



# **Science, Innovation, Technology and the African Society: Implications for Achieving MDGs**

**Report of the 2006 ATPS/MCTM Annual Conference and Workshop held on 27 - 29 November, 2006**

**Maputo  
Mozambique**

**African Technology Policy Studies Network (ATPS)  
Ministry of Science and Technology, Mozambique (MCTM)**

## **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*, the European Union and the Royal Dutch Government.

## List of Abbreviations and Acronyms

AGOA	African Growth and Opportunity Act
ADMADE	Administrative Management Design
ATPS	African Technology Policy Studies Network
CAMFIRE	Community Areas Management Programme for Indigenous Resources
COMESA	Common Market for Eastern and Southern Africa
GM	Genetically Modified
GMOs	Genetically Modified Organisms
GDP	Gross Domestic Product
ILRI	International Livestock Research Institute
IK	Indigenous Knowledge
ICT	Information and Communication Technologies
IPRs	Intellectual Property Rights
MDGs	Millennium Development Goals
MCTM	Ministry of Science and Technology in Mozambique
NEPAD	New-Partnership for Africa's Development
NGOs	Non-Governmental Organization
NIS	National Systems of Innovation
PRIs	Public Research Institutions
R&D	Research and Development
SITS	Science, Innovation, Technology and Society
S&T	Science and Technology
SSA	Sub-Saharan Africa
UNDP	United Nations Development Programme
UNU-MERIT	United Nations University - Maastricht Economic and Social Research and Training Centre on Innovation and Technology
USAID	United States Agency for International Development
WIPO	World Intellectual Property Organisation

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# 1 Organization of Conference and Workshop

## Venue, Date of Conference and Workshop

The 2006 Annual Conference and Workshop of African Technology Policy Studies Network (ATPS) was held at the Pestena Rovuma Hotel, Maputo, Mozambique from 27 - 28 November, 2006.

## Support for the Conference and Workshop

The 2006 Conference and Workshop was organized by ATPS in collaboration with the Ministry of Science and Technology in Mozambique (MCTM) and the country's information and communication technologies (ICT) Policy Commission.

## Theme of Conference and Workshop

The theme of 2006 ATPS Conference and Workshop was "Science, Innovation, Technology and the African Society: Implications for achieving the millennium development goals (MDGs)"

## Objectives of the Conference and Workshop

The objectives of conference and workshop were:

- (i) To demonstrate to policy makers and other stakeholders the relevance of national systems of innovation (NIS) approach to Africa's development and how the approach can be deployed to address self-determined development needs in the context of MDGs.
- (ii) To identify the institutional, knowledge and policy gaps that may constrain effectiveness of science, innovation and technology policies in Africa and how research and capacity building programmes may be targeted to bridge these gaps in future.
- (iii) To identify training, institutional capacity building and research needs that can inform how African innovation systems actors, institutions, policies, behaviors and linkages might better apply science and technology (S&T) and innovation systems approach to address the MDGs at relevant levels: local, regional, national and international.
- (iv) To provide the opportunity for dialogue and knowledge sharing among African and non-African innovation systems actors and stakeholders to negotiate and prioritize innovation processes and systems action plans so as to effectively and efficiently use the expertise and available resources for greater impact.
- (v) To generate through stakeholder dialogue a concept note for a three-year research programme on the subject, exploring how best to strengthen learning capacity and social responsiveness in Africa to deploy scientific knowledge, innovation systems and technology in African social contexts to achieve the MDGs.

## Conference Themes

In the attempt to successfully achieve the above objectives, the conference and workshop focused on the following sub-themes:

- a. National Systems of Innovation and its application and relevance to Africa's socio-economic development.
- b. S&T exclusion, social exclusion and learning capacities in support of innovation and governance of new technologies in Africa.
- c. Science, innovation and technology policy research priorities for Africa
- d. S&T and innovation systems training and institutional capacity building needs for Africa.

### **Expected Outcomes**

The conference and workshop was expected to lead to better understanding of the role of NIS in achieving the MDGs in Africa and African perspectives on using innovation systems to attain both national and international development goals. The specific outputs expected from the workshop were:

- ❑ Improved awareness and understanding of the concepts of National Systems of Innovation and their application and relevance to Africa's development by workshop participants.
- ❑ Better understanding of innovation systems actors, their roles and interdependencies and the barriers and gaps in Africa's innovation systems with respect to learning capabilities and inter-linkages.
- ❑ Identification and prioritization of knowledge and research gaps, training and capacity building needs for tailoring Africa's science, innovation and technology policies to achieve the MDGs.
- ❑ Identification of modalities and strategies for inter-regional and international collaboration to complement national, regional and international initiatives and programmes.
- ❑ A concept note for a full proposal on science, innovation, technology and society (SITS) in Africa to be produced in liaison with key stakeholders, policy makers, development partners and international experts.

## 2 Background to the Conference and Workshop

The African Technology Policy Studies Network (ATPS) in conjunction with the Ministry of Science and Technology in Mozambique and the country's ICT Policy Commission held a three-day conference and workshop in Maputo on the theme "Science, Innovation, Technology and the African Society: Implications for achieving the millennium development goals (MDGs)."

The conference and workshop were held to deliberate on how African countries can tap and adapt the existing science and technology policies and innovation processes and systems to African social contexts for equitable and sustainable social and economic development in the continent. It was expected that amongst other outputs, the workshop would improve understanding of the status of science and technology policy development and innovation processes and systems impacts on the continent as well as build and strengthen the necessary skills, learning capacities of innovation systems actors and institutions and social responsiveness to addressing the continent's development challenges in the context of the MDGs.

The conference and workshop comprised plenary presentation of papers commissioned from professionals and resource persons in various fields of expertise from Africa and outside. There were participatory stakeholder dialogue to distill new knowledge gained from the presentations and research issues, needs and priorities requiring attention for improved understanding and capacity of innovation systems actors, science and technology (S&T) policy development, and impacts analysis; and plenary sessions to synthesize and prioritize emerging research and policy issues and ways that ATPS (and other relevant organizations as well as development partners) might contribute to the advancement of social, institutional and legal mechanisms for sustainable governance of new technologies in Africa. The diversity of stakeholders and professionals targeted was expected to bring and bear the different experiences and approaches that should result in richer and more inclusive innovation policy dialogue to develop more focused research programmes and time-bound and achievable action plans.

This conference and workshop came at a time when reviews had shown that most of the African countries were unlikely to meet the MDGs and other international development targets. The development gap, between the developing and the developed countries, has been associated to a large extent with the scientific and technological capacities. This science, technology and innovation gap between the developed and developing countries as well as the S&T exclusion in the poorer regions in Africa was seen as likely to continue widening if innovative S&T policy interventions which match Africa's unique social realities are not developed and implemented soon.

# 3 Conference and Workshop Opening Ceremony



From Left, Eng Lourino Chemane, National Coordinator, ATPS-Mozambique, Dr Kevin Urama, Resource Person, ATPS, Prof Venancio Massingue, Minister of Science and Technology, Mozambique, Prof Norah Olembo, Chair, ATPS Board and Prof Sarifa Fajilder, Advisor, Minister of Science and Technology

The conference and workshop opening session was chaired by Professor Sarifa Fajilde, the Advisor to the Minister of Science and Technology in Mozambique. Eng Lourino Chemane, National Coordinator of ATPS Mozambique chapter, welcomed guests and participants to the conference and workshop.

## 3.1 Remarks from the Executive Director, ATPS



The Executive Director of ATPS, Dr Osita Ogbu, in his conference and workshop opening speech said Sub-Saharan Africa lagged behind in development and was off target in meeting the millennium development goals (MDGs) by the 2015 deadline. The sluggish progress in meeting the goals was, however, not attributable to lack of commitment on the part of most African countries. Indeed, most sub-Saharan African countries had integrated the MDGs into their national development frameworks. The problem lay in Africa's inadequate capacity and poor institutional support systems, Dr Osita submitted.

Quoting an editorial published in *Science Magazine* by Mohamed H. A. Hassan, the President of the African Academy of Sciences, the speaker said in the 1960s and the early 1970s, science departments in many African universities, including the Universities of Lagos in Nigeria, Dar-es-Salaam in Tanzania, Accra in Ghana, and Khartoum in Sudan, were among the finest and regarded as beacons of progress in the developing world. Today, however, the departments face a myriad of problems and are unable to meet even minimal departmental responsibilities, a situation that has had a grave impact on Africa's socio-economic development.

In the speech delivered on his behalf by Dr Kevin Urama, the ATPS Director also cited the 2003 NEPAD Ministerial Conference on Science and Technology that had endorsed the role

of S&T and innovation in development and stressed that all African countries should put in place comprehensive science, technology and innovation policies and emphasize the need for national systems of innovation.

He said the National Systems of Innovation (NIS) is the technology and information flow crucial for the development and diffusion of new technologies in a country. The system is facilitated by a network of intricate relationships amongst actors, including enterprises, universities, policy makers and government research institutions.

The conference and workshop, Dr Ogbu said, would offer innovation systems actors and stakeholders an opportunity to exchange knowledge and ideas while raising African perspectives on the use of innovation systems to attain national and international development goals. He expressed hope that the meeting would identify institutional knowledge and policy gaps that hinder the efficiency of science and innovation policy in Africa. He also called on the meeting to identify training needs for African innovation actors to better apply S&T innovation systems to meet the millennium development goals.

He said ATPS is wholly committed to improving the quality of technology policy making in sub-Saharan Africa and would continue to strengthen the region's institutional capacity for the management of technological development.

