s and the 1980s that would help conceptualize the effort in four broad ways: infoware, organware, humanware and technoware.
2. That focus has now shifted from what researchers need to know to what they need to do – and this must be taken into consideration in the initiative.
3. It is important to establish for certain the kinds of technology that would move the project forward. It was noted that a lot of micro finance institutions are able to buy such technologies as a pump but they may know very little about the gadget.
4. For success, every effort must be made to ensure micro finance institutions clearly understand the problems of micro enterprises – as this is the only way towards sustainability of the project.
5. Innovation is critical in the assessment of small-scale enterprises.
6. Sector participation would tend to be tricky and one must therefore prepare for it. Agriculture, for example, is a composite undertaking.
7. Whenever there is government micro enterprise policy it should be used to influence support and development of small-scale enterprises.
8. Even as the project considers and attracts micro financing, it is important to remember capability can be available without the financing. The two should not be divorced from each other.
9. It is important to sensitize micro finance institutions to support small-scale enterprises.
10. For success, it is important to find out who finances SMEs and what the indicators of performance are.

## EDUCATIONAL VISIT TO ILRI'S DEBRE ZEIT RESEARCH STATION

Conference and workshop participants made an educational tour of ILRI's Debre Zeit Research Station where they were received by Dr A. Emmanuel. The host gave a historical background to the station and explained its mandate and activities, among them carrying out research in livestock, and promoting technologies in livestock production and promotion. The station, established in 1975, also carries out research on livestock feeds. The guests had an opportunity to see the different animals used for research activities at the station, the growing and preparation of different animal feeds and the making of animal products, including butter and ghee.

The host explained the station encouraged joint training ventures and the sharing of experiences with other research organizations in Africa as long as the activities are mutually beneficial.

The research institute changed its name to ILRI in 1998 and joined Nairobi's ILRI as a sister organization mandated to carry out research in livestock development while the Kenyan-based institute carries out research on livestock diseases. The station has offices in Latin America and Asia for purposes of collaboration, although its main activities and partners are in Africa.

The host explained that some of the livestock developed at the station are taken to other parts of Africa and to other parts of the world as well.

## 8.0 The ATPS Annual General Meeting

The African Technology Policy Studies Network (ATPS) held its 2004 Annual General Meeting at ILRI's Zebre Zeit Research Station, some 50 kilometres east of Addis Ababa, Ethiopia.

### REMARKS BY THE ATPS CHAIRMAN

Prof Norah Orembo, the Chairman of ATPS, paid special tribute to the Ethiopian chapter for its role in hosting the 2004 conference and workshop. She exhorted participants and other chapters to emulate the spirit of hard work and commitment demonstrated by Ethiopia in the mounting of the Network's meeting and noted as follows:

1. Resources for organizing and mounting the conference and workshop were scarce by because of devotion and a sense of selflessness on the part of the organizers and hosts the meeting had turned out to be a major success.
2. The quality of papers and presentations was high, the variety wide, the content rich and the mood of the meeting serious. She called on all stakeholders to maintain that standard, noting, "We all certainly have something to take back home."
3. Research proposals were of a much higher quality and were stronger in content, and brighter in style and packaging.
4. Owing to the scarcity in funding, not all research proposals could be supported financially, a setback that she regretted.
5. The ATPS fraternity and stakeholders had come of age and had clearly demonstrated ownership of the Network. Coted'Ivoire, the youngest entrant into the fraternity, had come with a "bang" and had probably overtaken most of the older members.
6. The centrality of ATPS' work can clearly be seen from the impact it was making across the entire continent in the realm of science and technology policy and in advising governments, NGOs, donors and stakeholders in key areas relating to development, decision-making, international negotiations and globalization. This has made ATPS a major player in strategic development matters on the continent.
7. The lean ATPS Secretariat headed by Dr Osita Ogbu had made tremendous achievements in the realization of the Network's mandate despite major financial constraints.
8. ILRI was a wonderful host in Addis Ababa. The institute had offered a most hospitable facility for the conference and workshop and also given participants an opportunity to learn about the great work they do for Africa

