The 2006 ATPS Annual Report

List of Abbreviations

ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ASEE	African Society for Ecological Economics
ATPS	African Technology Policy Studies Network
AYFST	African Youth Forum for Science and Technology
Bio-EARN	the East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development
CIPIH	Commission on Intellectual Property Rights, Innovation and Public Health
CNRA	Centre Nationale de Recherche Agronomique
CoET	College of Engineering and Technology
CSIR	Council for Scientific and Industrial Research
CTA	the Technical Center for Agriculture and Rural Cooperation
ECOWAS	Economic Community of West African States
FARA	Forum for Agricultural Research in Africa
FPEAK	Fresh Produce Exporters' Association
GM	Genetically Modified
GMOs	Genetically Modified Organisms
HCDA	Horticultural Crops Development Association
ICT	Information Communication Technology
IFPRI	International Food Policy Research Institute
INTREPID	Integrated Transboundary River Basin Management Policy Development
IPRs	Intellectual Property Rights
ISAAA	International Service for the Acquisition of Agri-biotech Applications
ISEE	International Society for Ecological Economics
ISCP-EA	Innovations Systems and Cluster Programme in East Africa
KARI	Kenya Agricultural Research Institute
KATC	Kasisi Agricultural Training Centre
KEBS	Kenya Bureau of Standards
KEPHIS	Kenya Plant Health Inspectorate Service
KFC	Kenya Flower Council
KICTANET	Kenya ICT Action Network
KIF	Kenya ICT Federation
KNUST	Kwame Nkrumah University of Science and Technology
MAXFACTA	Maximizing Facts on AIDS
MDGs	Millennium Development Goals
MESHA	Media for Environment, Science, Health and Agriculture
NABDA	National Biotechnology Development Agency
NARO	National Agricultural Research Organization
NASRDA	National Space Research and Development Agency
NEPAD	New Partnership for Africa's Development
NETWAS	Network of Water and Sanitation
NGOs	Non-Government Organizations
NIS	National Systems of Innovation
NITDA	National Information Technology Development Agency
OAU	Organization of African Unity
PEAP	Poverty Eradication Action Plan
R&D	Research and Development
RMRDC	Raw Materials Research and Development Council

RU FORUM	Regional Universities Forum for Capacity Building in Agriculture
SDC	Swedish Agency for Development and Cooperation
SIDA	Swedish International Development Cooperation Agency
SMEs	Small and Medium Enterprises
STI	Science Technology and Innovation
SSA	sub-Saharan Africa
SSIP	Small Scale Independent Providers
STDev	Science and Technology for Development
SWOT	Strengths, Weaknesses, Opportunities and Threats
TEKEL	Finnish Science Park Association
TEKES	Finnish Funding Agency for Technology and Innovation
UNAS	Uganda National Academy of Sciences
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNCST	Uganda National Council for Science and Technology
UNCTAD	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Educational Fund
W&E	Water and Environment
WHO	World Health Organization
WSP	Water and Sanitation Program
YPARD	Young Professionals' Platform for Agricultural Research

The Executive Director's Message

Sub-Saharan Africa (SSA) is lagging behind and is off target in meeting the Millennium Development Goals (MDGs) by the set deadline of 2015.The sluggish achievement of these goals, however, is not due to lack of commitment, as most SSA countries have integrated the MDGs into their national development frameworks. The tardiness, however, is due to inadequate capacity and poor institutional support systems within the continent.

The President of the *African Academy of Sciences*, Mohamed H. A. Hassan, in an editorial published in *Science Magazine*, the world's leading journal of original scientific research and global news, stated that in the early 1960s and the early 1970s, science departments in many African universities, including the University 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. However, he explained that presently these departments face a myriad of problems such that they are unable to meet even minimal departmental responsibilities, a situation that has had a grave impact on Africa's socio-economic development.

I have no doubt that we all appreciate the fundamental role science innovation and technology can play, particularly through the National Systems of Innovation (NIS), in achieving the Millennium Development Goals (MDGs) and ultimately Africa's socio-economic development.

The 2003 NEPAD Ministerial Conference on Science and Technology endorsed the role of science, technology and innovation (ST&I) for development by stressing that all African countries should introduce comprehensive national STI policies that emphasize NIS.

NIS is the technology and information flow crucial for the development and diffusion of new technologies within a nation and is facilitated by a network of intricate relationships amongst actors in the system including enterprises, universities, policy makers and government research institutions.