### **3.2 Remarks from the Chairperson, ATPS**

In her opening remarks, the chairman of ATPS, Professor Norah Olembo, said she would remember this century for its commitment to a global partnership and a series of time-bound targets, the millennium development goals (MDGs), aimed at improving the socio-economic wellbeing of humanity by 2015. She warned, however, that realization of the goals may remain a dream for the continent unless action is taken to reverse the socio-economic decline in the region. She expressed conviction that adoption of science technology and innovation strategies and policies would help African countries attain the MDGs and sustainable development. She further noted that application of science and technology and building upon local knowledge, skills and materials are central in facilitating the achievement of the MDGs in the developing countries, especially in combating poverty, in improving the lives of women, and fighting disease. This could be achieved if African governments supported their scientists in the struggle for development.



African scientists, she noted, have, in many fora, accentuated the need for government support to strengthen national science advisory bodies and increase investment and incentives for research and development. They have further called for stemming the brain drain of African scientists and for increased public awareness on the potential of S & T to help achieve MDGs.

Prof Olembo said ATPS, in line with its key mandate of improving the quality of science and technology policy making in sub-Saharan Africa, had brought together a diverse pool of policy makers, scientists, researchers, academicians in Maputo to discuss the involvement of science technology and innovation for Africa's development. She expressed optimism that

the conference and workshop would strengthen skills and learning capacities of innovation systems actors as well as social responsiveness to addressing the continent's development challenges in the context of MDGs.

She stressed that national systems of innovation play a key role in the generation and utilization of new knowledge and technologies through networking, learning and collaboration and expressed hope that the initiative would lead to a marshalling of forces and a pooling of resources in an effort to address the continent's problems.

Prof Olembo also said the gathering would engage key stakeholder and relevant innovation system actors in an attempt to ascertain realization of research needs and priorities that would empower stakeholders. ATPS and its collaborators would also identify and prioritize short and long-term training and capacity building needs and strategies with a view to retaining highly skilled professionals in Africa.

She further expressed optimism that the conference and workshop would foster inter-regional and internal partnerships in support of appropriate science, innovation and technology policy development for achieving the MDGs in Africa.

Prof Olembo warned that history would judge its leaders and professionals harshly if they left a legacy of broken promises for posterity, and called on all stakeholders to rededicate their skills, expertise and experience at the conference and workshop with a view to leaving a legacy where food insecurity, health challenges and poverty would be history in Africa.

### 3.3 Remarks by Mozambique's Minister of Science and Technology



The conference and workshop was officially opened by Mozambique's Minister of Science and Technology, Prof Venancio Massingue, who termed the gathering of minds in Maputo to discuss science, technology and innovation as "timely".

The Minister said Mozambique, like most sub-Saharan African countries, was struggling to achieve the MDGs to improve the quality of life for the world's citizens by 2015. Despite a number of shortcomings, Mozambique was determined to apply its resources, efforts and energy to meet the goals and attain socio-economic development.

He said his country believes science, technology and innovation are key to the country's development and noted President Armando Guebuza had stated that technology on its own was not a panacea to the world's problems but rather depended on man's ability to manipulate technologies for the wellbeing of humanity.

Prof Massingue said Mozambique had early last year approved the science, technology and innovation policy for the country, which intends to apply science, technology and innovation to poverty reduction efforts and to economic and social growth of the country. To actualize the initiative, the government had embraced the *Projecto Moz/02/002: Technologies of Information and Communication for the Development* which encompasses the use of mobile ICT units to promote the use of ICTs to disseminate agricultural and social

knowledge essential to the Mozambican people. Other programs and projects include application of technology to develop early warning mechanisms and avert the impact of national disasters, and the inclusion of the youth in producing local software systems. "We have held successful exhibitions, lectures in the past to encourage the culture of science technology and innovation among Mozambican youth for sustainable development in the country".

Mozambique, he said, had embraced partners such as Cisco Systems International, Microsoft and other development organizations to ease the diffusion of ICTs and other technologies for development in the country. "I believe that fortifying these partner relationships is key to the innovation process as proposed in the innovation system theory which states that innovation, technology development are results of a complex set of relationships among actors in the system, such as enterprises, universities and research institutes."

The minister congratulated ATPS on organizing the conference and workshop which would explore ways in which African countries can adapt the existing science technology and innovation policies and processes to the African context for sustainable development. He also thanked ATPS Network for her efforts to mainstream science and technology policy in Africa's struggle for development.

Prof Massingue equated knowledge and technology that scientists had to guns which, he said, they must use to fight poverty on the continent. He urged scientists to look for practical solutions to the problems facing the country and tickled guests and participants when he narrated an incident in which he had asked scientists working on a pig project in his country what they hoped to achieve upon its completion. "We will publish a report," was the answer the minister got, saying, he had hoped the result would be more pork for Mozambicans, not more papers. In Africa, he moaned, professionals and academics had "perpetually" let the people down, making Africans "perpetually dependent".

The minister acknowledged the fact that some of the problems scientists faced could have been ameliorated by governments and donors. Citing an example of the frustrations African scientists went through, Prof Massingue said a researcher's request for \$10 to facilitate his professional work was often turned down but a \$10,000 request to fund a conference was easily granted by governments or donors. "Let these frustrations not distract you," he advised.

### **3.4 Remembering a National Co-ordinator**

During the conference and workshop opening ceremony guests and participants stood to observe a minute's silence in remembrance of Mr Alex Gacuhi, Kenya's ATPS National Co-ordinator, who had passed away in September 2006.

### 3.5 Celebrating a Woman's Success and Achievement

At the end of the conference and workshop opening ceremony a significant number of participants, mostly women, raised concern over the failure on the part of the facilitator to properly introduce the chair for the session. Concern was raised that Prof Sarifa Fajilde, the Advisor to the Minister for Science and Technology was a woman who had made tremendous achievement as an academic and as a government official in a world where women rarely excel. To address the concern, Prof Fajilde was re-introduced not only as advisor to the minister but also as a member of the Pedagogical University where she had been since 1989. She had also served in the past six years as Mozambique's National Director for Secondary Education and as Advisor to the Minister of Education and Culture. She had worked as a mathematics teacher since 1978 and was a holder of a Masters degree from Australia and a PhD degree in mathematics education from Cape Town. Prof Fajilde has two children.



**Prof Dr Eng Venancio Massingue, Minister of Science and Technology, Mozambique and Prof Norah Olembo, Chair, ATPS Board addressing journalists before the official opening**



**From Left, Eng Lourino Chemane, National coordinator, ATPS-Mozambique, Dr Kevin Urama, Director of Research, ATPS, Prof Venancio Massingue, Prof Norah Olembo and Prof Sarifa Fajilder, Advisor, Minister of Science and Technology**

# 4 Conference Plenary and policy Presentations

## 4.1 Banji Oyeyinka

### *Systems of Innovation and Development: A Framework*



In this presentation, Prof Banji Oyelaran-Oyeyinka of the United Nations University-Maastricht Economic and Social Research and Training Centre on Innovation and Technology (UNU-MERIT) at Maastricht, Netherlands discussed science and technology policy, giving examples of their development, formulation and implementation in various countries and demonstrating where and why they succeeded or failed. Science policy in underdeveloped countries was impeded by the disproportionate concern placed on research and development and the fact that technology policy was not viewed as an inherent part of industrial development policy. He defined an innovation system as a network of firms and other agents that together with institutions and policies bring new products, processes and new forms or organization. He further defined innovation as the continuous improvement of a product, design and quality; as changes in organization and management routines; as increase in efficiency and environmental sustainability; and as ability to manage partnerships, form linkages and learn through them.

Explaining the role of innovation policy, Prof Oyeyinka said policies – whether tacit or explicit – play a role in setting the parameters within which actors make decisions. He said innovation processes are not the outcome of a single policy but a set of policies that collectively shape the behaviour of actors.

The presenter said technology policy in developing countries should be seen as an integral part of industrial development policy and gave examples of the South Korea and Taiwan that had adopted highly interventionist strategies on trade and domestic resource allocation to promote indigenous enterprises and strengthen their national economies. Exports in these countries were led by local firms, and national policies allowed them to build impressive technologies. The policies in these countries, he said stimulated research and development, the building of technology-support institutions and the establishment of small and medium-size enterprises. Also, as part of the direct intervention policy, governments in these countries provided selective and functional support by setting up a massive technology infrastructure and by building capacities for the development of general and technical skills.

## 4.2 Padmashree Gehl-Sampath

### *Sectoral Systems of Innovation for Health*

This presentation was delivered by Dr Padmashree Gehl-Sampath of UNU-MERIT. She said a look at Africa's health innovation systems was justified because 50 percent of the people in developing countries lack access to essential drugs; 50 – 90 percent of drugs in these countries are paid for out-of-pocket; and up to 75 percent of antibiotics in these countries are prescribed inappropriately. In addition, only 50 percent of patients worldwide take medicine correctly; antimicrobial resistance to drugs is growing



for most major infectious diseases; and less than one in three developing countries have fully functioning drug regulatory authorities. She also observed that 10 – 30 percent of sampled drugs fail quality control tests in many developing countries.

In justifying the concern with health innovation systems in Africa, Dr Sampath further observed that not less than four MDGs focus on health. It also is worth noting that more than 90 percent of the worldwide pharmaceutical production by value and 97 percent of research and development activity took place in developed countries. She said a sectoral perspective on health innovation would help to take a holistic approach by focusing on knowledge and technological domain, the actors and networks as well as the institutions. A wide-range of policies, she said, affect health innovation systems. These include science and technology policies, pharmaceutical production policies, policies on small and medium enterprises, educational policies, technology transfer policy, and intellectual property policy.

The presenter gave the example of India as an important emerging player in the pharmaceutical industry owing to its cost effectiveness, strong manufacturing base, strong science base, well-established market outlets, and access to highly trained scientists.

While gigantic steps in the field of innovation in health and related areas were being made, a significant part of Africa's population was still stuck on traditional remedies – which catered for two thirds of African people. How traditional healing knowledge would be mainstreamed into modern health systems is still a thorny issue, the speaker pointed out, because there still are credibility questions being raised about it.