## REMARKS BY THE ATPS EXECUTIVE DIRECTOR

The Executive Director of ATPS, Dr Osita Ogbu, made the following remarks:

1. ATPS had been granted international status by the Kenya government concluding a lengthy process. The status exempts ATPS from paying taxes, allows the Network to hire expatriates if needed, and affords the organization immunity to raise any issues in its mandate.
2. The Network was collaborating with NEPAD, UNESCO, the African Development Bank, among other organizations. He explained that NEPAD recognizes ATPS as a science and technology research organization and the two are doing some activities together. ATPS is dealing with UNESCO at two levels: In Nairobi and in Paris. The African Development Bank had offered financial support to the Network.
3. ATPS chapters should strive to establish contacts and develop partnerships at the national level in order to strengthen the Network. Lesotho, he said, had clearly shown that partnership and support could be garnered at the national level. Nigeria's ATPS chapter had also established a strong partnership with that country's Raw Materials Research Council through a memorandum of understanding. The council had offered ATPS tremendous support. Ghana and Uganda have also shown that partnership at the local level is possible. In Sierra Leone, the chapter co-ordinator had received financial support from the World Bank.
4. ATPS had experienced financial setbacks that had serious ramifications on their programs owing to a shift in donor priorities. As a result, there was a major shortfall in funds intended to support research work. In the past, traditional ATPS supporters, including the Dutch, did not give conditions on what its funds should support as long as it was in the Networks' mandate. ATPS, however, had persuaded the Dutch to support work on water and the environment, a development that had led to the hosting of the Addis Ababa conference and workshop. As a result of the conditions, therefore, ATPS could not raise enough money to fund an estimated 19 research proposals for the year 2004 as originally planned.
5. ATPS was talking to DFID, Australian Aid and to Saric, among other development partners with a view to soliciting support from them.
6. The International Development Research Centre's (IDRC) funding to ATPS has no conditions. A good part of it, therefore, is used to meeting the Network's administrative costs.

## VENUE FOR THE 2005 CONFERENCE AND WORKSHOP

It was agreed that the venue for the next ATPS Annual Conference and Workshop would be Freetown, Sierra Leone.

# APPENDIX 1: WORKSHOP PROGRAMME

## PLENARY SESSION

ATPS/EIIPD CONFERENCE AND WORKSHOP  
SCIENCE, TECHNOLOGY, WATER AND ENVIRONMENT IN AFRICA

### Monday, 29 November 2004

*Venue: Lalibella Hall, Sheraton Addis*

#### Opening Session

Chair: Prof. Kinfe Abraham, *President of Ethiopian International Institute for Peace and Development (EIIPD)*

09:00 - 10:30      Brief welcome remarks from Dr. Dejene Aredo, National Coordinator, ETPSA  
Brief remarks from Dr. Osita Ogbu, *Executive Director, ATPS*  
Brief remarks from Prof. Norah Olembo, *Chair, ATPS Board*  
**Keynote Speaker: “Genetic Engineering, Biodiversity and Africa”**  
Dr. Tewolde Gebre-Egziabiher, *General Director, Ethiopian Environmental Protection Authority (EPA)*

**Official Opening:** H.E. Mr. Shiferaw Jarso, *Minister of Water Resources, Ethiopia*

10:30 - 11:00      TEA/COFFEE BREAK

#### Session I

Chair: Mr. Dessalegn Mesfin, *Deputy General Director, Ethiopian Environmental Protection Authority*

11:00 - 11:30      **“Water Allocation, Stability and Collaboration within the Nile Basin”** by Prof. Kinfe Abraham, *President of Ethiopian International Institute for Peace and Development (EIIPD)*