The African Technology Policy Studies Network (ATPS), in line with its vision to act as a knowledge broker between the various actors in the S&T technology policy process, brings together top academicians, policy makers, researchers and scientists in the continent to deliberate on the relevance and implications of the to Africa's socio-economic development. During meetings and conferences, the network members get the opportunity to exchange knowledge and ideas while raising African perspectives on using innovation systems to attain national and international development goals.

I trust that the ATPS Network can identify institutional knowledge and policy gaps that hinder the efficiency of science and innovation policy in Africa and identify training needs for African innovation actors to better apply S&T innovation systems to meet the MDGs. ATPS is wholly committed to improving the quality of technology policy making in SSA and to strengthen the region's, institutional capacity for the management of technological development.

I urge you to apply science, innovation and technology (STI) accompanied by appropriate policy to comfortably meet the MDGs and achieve economic growth.

Dr Osita Ogbu
Executive Director (ATPS)

Message from the Chairperson

Ladies and Gentlemen,

Historians will remember this century for its commitment to a global partnership and a series of time-bound targets, commonly known as the Millennium Development Goals (MDGs) aimed at improving the general socio-economic well being of humanity by 2015.

The goal is to achieve sustainable development in improved health, eradication of poverty and hunger, access to basic education and safe water, environment management, respect for human rights and equitable trade for the world's citizens.

However, in 2001, Nelson Mandela, the retired South African president asked a valid and candid question. "Will the legacy of our generation be more than a series of broken promises?"

The UNDP/UNICEF Millennium Development Goals in Africa: Promises and progress Report (2002) attempted to review Africa's progress in achieving the set MDGs and reported that despite some success stories the continent's record in achieving the MDGs was inadequate and had little impact on the poor and disadvantaged people.

The report further indicates that 23 sub-Saharan countries are failing in achieving half or more of the goals because little or no progress has been made in reversing the HIV/AIDs pandemic, and efforts have been slow for child mortality, basic education, malnutrition, improved water supply, malnutrition, maternal mortality and gender discrimination in primary enrollment. The report remains optimistic; however, even though the MDGs remain unfulfilled for Africa, they still remain feasible, affordable and achievable.

The Global Poverty Report 2002 Achieving the Millennium Development Goals in Africa: Progress, Prospects, and Policy Implications additionally, states that while countries in Asia, Eastern Europe, and Latin America and the Caribbean are on course to fulfill many of the MDGs, few African countries are likely to meet most these goals.

I am convinced that science technology and innovation (ST&I) accompanied by appropriate policy has the potential to help African countries attain the MDGs and achieve sustainable development.

According to a 2004 UNCTAD and STDev (Science and Technology for Development Network) study, promoting the application of Science and Technology (S&T) to meet the Millenium Development Goals, the application of S&T building upon local knowledge, skills and materials, is central in facilitating the achievement of all MDGs in developing countries, especially in such areas as combating poverty, improving the lives of women, and combating diseases.

The study further found that academia, government and industry partnerships are essential in building S&T capabilities and fostering market-oriented policies and that technology and business incubators are effective mechanisms for promoting academia, government and industry partnerships.

Unfortunately this is often easier said than done in Africa. African scientists have, in many fora, accentuated the need for government support in terms of strengthening national science advisory bodies and increasing investment and incentives for research and development (R&D). They

have further called for stemming the brain drain of African scientists and increased public awareness on the potential of S&T to help achieve MDGs.

The African Technology Policy Studies (ATPS) in line with its key mandate to improve the quality of science and technology policy making in sub-Saharan Africa (SSA) works with a diverse pool of policy makers, scientists, researchers, academicians, during conferences and workshops to debate and discuss the appropriate involvement of ST&I for Africa's development and particularly in attaining the MDGs.

I am aware that the national systems of innovation (NIS) play a key role in generating and utilizing new knowledge and technologies through its key pillars of networking, learning and collaborations. I hope that ATPS will enlighten you on the need to join forces, pool resources and work together in addressing Africa's development. I also believe you will gain a better understanding of the human and social systems that support sustainable governance of new technologies, S&T policies and innovation systems in Africa.

ATPS engages key stakeholders and relevant innovation system actors in an attempt to ascertain research needs and priorities that will not only ensure targeted research but will also empower stakeholders to shape research priorities to encourage ownership of the results and ensure sustainable implementation of policy recommendations with an overall aim of attaining the MDGs. Moreover, the Network also identifies and prioritizes short and long term training and capacity building needs as well as strategies to retain the highly skilled professionals in Africa.