#### **4.3 Cheikh Oumar Anne**

##### *National Innovation System in Senegal*



Dr Cheikh Oumar Anne, the Director-General for Technology Innovation Alliance in Senegal, presented a case study of his country's innovation system. For Senegal, the innovation process involved research and enterprise because, he argued, innovation is about development. The innovation system in the country accommodates institutions and business firms in order to add value. An agency for promotion of technology in the country had been set up, a clear testimony to Senegal's determination to use science and technology as agents of development.

Senegal is, in addition, seeking appropriate tools of wealth creation in such areas as agriculture. An example is an effort that is underway to preserve perishable commodities such as mangoes. There also are efforts to come up with identical products that would be marketed through African Growth and Opportunity Act (AGOA).

The speaker demonstrated the various programs and projects that Senegal has put in place to promote technological development.

#### **Issues Arising from the Presentations**

- (i) A participant wondered how a science and technology culture that is all-embracing would be developed for individual countries taking into cognizance the complexity of the technological process.

- (ii) A participant noted that math and science literacy was key to the development of a successful culture of innovation. He called on African countries to move in the direction of math and science literacy for progress and noted that South Africa had already taken that step by making mathematics and science compulsory in school.
- (iii) A participant argued that innovations must be built on partnerships that are effective and wondered if Africa had the mechanisms to lead to innovation. A further question was who would be in charge, who would catalyze the initiative for innovation.
- (iv) A participant argued that Africa requires research for the benefit of the people. But most research on the continent is commercial, he said, and governments hardly fund research projects. What is the way out of this situation?
- (v) A question was asked on how to handle a person who combines both traditional and modern medical practice and assist them to reveal their secrets in the context of intellectual property rights (IPRs) for the benefit of the continent.
- (vi) A participant recalled that at the previous ATPS conference and workshop a proposal was made to have every African government commit one percent of its gross domestic product (GDP) to research and asked how many countries had honored the proposal. "And should we not go beyond the 1 percent for impact?"
- (vii) It was observed that the fight against poverty impacts on other areas, and the question on how ATPS can steer the enterprise factor was posed.
- (viii) Prof Norah Olembo said although the presentations were "excellent" they did not indicate what was missing from the various science and technology policies on the continent. She also sought to know if there were strategies that could be employed to enable Africa to catch up with the developed world. The ATPS chair called for a halt to the use of resources and technologies in Africa by outsiders without offering adequate compensation. She further argued that the term "innovation systems" appeared new and thus sounded complicated during the presentations and called for a more down-to-earth term.
- (ix) A participant observed that emphasis had been placed on the need to develop a culture of innovation but wondered exactly how this would work in the context of globalization. India's success story had been given, he said, but failed to see how Africa would design its own innovation system. A further question was who would define policy and the priorities for each African country - should this be left to the market?
- (x) It also emerged that the discussions at the conference were skewed towards the need for Africa to catch up with the developed world technologically even though most countries were unaware of what was going on in the world. What should be done to create the necessary awareness on the continent?
- (xi) It was pointed out that the issue on how incentives should create the necessary environment to allow the development of a culture of innovation had not been addressed. There is need to make decision makers appreciate the efforts being made and create incentives for them to spearhead the work.

### **Responses to the Issues Raised**

- (i) Lynn Mytelka (resource person) in response to Prof Olembo's concern said "Innovation is the outcome of your research project... A new process... a thing". She revealed International Livestock Research Institute (ILRI) was designing a methodology that would help end the confusion.
- (ii) On how to stimulate a culture of innovation, Prof Banji Oyeyinka said an innovation is a product, a process that emerges from the structure, from a system of production.

The strengthening of a culture of innovation is germane to the history of a specific country, the education system, level of literacy and prioritization of math and science education. For a culture of innovation to be created there must be an intersectoral and an integrated science and technology policy.

- (iii) On who is responsible for the creation of an innovation policy, Prof Banji said it was the responsibility of governments, in conjunction with all partners. He pointed out that there had been a tendency to leave out partners in the past as governments attempted to do everything. All must be involved, he clarified, with the government taking the lead role.
- (iv) On the role of research and development (R&D) in development, Prof Banji said investment should be concentrated on innovation rather than on research and development. R&D is a component of the science and technology development process.
- (v) Dr Sampath, in response, called for rights to protect traditional medical practitioners, noting there were no recognized or written rights for people in the practice. Rights would give incentives to traditional healers to reveal their knowledge and secrets. There is also a need to give credibility to traditional medical practice which is often viewed as working through trial and error, thus making scientists shun it. She said there also was a lot of traditional knowledge that needed copyright protection. "A broader view of what we want to protect should be had," Dr Sampath concluded.
- (vi) Prof Banji conceded that most research in Africa had been commercialized. He also said theft of innovations was not a new phenomenon. India and China were clear examples of what Africa can do in the field of technology. Today, however, Africa was 'feeding' the rest of the world with its raw materials rather than developing them. To integrate a culture of innovation in Africa lobbying would have to be a priority and the way forward.
- (vii) Prof Mytelka, in response, made a passionate statement on patenting and publishing. Patenting, she emphasized, is only as good as one can enforce it. Once an innovator is published, the product goes into the public domain. Africa could not stop China from making cheap products - only a powerful country like the United States could. She stressed that the point is to get innovation working - and as quickly as possible. This can be achieved by offering appropriate incentives.

#### 4.4 Lynn Mytelka

##### *New Pathways to Meeting the MDGs*



This presentation was delivered by Prof Lynn Mytelka, a former Director UNU-MERIT and also an ATPS board member. The presentation was based on research she had carried out based on case studies. The presenter said MDGs were a heuristic device that indicated what needed to be achieved without showing how we would get there. Achieving the MDGs requires new thinking, she stressed that, that changes the view of developing countries as 'technology users' and sees them as 'technology producers and innovators.' She called for the designing of new strategies that would build a 'system of innovation' with lesser emphasis on a 'system of production'.

A production systems approach focuses on inputs and outputs as well as efficiency and quality. It does not, however, take into consideration those who enjoy the range of choices - in for example, health care. An innovation systems approach, on the other hand, focuses on

the processes of change and analyses factors that shape innovation, the practices and sets of choices that affect sustainable development.

For success, effective policies must be put in place. These are industrial, science, technology and innovation policies. Industrial policies focus on production and outputs in quantitative terms. Science policies deal with the supply of knowledge, and the knowledge infrastructure, with outputs also being measured in quantitative terms.

Technology policies focus on competitiveness with emphasis on firm-level behaviour whereas innovation policies focus on dynamic processes of change, adaptation, interaction and integration.

Africa faces the danger of exclusion from the global realm of development as a result of technological change that tends to marginalize smallholders and the poor. In agriculture, for example, there is the danger of small producers being squeezed out by capital costs and high royalty payments for varieties. There are also limited incentives to develop breeding capabilities, market access, and prices are set by the high and mighty, and certification rules also work out against the less endowed.

Prof Mytelka thus called for programs that develop technologies in natural resource-based industries.

### **Issues Arising from the Presentations**

- (i) A participant observed that use of local languages must not be ignored when dealing with the problems the conference was trying to address.
- (ii) It also was noted that there had been many meetings across Africa, particularly under the auspices of the World Bank, to assess the continent's performance and its preparedness to achieve MDGs by the set deadline but a way out had not been found because the continent lags behind in development. The contributor suggested efforts be concentrated on improving food production to feed the people.
- (iii) A participant reminded the conference that ATPS had taken attendees to an ILRI farm in Ethiopia during a previous meeting where livestock development and the making of livestock products, such as cheese was extremely impressive. The participant called for the setting up of such projects in Africa to help end hunger and malnutrition.
- (iv) A contributor from Swaziland said there was heightened activity in the country in the name of MGDs and women were being exploited in the process. They would, for instance, make oil which would be taken away to benefit others.

### **Responses to the Issues Raised**

The presenter, Prof L. Mytelka, said the central question appeared to be what should be done to ensure wealth in rural areas benefited the people. The answer, she said, lay in identifying what we have and what we need. Unfortunately, she said, wrong economics was the talk in much the same way it was after World War II.

#### 4.5 Andy Safalaoh

*Applying the NIS in an African Set-Up: Preliminary Findings of a Case Study of the Maize Sub-Sector in Malawi*



This case study of the maize sub-sector in Malawi was prepared by Prof Andy Safalaoh of the Bunda College of Agriculture, University of Malawi. On policies that had a bearing on the maize sub-sector in Malawi, the presenter first discussed a general one adopted soon after independence that had a dual role. The policy was augmented in the 1970s and also in the 1990s by the country's Statement of Development Policies and, in 1995, by the Agricultural and Livestock Strategy and Plan of Action. In 2005 Malawi formulated the new agricultural policy to complement other strategies. The policy is guided by the country's Vision 2020, the Malawi Growth and Development Strategy and the MDGs, among other strategies.

The country has also formulated an input policy aimed at establishing structures for marketing of farmers' produce. It has also set up the Agricultural Productivity Investment Programme to promote agricultural development. A land reform commission was also set up in 1996 to facilitate security of tenure and equitable access to land. Also in place are an irrigation policy, a science and technology policy and a national biotechnology policy.

The presenter gave examples of innovations and technologies adopted by farmers in the maize sub-sector. These include innovations in hybrid and open-pollinated varieties for quality protein maize, post-harvest technology, irrigation at the small-scale level, and in rain-water harvesting. Other innovations recorded include contract farming, formation of farmer associations, adoption of marketing information systems – such as the use of the cellular phone, and establishment of community food banks. Other innovations include mounting of field schools for farmers, setting up of funds for inputs such as fertilizers, taking pluralistic extension approaches to farming, and distributing land to the landless.