11:30 - 12:00      **“Managing Conflicting Priorities through collaborative decision-making for integrated river basin management: Approaches and Challenges”** by Krishna Prasad & Seleshi Bekele, *International Water Management Institute (IWMI), Addis Ababa*

Discussant: Prof. M. C. Madukwe, *National Coordinator, ATPS Nigeria*

12:00 - 13:00      Open Discussions

13:00 - 14:15      LUNCH (at the ILRI Campus)

#### Session II: Venue: Main Auditorium, ILRI – Addis Campus

Chair: Professor Lynn Mytelka, *Director, United Nations University/ Institute for New Technologies (UNU/INTECH), The Netherlands*

14:15 – 14:30      Welcome Address by Dr. Shirley Tarawali, *Director, People Livestock and Environment, ILRI*

14:30 - 15:00      **“Understanding Public Attitude, Values and Behaviour towards Adoption of Sustainable Water Catchments Management Technologies: The role of economics, ethic and social psychology”** by Dr. Kevin Urama, *Research Fellow, The Macaulay Institute, Aberdeen, UK*

Discussant: Dr. Roch Mongbo, *National Coordinator, ATPS Benin*

- 15:00 - 15:30 Open discussion
- 15:30 - 16:00 **“Water Access, Conflict and Knowledge: Lessons from the Horn of Africa and the Great Lakes”** by Chris Huggins, *Research Fellow, African Centre for Technology Studies (ACTS)*
- Discussant: Dr. Julius Mangisoni, National Coordinator, ATPS Malawi
- 16:00 - 16:30 Open discussion
- 16:30 - 17:30 Tea/Coffee break and Marketplace/Exhibition and Networking

**18:00 - 20:30 Cocktail Reception at Sheraton Addis Ababa hosted by EIIPD**

**PLENARY SESSION**

**CONT'D**

**ATPS/EIIPD CONFERENCE AND WORKSHOP**

**SCIENCE, TECHNOLOGY, WATER AND ENVIRONMENT IN AFRICA**

## **Tuesday, 30 November 2004**

### **Session III: Venue: Main Auditorium, ILRI – Addis Campus**

Chair: *Dr. Alex Tindimubona, Senior Scientific Affairs Officer, UNECA, Addis Ababa, Ethiopia*

08:30 - 09:00 **“Investing in Sustainable Water Development for Livestock Sector in Africa: S&T Policy**

**Implications”** Dr. Don Peden, *Leader, Sustaining Water and Nutrition Productivity, ILRI Addis Ababa*

Discussant: Prof. Zacharia Matsela, *National Coordinator, ATPS-Lesotho*

09:00 - 09:30 Open discussion

09:30 - 10:00 **“Strategic Cooperation in the Nile Basin; Security, Environmental, Economic and Institutional Issues”** by Dr. Yacob Arsano, *Addis Ababa University*

Discussant: Dr. Joseph Obua, *National Coordinator, ATPS Uganda*

10:00 - 10:30 Open discussion

10:30 - 11:00 TEA/COFFEE BREAK

### **Session IV**

Chair: *Mr. Firku Dessalegn, Minister of State for the Ministry of Capacity Building, Addis Ababa, Ethiopia*

11:00 - 11:30 **“Sustainable Water Catchment Management Technologies: Why should we care?”** by Dr. Kevin Urama, *Research Fellow, The Macaulay Institute, Aberdeen. UK*

11:30 - 12:00 **“Waste Water and Irrigated Agriculture: Lessons, knowledge transfer and possible applications in Africa”** by Frans Huibers, *Associate Professor, Health and Environment Irrigation and Water Engineering Group, Wageningen University, The Netherlands*