ATPS strives to ensure that the members have a better understanding of the role of NIS in achieving the MDGs in Africa and the importance of African perspectives on using innovation systems to attain national and international developmental goals. Moreover, it also fosters inter-regional and international partnerships in support of appropriate science, innovation and technology policy development for achieving the MDGs in Africa.

Nokia, the largest manufacturer of mobile phones in the world and a market leader in mobile telephony and related communications, was initiated as research work on point-to-point communications. The company that plays an integral role in the Finnish, currently commands a global market share of approximately 36% as of September 2006 and was ranked as one of the 20 most admirable company worldwide in Fortune's list of 2006.

Few people appreciate that Nokia that has one of the highest number of patents in the world, currently spends more than the Finnish government on research and development and employs thousands of researchers .Nokia is one of the most visible examples of how a planned interrelation between research and development, science, innovation, and technology coupled with proper policy can radically transform a nation's economy. The possibilities for us in Africa are endless with S&T at the center of our development agenda. We, as African scientists, can learn from this.

History will judge us harshly if we leave a legacy of broken promises for the next generation. We all recognize the potential of ST&I in achieving the MDGs. So let us put extra effort with proper support to bridge the S&T gap and attain these goals. This is our process, let us rededicate our skills, expertise and experience in our countries to leave a legacy where food insecurity, health challenges, poverty will be a distant memory for the current and future generation of Africans.

Prof Norah Olembo
Chair, ATPS Board

Research and Capacity Building

ATPS programmatic focus is motivated by its mission to support research in science and technology, building capacity for research and policy analysis, and dissemination. However, in the current phase, the key concern of ATPS will be on closing the loop through generation of new knowledge, outreach, knowledge brokerage, dissemination and advocacy in key thematic areas. This concern is derived from both the evolution of Africa's development challenges as articulated in the Millennium Development Goals (MDGs), the resolutions of World Summit on Sustainable Development (2002), the NEPAD framework and the belief that bridging the knowledge and technological gap between Africa and the rest of the world is the key to Africa's global inclusion and prosperity.

A. The 2006 ATPS Annual 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 focused on the following sub-themes:

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

The objectives of conference and workshop were:

- 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.
- 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.
- 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.
- 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.
- 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.

At the conference and workshop, eighty six participants from the academia, policy makers, relevant innovation system actors and selected stakeholders from 23 Africa countries deliberated 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 analyses; 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.

The conference and workshop was designed 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 of 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.

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.

B. The ATPS Programme on Strengthening Health Technology Policy in Africa

Introduction

The ATPS Programme on Strengthening Health Technology Policy in Africa focuses on key knowledge and technology issues that lead to the improvement of the health delivery systems in selected African countries. The overall objective of the programme is to contribute to the

improved healthcare delivery and access in Africa by improving the quality of science and technology (S&T) policy by generating and disseminating relevant knowledge.

The purpose of the programme is to generate, disseminate and promote the use of relevant knowledge that will enhance the efficient management and use of various health technologies and frameworks. The aim is to contribute to increasing knowledge on the acquisition and use of technologies for the efficient management of healthcare systems, improve global and national policy environments, and empower grassroots and other levels by increasing knowledge and benefits of health technologies for improved health.

More specifically, the programme hopes to strengthen policies for healthcare technology management and assessment, and national AIDS coordinating institutions; reduce the incidence of HIV/AIDS through information communication technology (ICTs) and HIV-related technologies; and to enhance the use of pyrethrum and indigenous plants for managing malaria.

The Programme on Strengthening Health Technology Policy in Africa was launched in 2005 when ATPS and the New Partnership for Africa's Development's (NEPAD) S&T secretariat, held a five-day conference and workshop on 28 November – 2 December 2005 in Mombasa, Kenya. The main aim of the conference was to deliberate on how African countries can tap the existing science and technology potential and build the necessary skills, competence and expertise to address the ever increasing disease burden and other related health challenges in the continent. The conference, organised under the theme, *Science and Technology and Health Innovation Systems in Africa*, brought together over 80 participants representing various stakeholder groupings from at least 21 African countries.