The presenter identified policy issues that were not conducive to all actors and inadequate funding for research as among the challenges being faced in the sub-sector. Others are inadequate research and development capacity, poor information flow and poor linkages among the actors. Poor access to inputs, unreliable markets, high cost of inputs, inequitable land distribution and small land sizes as well as changes in climate are also challenges in the sector. He stressed that the way out was in strengthening the National Innovation System (NIS).

#### 4.6 Maurice Bolo

*Applying the Innovation Systems Approach to the Agricultural Sector: the Case of Kenya's Floriculture Industry*



The case study was presented by Maurice Bolo of ATPS who said floriculture in Kenya forms 60 percent of the total earnings from horticulture and 8 percent of Kenya's total export revenues. The sub-sector contributes US\$200 million to the economy annually and employs 100,000 people directly and two million people indirectly. Kenya is the largest exporter of floriculture produce to the European Union.

The presenter said the sub-sector was guided by agricultural policies such as the 1986 Sessional Paper that removed all monopolistic trends. Sessional Paper No. 1 of 1994 restricted government role to provision of public goods, and the creation of a conducive environment for agricultural produce as marketing and distribution were passed on to private sector players. He said Sessional Paper No. 1 of 1986 called for wider stakeholder participation in agriculture while Sessional Paper No. 1 of 1994 called for generation of technologies in collaboration with research institutions, and the fostering of linkages between farmers and agro-industries.

The presenter said the policies, institutions and actors that are needed to create a functional innovation system exist in Kenya. This can be borne out of the fact that the government does not interfere in agro-business, the laws enable innovation, and there are strong industrial associations and a robust private sector. The challenges facing the sector, however, include weak interactions between growers and the local research and development system, failure on the part of industry to use research capacity to diagnose problems besetting the industry, and an over-reliance on external knowledge from the international research and development system.

### **Issues Arising from the Presentations**

- (i) It was pointed out that the presentations were clear that relations between farmers and researchers are weak. For the linkages to be strengthened, deliberate action by decision-makers at the top must be taken.
- (ii) A participant was thrilled to learn flowers could be grown in Africa to earn people money but wondered how the farmers were competing with business people in the trade from China. He called for increased and large-scale growing of flowers across the continent.
- (iii) Clarification was sought as to whether irrigation from large water sources in Malawi would interfere with hydro-electric power generation.
- (iv) Further clarification was sought as to whether Kenya was growing flowers from the wild and whether materials were imported for the industry.
- (v) It was pointed out that Malawi women's fishing business faced the danger of being taken over by men even after the women had spent a lot of time learning to fish and to maneuver canoes and boats.
- (vi) Someone sought to know if sewage farming posed any problems.
- (vii) A participant observed that far too much emphasis in the presentations tended to be on developing and strengthening linkages.
- (viii) A participant said there was a danger in trying to formulate far too many policies that might eventually be contradictory. It is useful, it was suggested, to look at policies in different sectors with a view to harmonizing them for consistent progress and development.
- (ix) It was pointed out that subsidies had come out as major incentives to farming in Malawi. How sustainable are they?
- (x) Clarification was sought on the extent to which flower farming was affecting the Kenyan socio-economic and political scene considering it was carried out mainly by white farmers or farmers of Asian origin.
- (xi) Incentives for flower growing in Ethiopia were said to be exemplary and a participant wanted to know what effect this had on the country.
- (xii) Clarification was also sought on the type of taxes levied against flower farmers.
- (xiii) A further question was whether lives of people in the flowering-growing countries had improved.

- (xiv) Another question was whether there are international non-governmental organization (NGOs) in flower farming in Africa and why whenever some intervention was required foreigners got involved.
- (xv) It was pointed out that marginal costs are important in international markets but Cote d'Ivoire attempted to increase its market by 60-70 percent to beat neighboring countries but the marginal costs were far too low. Africa, it was pointed out, needs to exert control on the international market.
- (xvi) A participant sought to know the extent to which flower growers in Kenya and maize farmers in Malawi were conforming to environment standards.

### **Responses to the Issues Raised**

- (i) The Malawi presenter said liberalization of the economy had led to very high prices in the country. Subsidies that had been removed were re-introduced to combat hunger among the people. NGOs are involved in farming in the country. He also said science and innovation systems were being encouraged and their application in various places was on. In Malawi, linkages between farmers and researchers are weak, particularly between farmers and universities. There is also a lack of outreach and extension programs. In certain places, farmers decline to use fertilizers.
- (ii) The Kenyan presenter said farmers were continually innovating on the farms. Flowers were sold almost entirely to European markets and only rejects found their way to the local market. Most of the flowers grown are imported - which is a constraint - because the farmers have to pay for the imports. Majority of the flower farmers are of western or Asian origin but they consider themselves Kenyans. It is not clear what profits may be re-investing in the country and policies on health and sanitation tend to be exerted by the market. There's a move to shift flower growing business to Ethiopia because of the many taxes the farmers have to pay to the Kenyan government - as many as 35 taxes.

### **4.7 Marcelino Lucas**

#### *Mozambique's Science, Technology and Innovation Strategy*

This case study was presented by Dr Marcelino Lucas, Mozambique's Director of Planning Statistics and Cooperation who said his country had begun to appreciate the fact that technology is a cross-cutting issue. He also said technology is controversial and requires good inter-institutional co-ordination for it to be integrated in the development process. He discussed his country's innovation strategy and identified the key areas as agriculture, human resource development, education, energy, health, marine sciences and fishing, mineral resources, water and construction. The enabling technologies were identified as biotechnology and ICTs.

Mozambique's innovation strategy, he pointed out, aims to foster a culture of innovation in the country, promote grassroots innovation to help the poor and disadvantaged communities and promote research and development in industrial and public sectors. The strategy also seeks to foster transfer of technology, promote use of ICTs for good governance and service delivery and enhance human resource development. In addition, the strategy seeks to build policy instruments, establish funding policies and mechanisms for research, assess performance, and promote mainstreaming of science and technology in all sectors.

The speaker said Africa could not afford to miss the potential of innovativeness.

# 5 Panel Discussion on Efforts to Realize MDGs

The third session of the conference and workshop took the form of a panel discussion to examine what Africa must do to be on course in efforts to realize the millennium development goals (MDGs) by 2015. There had been a consensus that Africa had lagged behind in realization of MDGs and analysts were highly skeptical that the continent would be able to achieve the goals by the set deadline. The panelists were expected to make suggestions on what the continent should do to reverse the situation. They were expected to state what measures Africa should take in applying science, technology and innovation to achieve the MDGs and to also propose what such organizations as African Technology Policy Studies Network (ATPS) can do to facilitate the process.

The panelists included Dr John Mugabe of New-Partnership for Africa's Development (NEPAD), Prof Lynn Mytelka of ATPS, Prof Banji Oyelaran-Oyeyinka of the United Nations University-MERIT, Dr Roch Mongbo of Benin, Dr Sidiki Dembele of Mali, Prof Antonio Leao of Mozambique, Dr Lucas Marcelino of Mozambique and Mr Francis Kweku Amalgoh of Ghana.

Prof Banji Oyeyinka said setting goals must be a priority in efforts to realize the MDGs. Stakeholders should move away from their fixation with research, saying this was but one component of the science and technology policy initiative. Thought must be given to the design of capabilities, link systems as well as to the development of science and technology resources. Thus, stakeholders must be careful about the type of research they fund, and this would only be achieved through careful goal setting.

Goal-setting must be followed by a rigorous evaluation process that monitors successes, failures and limitations on a regular basis. The tendency on the continent was to set goals, begin implementation, fail to monitor and later begin to panic when we realize we are not achieving expected results. Policy-makers must be part and parcel of this process. However, the common trend, even at universities, has been to build capacities that policy-makers are unaware of. The building of innovation systems, therefore, must include policy-makers, legislators and universities, among other stakeholders.

Innovation systems should be designed for the long-term and must envision a wide range of actors.

Thirdly, priority setting is a must. Prof Oyeyinka painted out that there are eight MDGs and the capacity to work towards achieving them differs from country to country. Sectoral priorities, therefore, must be considered for effective realization of the goals.

Dr Roch Mongbo was very skeptical about the continent's ability to achieve the MDGs. Indeed, he posed the question whether Africa was interested in achieving them and argued that Africa's energy should no longer be riveted to achieving MDGs but to eradicating poverty and raising production on the continent.

The panelist also said there is a lack of re-assessment of MDGs by individual African countries with a view to dealing with them in specific country contexts.

Dr Sidiki Dembele was optimistic that Africa would realize the MDGs. ATPS, he said, should sensitize people on their rights and responsibilities for this to happen. In addition, a platform for synergy of actors and end-users must be created if MDGs are to be achieved.

Mr Francis Kweku said the primary question is whether Africa is ready for development. Going by Ghana's experience, the continent is not ready – and could therefore not attain the MDGs. He stressed that agriculture must first be developed if the continent is to make a step in realizing the goals. There must also be a change of thinking and priorities, a re-orientation that supplies Ghanaian mangoes to the people of Ghana and not to Europe and China. Most research in Ghana is foreign-sponsored, and thus supports foreign interests. Over-dependence on aid on the continent is creating problems for Africa – and thus making it difficult to move towards achieving MDGs.

Dr Marcelino Lucas proposed that the continent stops focusing on research for production only. In addition, there must be created a vision through which knowledge is not used for purposes of discrimination. Those with knowledge in Africa have a responsibility to those who do not have it. Attitudes must also change to give room to the creation of a culture of innovativeness on the continent. African people must begin to appreciate use of technologies to change their lives.

Prof Lynn Mytelka said Africa must broaden its agenda and involve stakeholders who had been left out, such as universities. Agricultural change must be supported, and Africa must think about local varieties of their crops that need research. Africa must think about the needs of those in need.

Equally important is the creation of mechanisms that enable Africa to learn – such as dialogue.