Discussant: Ms. Bitrina Diyamett, *National Coordinator, ATPS-Tanzania*

12:00 - 13:00 Open Discussions

13:00 - 14:00 LUNCH



## **Session V**

Chair: Dr. Osita Ogbu, *Executive Director, ATPS*

- 14:00 - 14:20      **“Nile Basin Capacity Building Network – Challenges and Achievements”** by Dr. Shreif Mohamedy, *Deputy Manager, Nile Basin Capacity Building Network*
- 14:20 - 15:00      **“A Survey of Indigenous Water Management and Coping Mechanisms in Africa: Implications for knowledge and technology policy”** by Prof. Femi Olokesusi, *Nigerian Institute for Social and Economic Research (NISER), Nigeria*
- Discussant: Mr. Benson Zwizwai, *Deputy Director, IDS-Zimbabwe and National Coordinator, ATPS-Zimbabwe Chapter*
- 15:00 - 15:40      Open Discussions
- 15:40 - 16:20      **Panel Discussion**  
*Moderator:* Prof. Oliver Saasa, *ATPS Board Member*  
*Panelists:* Policymakers/Water Administrators from selected African Countries and Key Resource People
- 16:20 - 16:50      Tea/Coffee break
- 16:50 - 17:20      **Panel Discussion (cont'd)**
- 17:20 - 17:40      **Summary and the Way Forward**  
*Summary by:* Prof. M. C. Madukwe, Dr. Kevin Urama, Ms. Bitrina Diyamett and Dr. Arsene Kouadio.
- 17:40 - 18:00      Closing Remarks from Dr. Osita Ogbu, *Executive Director, ATPS*  
Closing Remarks from Prof. Norah Olembo, *Chair, ATPS Board*  
Closing Remarks from Mr. Shiferaw Jarso, *Minister of Water Resources,*

## **Ethiopia GROUP SESSIONS**

ATPS/EIIPD CONFERENCE AND WORKSHOP  
SCIENCE, TECHNOLOGY, WATER AND ENVIRONMENT IN AFRICA

## **Wednesday, 1 December 2004**

### **GROUP A - Water and Environment Proposals from Francophone Africa**

#### **Venue tba**

Chair: Prof. Lynn Mytelka

Resource Persons: Dr. Roch Mongbo, Dr. Benoit Kaboré, Dr. Sidiki Démbélé

- 08:30 – 09:15      La Problématique de la Gestion de la Mangrove en Côte d’Ivoire: Le Cas d’Assinie-Mafia *by Mlle Maiga Mariame ; Mme Djédji Cathérine ; Mr. Anon N’Guessan*
- 09:15 – 10:00      Développement d’un Procédé e Zone Humide Simulée Planté avec Amaranthaceae, Capparidaceae, Tiliaceae pour le Traitement des Eaux Usées Domestiques *by Dr. Lacina Coulibaly*
- 10:00 – 10:45      Toward Effective and Sustainable Water Management Policy in Cameroon *by Dr. Ngwa Alfred; Dr. Jane-F Akoachere; Dr. Bumah Violet and Dr. Ndeso Atanga*
- 10:45 – 11:15      TEA/COFFEE BREAK
- 11:15 – 12:00      Gestion Intégrée des Ressources en eau du Bassin Versant du Bandama Cote d’Ivoire *by ATPS Cote d’Ivoire Team*

12:00 – 12:45 [No Paper Assigned]

12:45 – 14:00 LUNCH BREAK

AFTERNOON FREE

## **GROUP B - Water, Quality and the Environment**

*Venue tba*

Chair: Prof. Norah Olembo, *Chair, ATPS Board*

Resource Persons: Dr. Kevin Urama

08:30 – 09:15 Impact of Water Catchments Degradation in Water Provision in Urban areas of Tanzania *by Dr.*

*Neema Ngware, Mr. Riziki Shemdoe, Ms. Bitrina Diyamett et al*

09:15 – 10:00 Distribution and Bio-Availability Assessment of Heavy Metals in Sediments from Lake Naivasha, Kenya *by Dr. M. C. Moturi and Mr. F. L. Polong*

10:00 – 10:45 Reducing Water Pollution in Lesotho *by Deepa Pullanikkatil Sajith*