The conference was organized around specific themes identified in the NEPAD health strategy, the ATPS health programme, the themes of the WHO Commission on Intellectual Property Rights, Innovation and Public Health (CIPIH) as well as other regional and international initiatives in Africa. The specific themes addressed the following issues:

- National Systems of Innovation and its Applications to Health Systems in Africa
- Health Science, Innovation and Technology Policy Research Priorities for Africa
- Brain Drain, Training and Institutional Capacity Building Needs
- National, Regional and International Programmes and Initiatives: Harmonization, Linkages and Collaborations
- Cultural Norms, Empowerment and Behavioural Change in the Fight against HIV/AIDS and other Communicable Diseases

National Systems of Innovation and its Applications to Health Systems in Africa

The National Systems of Innovation (NIS) is a relatively new approach to analyzing the relationships between S&T and development. It is a deviation from the linear (pipeline) model which assumes this relationship to be a linear process from basic research, to applied research, design, development then production. The NIS is more systemic and lays emphasis on the process by which enterprises, in interaction with each other, and supported by institutions (set of rules, policies and laws that define behaviour) and organizations (industry associations, R&D institutes, innovation and productivity centers, regulators etc) play a key role in the generation and utilization of new knowledge and technologies. It is important to note that institutions in

this context refer to the habits and practices of organizations that shape their propensity to interact, learn, access and share knowledge and take risks. These habits and practices in turn shape the tendency to be sensitive to the agendas of stakeholders.

The African Technology Policy Studies Network (ATPS) made a call for proposals under its programme on "Strengthening Health Technology Policies in Africa". The proposals, under the theme: Science, Technology and Health Innovation Systems in Africa were geared towards generating knowledge and insights that would be useful in strengthening policies for healthcare technology assessment and management. The programme is premised on the fact that effective health technology management and assessment plays an essential role in modern health care by supporting effective decision making in health care policy and practice.

Programme objectives:
Broadly defined, healthcare technology assessment studies encompass the medical, social, ethical and economic implications of development, diffusion, and the use of health technology. As such, the studies envisioned under this programme should define the following broad objectives:

- To map the health innovation systems by identifying key actors, their interactions and systems boundaries.
- To explain the performance of interventions, initiatives or projects in terms of innovation capacity, i.e. in terms of the effectiveness of the innovation system in which initiatives are situated.
- To identify systems failures that constrains innovation capacity.
- To develop practical options to strengthen the innovation system in which initiatives are situated.

Process Principles:

The following broad principles guided the studies under this programme:

- Based on sound theoretical principles and concepts of systems of innovation (SI).
- Cross-country studies will be based on 'comparative institutional analysis' studies.
- Based on sound framework that is flexible to accommodate diverse contexts and different historical times.
- Study will be policy-relevant
- Study will be based on multidisciplinary approach and principles

Structure and Composition of Country Research Teams:

In line with the multi-disciplinary requirement, it was recommended that each country establish a task team comprising the following:

- The research co-coordinating component: this should comprise a minimum of two researchers from different disciplines and will be in charge of coordinating the proposed research activities. The composition should allow for the necessary skills and expertise required to conduct the study.

- The policy contact component: this group should be composed as to permit access to the relevant policy organs in the country and should be responsible for mobilizing the support and participation of the policymakers in the study. Their roles and terms of reference should be clearly spelt out at the outset.

- The ATPS National Coordinators will ensure that researchers are adequately briefed on the focus of ATPS.

Tanzania, Uganda, Kenya, Benin, Cote d'Ivoire, Nigeria, Lesotho, Swaziland and South Africa teams will be participating.

C. The ATPS Programme on Water and Environment

Introduction

The ATPS Programme on Water and Environment is designed to utilize ATPS' areas of expertise including knowledge exchange, knowledge brokerage and advocacy. The programme emphasizes knowledge sharing at various levels primarily through:

- Joint research, training activities and deliberative workshops between African researchers, relevant government institutions and responsible water management authorities and international researchers/institutions involved in sustainable water catchments management
- Stakeholder and public participation events to share existing and new knowledge among researchers, government agencies and the public to encourage ownership of technology policies that result from the research and participatory exercises.

The main objective of the programme is to enhance the generation, use and communication of knowledge in driving environmentally sustainable use of water resources in Africa. Pursuant to the main objective, ATPS brokers and enhances the use of knowledge from partners within and outside Africa in meeting Africa's and NEPAD goals, and Millennium Development Goal 7 to attain environmental sustainability in sub-Saharan Africa (SSA).