### **Issues emerging from the panel discussion**

- (i) MDGs will remain a dream unless the issue of leadership in Africa is resolved, a participant contended.
- (ii) Africa is too poor to move into the science and technological world. The irony is that the continent is spending huge amounts of money on the military and on elections.
- (iii) There was a clarion call from Uganda for Africa not to ignore the youth who have great potential but remain unemployed and idle. Majority of them are over 18 years.
- (iv) A participant from Swaziland called for the involvement of everyone who matters if MDGs are to be achieved.
- (v) Agenda for African countries are set by foreigners, a participant from Ghana declared. The agenda for Mozambique, she said, is replicated in Ghana although the two countries are different in many ways.
- (vi) To achieve success, research must be participatory, a contributor from Mali said. ATPS should facilitate involvement of authorities to achieve better research results.
- (vii) Padmashree Gehl-Sampath said knowledge was being confused with production. There is plenty of knowledge being generated out there at all times and there is dire need to tap it. The question, she said, should be how research projects initiated in, say, Mozambique are impacting on the grassroots. Too much valuable time was spent discussing MDGs and wondered how credit would be given to indicators that appear similar in all African countries.

(viii) Dr Kevin Urama, conducting a wrap-up of the panel discussion, underlined the need to see the 'interconnectedness' and complexity of MDGs. Secondly, he emphasized the importance of engaging all actors, even at the grassroots, for sustainability. Thirdly, he described MDGs as global issues requiring specific handling at the country level. Fourth, he voiced disagreement with those who had called for a stop to dealing with MDGs, saying Africa 'needs to engage' and to be heard. Fifth, he said Africa needs to know where it is *vis-à-vis* demand-driven research. It must also involve the youth in all initiatives geared towards achievement of MDGs.

# 6 Working Group Discussions

This session was devoted to working group discussions which were designed to facilitate closer interaction amongst the participants. It was envisaged to give all participants an opportunity to share their experiences and views on the assigned topics. More importantly, these deliberations would inform and shape the proposed ATPS regional programme on science and innovation policies in Africa. The working group members would discuss key priority issues relevant to the topic and suggest strategies and actions required to assist sub-Saharan Africa (SSA) countries achieve the millennium development goals (MDGs).

At the end of the session, each working group was expected to come up with:

- ❑ A set of key research needs that can inform how African innovation systems actors, institutions, policies, behaviors and linkages might better apply S & T and innovation systems approach to achieve the MDGs in SSA.
- ❑ A set of five key training and institutional capacity building issues that require immediate action if SSA is to achieve the MDGs.
- ❑ A set of top three prioritized recommendations to address each of the issues identified as they relate to policies, institutions, organizations, knowledge and technology generation and utilization.
- ❑ Suggestions for the role of ATPS in addressing the identified issues and achieving the recommendations.

Working Group 1 examined “The Role of Linkages, Partnerships and Mechanisms to Generate and Promote Access to Knowledge, Innovations and Technologies in Meeting The MDGs in SSA” and responded to the following questions:

- ❑ What roles can partnerships play in helping to realize the MDGs?
- ❑ Will this differ if the partnerships are within a national system of innovation or involve north-south linkages?
- ❑ Would the roles that partnerships might play differ across the MDG goals and if so, which might benefit most from which kinds of partnerships?

Working Group 2 examined: “Integrating Knowledge Systems: Towards an Inclusive Approach to Achieving the MDGs” and deliberated on how research can build on local knowledge in order to achieve the MDGs, and how you blend modern and traditional as well as local and international science to encourage innovation.

Working Group 3 examined: “Coping with Technical Change: Harnessing Traditional and Emerging Technologies for Africa’s Needs” and explored the areas and technologies of preference.

## Group 1 Report

Group 1 was tasked to examine “The Role of Linkages, Partnerships and Mechanism to Generate and Promote Access to Knowledge, Innovations and Technologies in Meeting MDG’s in Sub-Saharan Africa”

The group identified the linkage gaps between knowledge and producers as the following:

- ❑ Lack of policy harmony at the political policy level
- ❑ Poor incentives to enhance collaboration among actors

- ❑ Poor funding of fora and mechanisms to bring actors together
- ❑ Poor linkage of research to production
- ❑ Poor linkages from other actors apart from the government
- ❑ Lack of support for existing linkages to new ones

The group also examined the differences between local and global linkages and found:

- ❑ Different linkages at local and global levels
- ❑ Local linkages tend to be more sustainable
- ❑ Global linkages involve power asymmetry, e.g. commodity value chains
- ❑ Weak linkages among producers at different technological levels in the given commodity chain
- ❑ Foreign technological knowledge could be appropriated through global-local linkages
- ❑ Weak partnership among sub-Saharan countries and within components of the national system of innovations
- ❑ Lack of competitiveness in global markets for standard commodities
- ❑ Lack of organization to meet the market requirements at global level

#### **Proposed Research for ATPS**

- ❑ Study linkages at local, regional, national and international levels
- ❑ Examine through systematic study forms of linkages among local actors.
- ❑ Study value chain of selected commodities in Africa to understand the role of power and governance of the value chains.
- ❑ Study how foreign local linkages could be used to build domestic technological capacities.

#### **Action Points and Capacity Development**

- ❑ Build partnership among actors in sub-Saharan countries and within the national system of innovations. There is a need to solve our problems by ourselves.
- ❑ Build analytical capacity at all levels of the innovation system (including policy and technological capabilities).
- ❑ Look for untapped markets and promote new growth sectors.
- ❑ Foster networks among local and regional actors.
- ❑ National governments should facilitate public-private sector partnerships. ATPS should be a main advocate.
- ❑ All other actors (civil society, chamber of commerce, etc.) in the system of innovation should participate have a say in policy formulation and evaluation

#### **Linkages and MDGs Priorities**

Example 1: Local-global partnership with direct benefits to producers (small-scale flower producers in Ethiopia).

Example 2: Local-global partnership with direct impacts on producers (large scale floriculture in Kenya).

Example 3: Local-global partnership between researchers and foreign institutions.

Example 4: Partnerships triggered by crisis with longer term positive impacts (scientific joint venture to combat HIV, fish export ban to the EU in Uganda).

#### **Broad Research Agenda**

- ❑ Research program to better understand types of linkages across countries, sectors and time.

- ❑ Comparative studies of policy impact on interactions within different systems of innovations.
- ❑ Comparative studies of linkage and learning in national and sectoral systems and value chain for commodity/market linkages at national and international levels.
- ❑ Impact of knowledge and technology of producers on partnerships and competitiveness.
- ❑ Comparative studies between alternative uses of commodities (between food chain/industrial chain), e.g. cassava for food or for starch.

## Group 2 Report

Group 2 was tasked to examine “Integrating Knowledge Systems Towards an Inclusive Approach to Achieving the MDGs”

The group identified the following as the major issues to tackle in the realization of the MDGs:

- ❑ Role of indigenous knowledge (IK) in promoting research priorities.
- ❑ Link between grassroots innovative capabilities and knowledge generation capacity.
- ❑ Access to knowledge – both indigenous and knowledge generated in modern research.

The group identified health actors as

- ❑ Traditional medicine associations
- ❑ Traditional healers
- ❑ Universities and public research institutions (PRIs)
- ❑ Private sector
- ❑ Government agencies, ministries of science and technology (MoS&T)
- ❑ Rules and law-making agencies
- ❑ Health institutions and donors
- ❑ Hospitals
- ❑ Civil society, communicators, NGOs
- ❑ Consumers.

The problems in integrating traditional medicine (TM) in modern health care were identified as:

- ❑ Secrecy: incentives to reveal for TMH
- ❑ Lack of policies and laws to promote collaboration
- ❑ Low education levels among TMH, resulting in problems of consumer credibility.
- ❑ Lack of resource centres to train.
- ❑ Apathy between scientists and doctors & TMH
- ❑ Financial limitations to conduct R&D based on TM

Incentives for disclosure were identified as:

- ❑ Property rights
- ❑ Financial incentives – Mali
- ❑ Recognition of authority – Zimbabwe
- ❑ Transfer of cases – Zambia, Mali.

Issues with the larger health innovation system and capacity include:

- ❑ Lack of facilities

- ❑ Lack of private sector
- ❑ Unsustainable provision of raw materials leading to environmental degradation
- ❑ Lack of financial resources.

#### **Suggested action for ATPS**

- ❑ Support research on IPRs on TM for Africa
- ❑ Support research policies on integration of TM and modern health care.
- ❑ Support curriculum development and review to educate TMH

The other area looked into was agriculture where the actors were identified as:

- ❑ Farmers
- ❑ Agricultural associations
- ❑ Universities & PRIs
- ❑ Private sector
- ❑ Government agencies
- ❑ Rules and law-making agencies
- ❑ International associations and donors
- ❑ Civil society, communicators and NGOs
- ❑ Consumers.

The problems of IK in agriculture were identified as:

- ❑ Loss of crop varieties due to climate change, e.g. drought
- ❑ Loss of indigenous germplasm due to introduction of new varieties (from modern agriculture).
- ❑ Indigenous knowledge resources not taken into account when planning for research.
- ❑ Loss of IK information due to shift towards modern agricultural methods, e.g. monocultures.
- ❑ Low resistance of seed to disease

The problems in relation to collaboration were identified as follows:

- ❑ Indigenous agriculture is associated with subsistence farming and poor yields – so capacity to contribute and further strengthening of IK ignored in policy initiatives.
- ❑ Lack of government policies for enhancement IKS for profitable motives by e.g. organic farming.
- ❑ Lack of collaboration between universities and PRIs and private sector.
- ❑ Lack of policy initiatives to educate farmers of shifting interests and its implications (e.g. finger millet substituted by maize due to consumer preferences in Zimbabwe).
- ❑ Research priorities not set in line with local needs (indigenous breed of cattle in Zimbabwe and Swaziland).