10:45 – 11:15 TEA/COFFEE BREAK

11:15 – 12:00 Mining Effects on Water Quality and Yield of River Nyamwamba, Western Uganda *by Abraham R. Mwesigye and Kaye Emmanuel*

12:00 – 12:45 [No Paper Assigned]

12:45 – 14:00 LUNCH BREAK

## GROUP SESSIONS

CONT'D

ATPS/EIIPD CONFERENCE AND WORKSHOP

SCIENCE, TECHNOLOGY, WATER AND ENVIRONMENT IN AFRICA

## **Wednesday, 1 December 2004**

## **GROUP C - Water, Policy and Institutional Management**

*Venue tba*

Chair: Prof. Oliver Saasa, *ATPS Board Member*

Resource Persons: Dr. Joseph Obua

08:30 – 09:15 Using Information and Communication Technologies to Improve the Management and Sustainability of the Densu River *by Kwasi M. Setsoafia*

09:15 – 10:00 Assessment of Rural Water Supply Management in Ibarapa Area of Oyo State, Nigeria *by Prof. A. S. Gbadegesin*

10:00 – 10:45 Policy Gap Analysis: The Case of Community Water and Sanitation in Ghana *by Rose Mamaa Entsua-Mensah and Charlotte Engmann*

10:45 – 11:15 TEA/COFFEE BREAK

11:15 – 12:00 Access to Fisheries and Issues of Sustainability and Collective Action in Ethiopia: The Case of Lake Tana *by Dejene Aredo and Sewmehon Demissie*

12:00 – 12:45 The Role of Institutions in Water Management in Nigeria by *Prof. Michael Madukwe, et al*

12:45 – 14:00 LUNCH BREAK

AFTERNOON FREE

## **GROUP D – Rainwater Harvesting and Technology Transfer**

*Venue tba*

Chair: Dr. Osita Ogbu, *Executive Director, ATPS*

Resource Persons: Mr. Chris Squire, Prince R. I. Ihenacho

08:30 – 09:15 Comparative Performances & Environmental Impacts of Different Water Harvesting Technologies in Ethiopia by *Yusuf Kedir, Yilma Seleshi and Dejene Aredo*

09:15 – 10:00 Socio-Economic Factors Influencing Rainwater Harvesting in Chingale Extension Planning Area in Malawi by *Dr. Julius Mangisoni*

10:00 – 10:45 Ability and Willingness to Adopt Ecological Sanitation as a Water and Environmental Conservation Technology: The Case for Peri-urban Communities in Kampala by *James Kakooza and Dave Khayangayanga*

10:45 – 11:15 TEA/COFFEE BREAK

11:15 – 12:00 Small Scale Rainwater Harvesting for Combating Water Deprivation in Orphaned Households in a Peri-urban area of Lilongwe City, central Malawi by *Henry Raphael Mloza-Banda*

12:00 – 12:45 Understanding Gender roles in Technological Innovations and Practices for Integrated Water Resource Management in Rural Settlements: A Case of Usambara Highlands, Tanzania by *Riziki S. Shemdow and Rukia Kitula*

13:00 - 14:00 LUNCH BREAK

## **OTHER SESSIONS**

**ATPS/EIIPD CONFERENCE AND WORKSHOP**

SCIENCE, TECHNOLOGY, WATER AND ENVIRONMENT IN AFRICA

### **Wednesday, 1 December 2004 (Afternoon Session)**

*Venue Main Auditorium, ILRI*

Chair: TBA

Resource Persons: Dr. Kevin Urama, Prof. M. C. Madukwe, Mr. Magayu K. Magayu

14:00 - 15:30 Training Workshop

15:30 - 16:00 TEA/COFFEE BREAK

16:00 - 17:00 Training Workshop

## APPENDIX 2: LIST OF PARTICIPANTS

### BENIN

**1. Dr. Roch L. Mongbo**  
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