The specific objectives are:

- to improve water management and conservation for poverty reduction
- to enhance the capability of the water and sanitation governance and delivery institutions in meeting their service delivery objectives in selected key countries
- to induce attitudinal and behavioral changes with respect to sustainable water and environmental management at various levels
- to harmonize national and regional water acts and environmental acts/policies to avert potential cross-border conflict
- to enhance knowledge exchange and collaboration between the different water stakeholders' in Africa
- to generate new knowledge and build capacity for efficient water management

(a) Programme on Water and Environment – Progress workshops for: Baseline studies on sustainable water catchments management, July 2006

As a follow up to the baseline studies that began in 2005, two regional progress workshops were held in July 2006. The first was held in Nairobi on the 14 – 15 July for country teams in Kenya and Ethiopia. A second was held in Abuja on 19 – 22 July, 2006 for country teams from Nigeria, Cameroon and Ghana. The research teams have made good progress and the study is likely to be completed in 2007.

(b) Programme on Water & Environment – Small grants, April 2005 – October 2006

Eight of the nine small grants issued in 2004 after the Addis Ababa workshop are now complete with the final reports of these papers being presented at the 2006 conference and workshop. Three abstracts from the small grants process were accepted for presentation at the International Society for Ecological Economics (ISEE) Conference which was held in New Delhi from 15 December 2006. In addition, the grantees won sponsorship to this conference through the African Society for Ecological Economics (ASEE).

The eight awarded research grants were:

- Assessment of Rural Water Supply and Management in Selected Rural Areas of Oyo State, Nigeria byA.S. Gbadegesin, *Nigeria*
- Stratégie de Gestion Durable des Zones Humides aux Niveaux Local et Communal Dans le Department du Zou, Bénin pour le Mieux être des Riverains et la Conservation de la Biodiversité by Roch Mongbo, *Benin*
- Reducing Pollution in Lesotho by Deepa Pullanikkatil-Sajith, *Lesotho*
- Ability and Willingness to Adopt Ecological Sanitation as a Water and Environmental Conservation Technology: The case for peri-urban communities of Kampala, Uganda by James Kakooza and Dave Khayangayanga, *Uganda*
- Developpement d'un Procede de zone Humide Simulee Plante avec Amaranthaceae, Capparidaceae, Tiliacée pour le Traitement des eaux domestiques, Cote d'Ivoire by Lacina Coulibaly*, Cote d'Ivore*
- Distribution and Bio-availability Assessment of Heavy Metals in Sediments from Lake Naivasha, Kenya by M.C. Moturi and Francis Polong, *Kenya*
- Small-scale Rainwater Harvesting for Combating Water Deprivation in Peri-urban Area of Lilongwe by Henry Raphael Mloza-Banda, *Malawi*
- Policy Gaps Analysis: The case of community water and sanitation in Ghana by Rose Entsua-Mensah and Charlotte Engmann, *Ghana*

(c) Programme on Water & Environment – Regional studies on existing water initiatives, August 2006 – May 2007

Three regional studies have been commissioned to review the existing water initiatives for S&T content: learning, innovation, relevance of technology and skills transfer; poverty reduction; food security; and the attainment of MDG goal 7 and use this as a basis to advocate change and share best practices. These studies are designed to cover the ECOWAS, Great Lakes and Horn of Africa, and the SADC regions.

The research teams were selected from different countries to encourage interregional knowledge sharing and exchange of country experiences in water policy-making, implementation and management. The expected outcome of the review studies is a web-hosted interactive database

resource with a comprehensive synthesis of national and regional Water Acts and environmental policies in the continent to encourage interregional knowledge sharing for internal / interregional harmonisation of W & E policies in Africa. This web-hosted interactive database resource will be hosted and managed by ATPS. The regional analyses of the interrelationships / linkages amongst the existing water and environment acts, initiatives, policies and programmes with respect to their S & T content, relevance to poverty reduction and food security in the continent and recommendations on how to encourage good practice will also be published in the ATPS special paper series and as policy briefs.

(d) Programme on Water & Environment – ATPS/NETWAS/SDC Water & Sanitation Workshop, September 2006

Africa's population particularly in urban areas is rapidly increasing, with majority of these populations living in low income informal settlements characterized by poverty, lack of privacy, and inadequate water supply. Access to improved water supply and sanitation in urban settlements is critical to the achievement of the Millennium Development Goals of reducing absolute poverty by half in developing countries.