Problems in collaboration

- ❑ Indigenous knowledge very difficult to remunerate in agriculture.

#### **Suggested action for ATPS**

- ❑ Carry out research in indigenous farming to include nutrition and commercial value issues.
- ❑ Carry out research to shape research priorities in indigenous farming to take grass root innovations into account.
- ❑ Help countries to formulate policies on the above
- ❑ Carry out research on what incentives should be given to farmers to promote indigenous farming methods.

- ❑ Facilitate the compilation and sharing of success stories in agriculture innovation in Africa.

The other area examined by the group was the environment where the actors were identified as:

- ❑ Farmers
- ❑ Chiefs/traditional rulers
- ❑ Private sector, universities
- ❑ Local communities
- ❑ Environmentalists, NGOs, civil society,
- ❑ Government agencies and ministries

#### Problems in IK – Environment

- ❑ Lack of prioritization of environmental outputs: preference on environmental products to environmental services
- ❑ Breakdown of community structures and values
- ❑ Reduced credibility of IK leading to mistrust
- ❑ No direct commercial motive of IK leading to its reduced promotion and use.
- ❑ Continued use of environmentally unsustainable practices.

#### Collaboration in IK – Environment

- ❑ Lack of focus on education in environmental sciences
- ❑ Lack of prioritization of indigenous knowledge development in environment.
- ❑ Lack of finances for environmental research.
- ❑ Lack of focus on education in environmental sciences.
- ❑ Lack of finances on environmental research.

Success stories in conservation were given as follows:

- ❑ Uganda – saving of the grey headed gull in Lake Victoria by local community with assistance of United Nations Development Programme (UNDP).
- ❑ Zambia – 25 percent of wildlife conservation profits filtering to local communities for clinics, schools, bridges, etc through administrative management design (ADMADE) programme. Also closed fishing season – December to February – observed by all.
- ❑ Zimbabwe – wildlife conservation profits to the community through community areas management programme for indigenous resources (CAMFIRE) programme.
- ❑ Zanzibar – Octopus fishing control with assistance from United States Agency for International Development (USAID)
- ❑ Mali – control of fishing activities through by-laws enforced by local leaders in the communities.

#### Suggested action for ATPS

- ❑ Conduct research on environmental indigenous knowledge to be integrated into research issues.
- ❑ Facilitate review of environmental laws and policies to include environmental knowledge.
- ❑ Facilitate the compilation of success stories on environmental conservation.
- ❑ Help structure course curriculum for secondary and tertiary education in environmental sciences.

## Group 3 Report

Group 3 was tasked to examine the topic “Coping with Technical Change: Harnessing Traditional and Emerging Technologies for Africa’s Needs”

Three issues were prioritized and covered: Agriculture, Health and Education.

### Agriculture

Traditional technologies in Africa have been applied over the years. Exemplary case includes visual selection of seeds. The method is however not consistent and the quality of seed varies from one year to another.

Some new technologies emerging from science-based research, such as genetically modified (GM) food production, have the potential to address issues of food security. Issues to be considered for discussion are capacity to adapt these technologies, favourable policy framework, general acceptance and the basis for acceptance. In particular, we need to be specific on how to address the issue of food security.

### Health

Common diseases such as malaria, tuberculosis, cholera and malnutrition are life-threatening to majority of our people. The situation is exacerbated mainly by:

- ❑ Wide spread malnutrition, making the fight against diseases difficult
- ❑ Poor disease control
- ❑ Lack of access to treatment
- ❑ Poorly equipped treatment facilities
- ❑ High cost of medicines which are patented outside Africa
- ❑ Poor drug compliance and emerging drug-resistant diseases
- ❑ Lack of funding for research and capacity
- ❑ Poor incentives in public health in general.

### Education

Education affects all other development sectors and hence it is critical to the attainment of MDGs. There is a need to overhaul our education system so that it focuses on Africa’s development needs. We should diversify our knowledge base so that we have capacity for industrial production which includes adding value to our produce for the export market. It is therefore important that industrial research institutes are established to address these issues.

Despite the fact that majority of Africans use traditional medicines this has been totally ignored in our education systems. To a very large extent, our culture and values have not been incorporated in the system. It is critical that our traditional knowledge system and way of life are integrated into the school curricula.

### Issues Emerging from Working Group Discussion Reports

- (i) It was observed that indigenous knowledge is often communal and one of the questions raised asked how intellectual property rights would be applied to protect what belongs to many people.
- (ii) It also was observed that traditional medicine required standardization so that its dispensation may also be in clear doses.

- (iii) A lot of innovation was going on in the field of traditional medicine and indigenous knowledge but the areas were surrounded with secrecy. ATPS was called upon to identify traditional healers in Africa with a view to documenting their work and knowledge.
- (iv) It was pointed out that the African Union had carried out a lot of work on indigenous knowledge and published four volumes on the subject.
- (v) It was reported that World Intellectual Property Organisation (WIPO) was working on intellectual property rights. In the case of indigenous knowledge, it was reported that an individual could not hold rights as the knowledge was communal. It was stressed, therefore, that communities should work together to reach an appropriate solution to the problem.
- (vi) HIV/Aids is a cross-cutting issue but it had not featured in the discussions, a contributor noted.
- (vii) Information should be available at all times on the implications of the use of technology, especially with regard to biotechnology, a participant said.
- (viii) Ways and means should be found to accommodate traditional medicine in Africa's health systems. Criteria such as industrial use may be obstacles to mainstreaming traditional medicine.
- (ix) Africans are opposed to genetically modified organisms (GMOs) because they have little knowledge and information on the technology. People must be educated on the technology.
- (x) GM foods should be supported on account of Africa's rising populations. The continent cannot rely on local breeding methods. More money should be devoted to equipping and modernizing Africa's educational institutions to enable them to catch up with those in the rest of the world.
- (xi) Protection of indigenous knowledge is complicated by territorial boundaries that separate the same people. The matter should therefore be handled collectively – it cannot be left to individual countries.
- (xii) To resolve the issues being raised there is a need to remain focused to the program of ATPS.

### **Other suggestions**

Availability of energy hampers revolutions in agriculture and industrial sectors, which would have contributed in poverty eradication efforts. Biomass (energy from plants) can be integrated for sustainable energy supply; solar cookers can also be used. ATPS should advocate for rural electrification.

Major issues	Responses required to effectively address the MDGs	Suggested actions to be taken by ATPS at regional/national levels over the next three years
<b>AGRICULTURE</b>		
<ul style="list-style-type: none"> <li>• Africa was marginalized in the technological revolution.</li> <li>• Hindered biotechnology adaptation.</li> <li>• Funding for availability of seeds for BTs (expecting rise in cost in future)</li> <li>• Climatic changes</li> <li>• Poor agricultural techniques</li> <li>• Lack of agricultural research facilities and human resources</li> <li>• Lack of capital</li> <li>• Lack of Government commitment.</li> <li>• agriculture production that is not demand oriented</li> <li>• Low productivity for increasing population/demand against overcoming malnutrition.</li> <li>• Lack of post harvest processing industry</li> <li>• Exportation of unprocessed agro products.</li> <li>• Focus on western markets for agro products.</li> <li>• Lack of supportive infrastructure for agro production</li> </ul>	<ul style="list-style-type: none"> <li>• Africa should master biotechnology (to have choice whether to adapt or not because it will have economic and financial impact in future)</li> <li>• Policies to reduce the scale of risks associated with biotechnology rather than discouraging its use (entry and exit must be defined)</li> <li>• Linking farmers to supplies and markets, and assist them to meet standard set by the market.</li> <li>• ICT should be used to promote agriculture.</li> <li>• Laboratories established by NEPAD in Kenya, South Africa and Cameroon should be used regionally.</li> <li>• National processing industries for agro produce should be established (discourage exportation of unprocessed agro produces).</li> <li>• Regional markets under COMESA need to be reviewed and stimulated</li> <li>• Improved infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>• Advocate for use of biotechnology based on availability of capacity and human resources.</li> <li>• Advocate for sustainability of agro production focusing resource allocation.</li> <li>• Advocate for post harvest processing or value addition to agro produce.</li> <li>• Advocate for strong linkage between actors in agriculture.</li> <li>• Advocate for using of ICT in enhancing productivity in agriculture.</li> <li>• Advocate for regional cooperation and collaboration.</li> <li>• Advocate for the removal of trade barriers between African states.</li> <li>• Advocate for improved infrastructure.</li> </ul>
<b>HEALTH</b>		
<ul style="list-style-type: none"> <li>• Child mortality results mainly from malnutrition and mothers' health</li> <li>• Majority of Africans depend on traditional medicines.</li> <li>• Lack of promotion for traditional medicines and healing techniques.</li> <li>• Complexity of traditional healing extending from biological to psychological issues.</li> <li>• Traditional medicine is not patentable under current laws.</li> <li>• Traditional treatment dosage not quantified.</li> </ul>	<ul style="list-style-type: none"> <li>• Improved nutrition to mothers</li> <li>• Research on active constituents in traditional medicines and effectiveness for treatment.</li> <li>• Research on traditional treatment techniques (knowledge, diagnostic and prescription).</li> <li>• Establish set of retrievable information on traditional healing knowledge and skill for transferability.</li> <li>• Establish an inventory of all endangered species</li> <li>• Mechanism should be devised to address the issue to compensation for disclosure of</li> </ul>	<ul style="list-style-type: none"> <li>• Advocate for research and use of traditional medicines.</li> <li>• Advocate for dialogue between actors such as traditional practitioners, medical doctors, scientists and policy makers.</li> <li>• Advocate for interface between traditional practitioners and medical doctors.</li> <li>• Advocate for relevant policies for IKS.</li> <li>• Advocate for research in IKS in general.</li> <li>• Advocate for the preservation of endangered medicinal plants.</li> </ul>