In line with the objectives of its W*ater and Environment programme*, the African Technology Policy Studies (ATPS) in collaboration with the Network of Water and Sanitation (NETWAS), the Water and Sanitation Program of the World Bank (WSP) and the Swiss Agency for Development and Cooperation organized *the 18th Regional Water and Sanitation Seminar* at the Plaza Beach Hotel in Mombasa, Kenya in September, 2006.

The four-day Seminar, which was held under the theme, *Water and Sanitation in Urban Africa: Emerging Approaches for Reaching the Un-served Poor,* brought together 50 water and sanitation experts from Ethiopia, India, Lesotho, Malawi, Uganda, USA, UK, and South Africa to share experiences, emerging trends and ideas on providing safe water and sanitation to the urban poor in Africa. The seminar was also attended by high ranking officials including Ines Islamshah, the Country Representative of the Swedish Agency for Development and Cooperation (SDC), Francis Mugo, the Managing Director of Nairobi Water and Sewerage Company, Prof Norah Olembo, ATPS Board Chair, and Eng Mwasina, the Chief Executive Officer, Coast Water Services Board.

The workshop aimed to evaluate the challenges facing water delivery and sanitation services in low income urban communities and to innovate pro-poor strategies, policies and practices that will lead to improved water and sanitation services

The Assistant Minister for Water and Irrigation, Hon. Major Rtd. Aden Sugow, officially opened the meeting and stated that there was a strong spatial link between water provision and poverty that had been propelled by rural urban migration.

"The problems in the informal settlement – what we are trying to address – are only symptoms. The real culprit is the rural-urban migration. Lack of the basic services in the rural areas is the cause of most problems in African cities. Water is the single most important commodity for tackling rural poverty. It supports all types of livelihoods. If we provide adequate water in the rural areas we shall indirect solve several problems in the cities," said Major Rt. Hon. Aden A. Sugow, Ass. Minister for Water and Irrigation, Kenya

The Minister declared that 60% of the population in Nairobi lived in unplanned informal settlements that were regarded as an eye sore by the middle and upper socio-economic classes and were often entirely disregarded in the programmes and budgets of national and local authorities.

Hon Sugow pointed out that the urban settlements were often located in illegal land tenures contravening official laws and were characterized by poor non-functional/non-existent water infrastructure with no public rights of ways to allow water pipes to be laid. He additionally said that Kenya alone had over two hundred urban centers, of which only 30 had sewerage systems, which were often built on city peripheries or located on hazardous site, such as valleys, flood plains, river banks therefore presenting engineering difficulties for infrastructure provision

Hon Sugow explained that these issues often posed a challenge for newly established water services boards as supplying the urban poor with water and sewerage services involved high unit costs coupled with the limited capacity of the population to pay for the water that consequently left a gap between costs and potential cost-recovery.

The Minister, however, expressed that the Kenyan government was very sensitive to water and sanitation service delivery leading to the enactment of the Water Act 2002 that had led to the establishment of water service providers with a special mandate to address the plight of the urban poor in cooperation with the local community. The most exemplary being a project by the Nairobi water and sewerage company that had started the Mukuru slums water supply program that had taken water right into the sprawling Mukuru Slums in Nairobi.

ATPS Chair of the Board, Prof. Norah Olembo, stated that inaccessibility to safe water and adequate sanitation is at the core of Africa's development challenges.

"I am aware that several bilateral partners are working with the governments around the continent to raise the quality of urban water services so they are attractive investments for private sector takeovers and therefore increase water efficiency and delivery at a reasonable cost to the public, Prof. Olembo said.

In his opening remarks, NETWAS Executive Director, Engineer Samuel Wambua said that rural urban migration had resulted into poverty and unemployment and stressed water and sanitation services presenting a looming disaster in many in urban centers

"This is a crisis in the making, a time bomb and we as professionals in whatever sector we work in must now respond with suitable, sustainable and participatory initiatives" Engineer Wambua said.

Francis Mugo, The Managing Director of the Nairobi Water and Sewerage Company also stressed that one of his company's priority was to improve access of water to poor and low income earners who make nearly two-thirds of water consumers in Nairobi. He said that the company had embarked on pro-poor water supply initiatives to Mukuru kwa Njenga and Maili Saba informal settlements with support from the World Bank.