<ul style="list-style-type: none"> <li>•Lack of research on traditional medicines so that active constituents are known.</li> <li>•Endangered traditional medicinal species.</li> </ul>	<p>traditional healing knowledge system (IPR issues).</p> <ul style="list-style-type: none"> <li>•ICTs can be used.</li> </ul>	<ul style="list-style-type: none"> <li>•Advocate for ICT connectivity in rural areas.</li> </ul>
<b>EDUCATION</b>		
<ul style="list-style-type: none"> <li>•The focus is on funding primary education, but secondary and tertiary education is left unattended.</li> <li>•Outdated curricula that do not take into account actual needs for Africa.</li> <li>•Curriculum that fails to reveal capacities of local scholars.</li> <li>•Inadequacy of teachers and distant schools, especially in rural areas</li> </ul>	<ul style="list-style-type: none"> <li>• Consider education as a strategic weapon for development.</li> <li>•Integrate lifelong learning and training to build up capacity.</li> <li>•Tailor made curricula, reviewed to cover dynamic societal needs.</li> <li>•Africa regional staff/student exchange programmes.</li> <li>•Periodical evaluation of education system to cover emerging issues and technologies.</li> <li>•Convene formal and informal education systems</li> </ul>	<ul style="list-style-type: none"> <li>•Advocate for education policy review.</li> <li>•Advocate for periodic curriculum review to cover Africa’s needs.</li> <li>•Advocate for lifelong learning practices for capacity building purpose.</li> <li>•Advocate for informal field training.</li> <li>•Advocate for integration of traditional knowledge system and way of life into school curricula</li> </ul>

# 7 Methodological Issues

## Innovation Systems Frameworks: Concepts and Methodological Issues

Prof Banji Oyelaran-Oyeyinka made the presentation on innovation systems frameworks based on case studies. He demonstrated the need to clearly show the objectives of a case study and the expectations, and outlined the innovation systems principles. The objectives of case studies are to map the innovation systems by identifying key actors, their interactions and boundaries. The objectives also include explaining the performance of interventions in terms of the innovation capacity as well as identify systems failures. The objectives further include developing practical options to strengthen the innovation system in which initiatives are situated.

The presenter defined an innovation system as one where all the actors and their interactions involved in the production and use of knowledge, and the institutional and policy context that shapes the processes of interacting, knowledge sharing and learning.

Innovation systems principles focus on innovation, linkages partnerships and networks. The principles take cognizance of the diversity of actors, the role of institutions and policies. They also take cognizance of learning and capacity development as well as evolution of contexts and connections. The innovation system timeline and evolution considers the central message and the sources of information. In examining the domestic policy, the questions to consider are:

- ❑ What are the set of policies that should be put in place to encourage innovation?
- ❑ Which ones are having a positive impact on the behaviour of actors and organizations and which ones are not?
- ❑ Are there contradictory policies that are counteracting each other? Are some of the dormant policies and support structures being affected by habit, practices and institutions of actors and organizations and what additional measures or incentives would be needed to account for this?

In system mapping the following should be considered:

- ❑ Who are the main actors and organizations in the innovation system, what role do they play and what are their skills and competencies?
- ❑ Which actors and competencies are missing?
- ❑ Are policies required to change the role of the public sector or to encourage others to play different roles or play existing roles more effectively?
- ❑ What is the extent of linkage between organizations? What is the nature of these links and do they support interaction and learning? Which links are missing and what types of linkage need to be encouraged?

In looking at habits and practices consider:

- ❑ What habits and practices do organizations have that restrict knowledge sharing, learning, investing and risk taking and inclusiveness of the demand side?
- ❑ Are there habits and practices that exclude poor stakeholders?
- ❑ Which habits and practices should be developed and in particular organizations? Are the policies designed to support innovation being counteracted by existing habits and practices?
- ❑ What measures should be put in place to account for this?

## 8 Exhibition by National Chapters

Seven countries mounted an exhibition at the conference and workshop to show what they had achieved and what progress the national chapters had made back at home. Those who participated in the exhibition were Cameroon, Lesotho, Ethiopia, Swaziland, Ghana, Cote d'Ivoire, and Burkina Faso.

Ghana was keen to demonstrate that the country had begun to evolve a policy on innovation, science and technology. The chapter's main success, however, was in hosting the Second African Youth Congress on Food Security and Health.

Swaziland had mounted two major workshops on science and technology. The country's chapter had also been re-launched and was working closely with stakeholders in an effort to achieve the goals of ATPS. The chapter had also developed two papers on ATPS initiatives as well as on MDGs, water and the environment. The chapter was busy working on a policy on science and technology.

Cameroon was keen to have African people re-discover their country and took great pride displaying their research output. They also displayed materials showing the rich Cameroonian culture and heritage.

Mozambique's Minister of Science and Technology visited the exhibition and commended those who mounted the display.

Swaziland was declared to have mounted the best stand.

# 9 2006 ATPS Annual General Meeting

## Remarks from the ATPS Chairperson and Board Members

Prof Norah Olembo, the Chairperson of the ATPS Board, observed that the conference and workshop had been a great success. It had opened room for dialogue on problems besetting Africa and ATPS would 'sieve' through the ideas and proposals generated, with a view to implementing those considered to be priority.

Prof Samuel Wangwe observed that development could not be achieved without employing technology. He expressed satisfaction at the way the conference had addressed issues of development and called for more actors to be brought on board.

Prof Lynn Mytelka said energy and commitment were noticeable at the conference. She congratulated ATPS on spreading its tentacles, saying the network had started small but had expanded to Francophone and Lusophone countries in Africa. She commended translators for doing a good job and further said she was impressed by the policy recommendations made. "I think we need more members from civil society and elsewhere to make this more inclusive".

Prof Oliver Saasa noted that the level of discussions was high and said focus should be riveted on the achievement of MDGs. He said one-third of African countries ought to have realized 50 percent of MDGs by 2015 and called on all to face the challenge. "The challenge is to demonstrate we can, as Africans, make a difference using innovation".

Dr Kevin Urama said he was optimistic that the conference and workshop had been the beginning of a truly beneficial process. He encouraged participants to engage with the stakeholders in their home countries

Ms Sheila Maina briefed the gathering on the ongoing ATPS programs including Water, Health and ICT. She updated the meeting on progress towards hiring the Network's new Director of Research. She explained that over 53 candidates applied for the post. Short listing and interviews have been conducted and the successful candidate has been informed. He will begin duty in due course.

## ATPS Award Ceremony

At the 2006 ATPS annual general meeting, ATPS Awards were won as follows:

- |    |                                   |   |               |
|----|-----------------------------------|---|---------------|
| 1) | Best Exhibition Award             | : | Swaziland     |
| 2) | Most Innovative Advocacy Activity | : | Lesotho       |
| 3) | Best Effort Chapter               | : | Mozambique    |
| 4) | Best Overall Chapter              | : | Cote d'Ivoire |

## The ATPS 2007 Conference and Workshop

It was agreed that South Africa would host the 2007 ATPS conference and workshop.

# 10 Closure of Conference and Workshop

The 2006 ATPS conference and workshop was officially closed by Prof Antonio Leao on behalf of the Minister of Science and Technology. He said the meeting was a milestone in Africa's development as it had brought scientists together to reflect on the role of science and technology as a tool for alleviation of poverty and realization of MDGs.

He said scientists are soldiers who must use knowledge to fight poverty and bring about development. "We have shared experiences... we have had dialogue," he said, congratulating participants on their contributions. "Let this not be the end... let us ensure we use the lessons to improve the welfare of people."

## **Remarks from the Mayor of Abidjan**

The mayor of Abidjan, Cote d'Ivoire, thanked ATPS for organizing the conference: The meeting he said, had reassured him that Africa had great hope. "When I attend a conference like this - of people like you - I am greatly encouraged about the future of the continent."

The mayor sought to know how he would be of use to ATPS and called on African governments to support the unique efforts of ATPS to foster S&T in Africa.

## **Vote of Thanks**

Ms Charlotte Wonani from Zambia, in passing a vote of thanks, thanked the Mozambique government for supporting the hosting of the conference and workshop. She singled out the Minister of Science and Technology for special tribute for having devoted "human and material support" to the meeting. The ATPS Mozambique Chapter also won accolades for its warm hospitality and for the onerous task they had borne in hosting the conference and for its visible role in formulating S&T policies in Mozambique. She also thanked the ATPS secretariat for superb administrative work. "Dynamite comes in small packages," she said in reference to ATPS' capacity. The resource persons also won praise. Special mention went to their skills in "sharing knowledge and experiences."

# 11 National Coordinators Meeting



**The National Coordinators Meeting**

The ATPS National Coordinators' meeting took place on 30 November 2006 in Sala Milando, Pestana Rovuma Hotel and Conference Centre, Mozambique, Maputo.

Sheila Maina, the Acting Executive Director, ATPS, chaired the meeting. Dr Kevin Urama, also attended the meeting. National Coordinators from 17 national Chapters were present. Also in attendance were Kennedy Auka, Finance and Administration Manager and Lily Aduke, Communication and Outreach Manager, ATPS. The highlights of the meeting are discussed below.

## **Presentation by Dr Kevin Urama**

Dr Urama's presentation on project management highlighted the following topics:

- ❑ Definition of a project
- ❑ Selection of individuals for activities
- ❑ Reviewing grants
- ❑ Project management cycle
- ❑ Project evaluation
- ❑ Implementing the plan
- ❑ Risks and issues

## **Chapter reports by country**

- ❑ Cote d'Ivoire highlighted the outcomes of the *National Biotechnology Seminar* in Abidjan that was a follow-up to the *ATPS Regional Biotechnology Forum* in Dakar, Senegal in March 2006.
- ❑ Tanzania presented a status report on the on-going project on *Innovation Clusters*, a project that has been funded by SIDA/SAREC in Tanzania and Uganda.
- ❑ Mozambique discussed the process and challenges of organizing the *2006 ATPS Annual Conference and Workshop*. The chapter is also involved in a weekly television programme on science, technology and innovation (STI).
- ❑ South Africa reported on the progress of the chapter's strategic plans and the initiative to visit universities, the private sector and non-governmental organizations to popularize ATPS
- ❑ The key activities in Lesotho were the dissemination workshops on the *Water and Environment Programme* from the ATPS Dutch-funded small grants. The chapter also

participated actively in the country's science and technology week. The chapter held its annual general meeting and elected a new national coordinator.

- ❑ The Zambia Chapter was invited by the Communication Authority to participate in the ICT policy-making process in the country. The chapter also participated in the organization of a *Media Workshop* that was sponsored by ATPS in Lusaka, Zambia.
- ❑ The Ethiopia National Chapter collaborated with the University of Addis Ababa in the study of the coffee sector.
- ❑ The Zimbabwe Chapter reported that the country's administrative and current economic structures have affected the chapters progress
- ❑ The Benin Chapter reported its involvement in the *Regional Biotechnology Workshop* in Dakar in March and the *ATPS Second Annual Youth Congress on Food Security and Health* in Accra, Ghana.
- ❑ The Mali Chapter informed the meeting about the status of the chapter's registration that is taking longer than expected because of changes in administration offices
- ❑ The Burkina Faso Chapter participated in the *ATPS Biotechnology Dialogue* in Dakar, the *ATPS Second Annual Youth Congress on Food Security and Health* and is currently disseminating the research finding on the study on underground water in Ouagadougou.
- ❑ The Uganda Chapter hosted the *East African Regional Biotechnology Dialogue*, and is also conducting a study on *Innovation Clusters* funded by SIDA/SAREC. The National Coordinator was part of the delegation that took a tour to Finland to visit science parks. The team comprised of the private sector and policy makers. The Dutch-funded small grants research on water and environment is progressing well.
- ❑ The Swaziland Chapter held a workshop to re-launch the chapter and actively participated in a UNESCO meeting
- ❑ The Senegal Chapter sent a representative to the *ATPS Second Annual Youth Congress on Food Security and Health* and commemorated the *Scientific Revival Day of Africa*. The chapter also hosted the *Biotechnology Dialogue* in March.
- ❑ The Ghana Chapter was actively involved in the organization of the *ATPS Second Annual Youth Congress on Food Security and Health* and the *Scientific Revival Day of Africa*. The National Coordinator was also involved as a resource person during the *ATPS Biotechnology Dialogue* in Dakar. The chapter also held their annual general meeting (AGM) to assess the impact of their activities. The Chapter also published a technopolicy brief on nanotechnology that has been disseminated widely. The process of appointing a new national coordinator is on-going. the,

## Discussions

The general discussions addressed the following issues:

- ❑ The need for timely reporting, by national coordinators, on chapter activities
- ❑ The importance of pro-activity among national coordinators in searching for information from the ATPS Secretariat, including regular visits to the ATPS Website for information
- ❑ The need to train newly-appointed national coordinators in certain aspects of chapter coordination
- ❑ The importance of ATPS to publish research findings in international journals and agree on acknowledgement modes
- ❑ The importance of accuracy while translating text from French to English. The francophone national coordinators offered to help

## Way forward

The following actions were agreed upon:

- ❑ That the ATPS Secretariat organizes an away day for national coordinators to discuss better linkages between the Secretariat and the national coordinators
- ❑ That the national coordinators initiate an e-forum to open discussions and information-sharing among themselves
- ❑ That national coordinators, in future, will send the chapter reports to the Secretariat, to allow comprehensive reporting to the board
- ❑ That the ATPS Secretariat will tap human and intellectual resources, among national coordinators in some of their activities
- ❑ The national coordinators will forward a one-page summary of their curriculum vitae (CVs) for uploading in the ATPS Website to help in promoting ATPS and their personal careers



Prof Zacharia Matsela, (centre) Senator, Lesotho Parliament and immediate former National Coordinator, ATPS-Lesotho during the National Coordinators meeting, On his right is Dr Rubin Pillay, National Coordinator, ATPS-South Africa and on his left Dr Spirit Tlali, the new National Coordinator, ATPS-Lesotho

# Appendix 1: Conference and Workshop Programme

ATPS/MCTM CONFERENCE AND WORKSHOP  
SCIENCE, INNOVATION, TECHNOLOGY AND THE AFRICAN SOCIETY

**Monday, 27 November 2006**

*Venue: Sala Mabula*

## **Opening Session**

*Chair: Prof Dr Sarifa Fagilde, Advisor to the Minister of Science and Technology*

09:00 - 10:00      Welcome remarks from Eng. Lourino Chemane, *National Coordinator, ATPS Mozambique*  
Brief remarks from Dr Osita Ogbu, *Executive Director, ATPS*  
Brief remarks from Prof Norah Olembo, *Chair, ATPS Board*

**Opening Address: Prof Dr Eng. Venâncio Massingue, Honourable Minister for Science and Technology, Mozambique**

10:00 - 10:30      TEA/COFFEE BREAK and PHOTOSSESSION

## **Session I**

*Chair: Dr Arsene Kouadio Konan National Coordinator, ATPS Cote d'Ivoire*

10:30 - 11:00      **"Towards Regional Innovation Systems in Africa: Policies, Programmes and Practices"** by John Mugabe, *Executive Secretary, NEPAD S&T Commission*

11:00 - 11:30      **"Systems of Innovation and Development: A framework"** by Prof Banji Oyeyinka, *United Nations University/MERIT*

11:30 - 12:00      **"Sectoral Systems of Innovation: An Application to the Health Sector"** by Dr Padmashree Gehl Sampath, *United Nations University/MERIT*

12:00 - 13:00      Open Discussion

13:00 - 14:30      LUNCH

*Luncheon speaker: "Science and Technology Parks as Stimuli for Industrial Development in Africa: Experiences from Finland"* by Prof Joseph Obua, *University of Makerere and ATPS National Coordinator, Uganda Chapter*

## **Session II:**

*Chair: Prof Zacharia Matsela, National Coordinator, ATPS Lesotho Chapter*

14:30 - 15:00      **"New Pathways to Meeting the MDGs"** by Prof Lynn Mytelka, *former director United Nations University/MERIT and ATPS Board Member*

15:00 - 15:30      Open discussion

15:30 - 16:00      Tea/Coffee break

16:30 onwards      ATPS Marketplace/Exhibition and Networking

**19:00 - 21:00      Cocktail Reception hosted by the Ministry of Science and Technology at the pool area**

**Tuesday, 28 November 2006**

**Session III:**

08:30 - 11:00

**Panel Discussion** – Achieving the MDGs in sub-Saharan Africa through Science, Technology and Innovation: What must change?

Sub-saharan Africa is lagging behind in all the MDGS and analysts are skeptical that these goals will be achieved in Africa by 2015. Is it too late for Africa to turn this situation around? What measures should Africa take in applying S,T&I to achieve the MDGs and what can organizations like ATPS do to facilitate that process?

*Moderator:* Dr Osita Ogbu, *Executive Director, ATPS*

*Panelists:* Dr John Mugabe (NEPAD), Prof Lynn Mytelka (ATPS Board), Prof Banji Oyeyinka (UNU/MERIT), Dr Roch Mongbo (Benin), Dr Sidiki Dembele (Mali), Prof Dr António Leão (Mozambique)

*Rapporteurs:* Ms. Charlotte Wonani (Zambia) and Dr Papa Alioune Ndiaye (Senegal)

11:00 - 11:30

TEA/COFFEE BREAK

11:30 - 13:00

**Case studies** – Application of Innovation Systems in Africa

This session will deal with the concept of innovation systems, its relevance and applicability to the African situations. Case studies will be presented from **Senegal, Malawi** and **Mozambique** giving experiences in applying the National Systems of Innovation in the African set up

*Moderator:* Prof Banji Oyeyinka

13:00 - 14:00

LUNCH

**Session IV**

**(Note: The water and environment session begins at the Sala Milano from this session onwards)**

14:00 – 16:00

**Working group sessions**

Three sub-thematic working groups will be constituted and the working group sessions will run concurrently. Each working group will have a convener (chairperson), a lead discussant and a rapporteur. The three working groups will address the following areas:

WG1: The role of linkages, partnerships and mechanisms to generate and promote access to knowledge, innovations and technologies in meeting the MDGs in SSA

WG2: Integrating knowledge systems towards an inclusive approach to achieving the MDGs

WG3: Coping with technical change: harnessing traditional and emerging technologies for Africa's needs

16:00 - 16:30

Tea/Coffee break

16:30 – 17:30

**Working group sessions continued**

## 29 November 2006

### Session V

Chair: Dr George Essegbey, *National Coordinator, ATPS Ghana Chapter*

- 08:30 - 10:00      Reports from working groups
- 10:00 - 10:30      TEA/COFFEE BREAK
- 10:30 - 13:00      Methodological issues on applying the NSI framework  
**The ATPS Board meeting will be held concurrently next to the Secretariat on the 1<sup>st</sup> floor of the hotel**
- 13:00 - 14:00      LUNCH BREAK

### Session VI

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

- 14:00 - 15:15      ATPS Annual General Meeting
- 15:15 - 15:45      Closing ceremony
- 15:45 -              Field trip to the Pequenos Libombus dam and city tour

**19:00 onwards** A closing dinner will be held at the Docks restaurant. Pick up will be from the hotel lobby at 7pm sharp.

## 30 November 2006

*Venue: Sala Milando*

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

- 09:00 - 11:00      National Coordinator's meeting

## Appendix 2: List of Participants

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