During the deliberations, the participants highlighted issues affecting the un-served poor at local, national, regional and international levels, and attempted to provide practical tools, strategies and ideas for improving access to adequate water and safe sanitation for the poor while keeping in mind the efficiency, appropriateness and sustainability of the systems. Participants at the seminar, further recognized that provision of service to urban poor must be guided by the

principles of Partnership, Ownership and participation, Innovative Technologies and approaches, Enabling policy environment, Improved service delivery and poverty reduction and Sustainability which formed the main discussion themes at the meeting.

Participants discussed the bottlenecks affecting water service delivery to the urban poor in their respective countries and insisted that pro-poor policy and principles must guide the reform process. Participants at the seminar further observed that urban informal settlements are a permanent feature in Africa's urban landscape that are unlikely to be abolished in the foreseeable future and that poverty alleviation in line with MDGs and PRSP is unlikely to be achieved if the urban poor are ignored. Additionally, the seminar participants saw that the urban poor are exposed to health hazards due to poor water and sanitation despite the fact that they pay higher water charges than the richer citizen. From the presentations, participants saw that the urban informal settlements were often left out of overall development plans and that small Scale Independent Providers who are often ignored by policy makers and professionals, played a significant role in provision of water services in urban informal settlements.

ATPS sponsored its water experts and researchers from the national chapters under the water and environment program to share their findings and experiences with the seminar participants. The presentations included:

- Water and Sanitation Services for Urban Poor in Addis Ababa by Bahiru Geneti, from the Addis Ababa Water and Sewerage Authority, Ethiopia
- Water Pollution by Industries in Lesotho by Deepa Pullanikkatil, Lesotho
- Service Delivery to the Urban Poor: Challenges and Good Practices of Public Tap Management and Operation in the City of Addis Ababa by Tekalyn Tsige, UN-Habitat, Ethiopia
- Grassroots Partnerships for Rainwater Harvesting in Peri-Urban Areas of Lilongwe City, Malawi by H.R Mloza Banda from the University of Malawi, Bunda College of Agriculture
- Ecological Sanitation as a Water and Environmental Conservation Technology Option: The Case of Slum Communities in Kampala by James Kakooza (Research Associate MISR)

One of the key outcomes of the meeting was the realization that informal urban settlement are likely to become permanent feature of Africa's urban landscape therefore creating urgent need for policy makers, professional and development partners to cooperate in improving access to safe water and environmental sanitation services for the urban poor. The participants urged the government to address the root cause of rural poverty in order to mitigate rural urban migration and to additionally enforce physical planning statutes to curb the mushrooming of informal settlements.

The Seminar recommended for research and promotion of appropriate management models and technologies that address acceptability, affordability and sustainability to increase access to water and sanitation for the urban poor and acknowledged the role of Small Scale Independent Providers (SSIPs) in providing water fro the urban poor. The Seminar further recommended central government budgetary allocations for the urban poor, capacity building for communities and SSIP working in the informal settlements, formation of partnerships between informal settlement communities with government, donors and civil society organizations

(e) Programme on Water & Environment – Follow-up Initiatives

The Water and Environment Programme has begun to forge new links with the Macaulay Institute in Scotland. As a result of this partnership, a one-year scoping study: *Integrated Trans-boundary River Basin Management Policy Development* (INTREPID) is in the final stages of contract

negotiation with the European Union (Framework V1 programme). The project focuses on the Mara River basin and is designed to lead to a full proposal to be submitted to the EC Commission services under the Framework VII TWIN Africa programme. Initial preparation for the TWIN Africa programme is ongoing.

D. Programme on Biotechnology Policy Dialogue in Africa

Introduction

The African Technology Policy Studies Network (ATPS) initiated a project on biotechnology in sub-Sahara Africa (SSA) to support the regional NEPAD-IFPRI African Policy Dialogues on Biotechnology and also guide nations in developing biotechnology and biosafety guidelines. Launched in October 2004, the programme has focused on knowledge generation, dissemination and brokerage, and emphasizes transparency, consensus building and inclusive participation of all key stakeholders.

The programme comprised four major components that complemented and re–enforced each other. These are research, training, policy dialogues and policy drafting. The objectives of the pilot programme were:

- To improve information and exchange and dialogue on biotechnology and biosafety in and among African countries
- To facilitate the development of guidelines and discussion documents on biosafety and intellectual property rights
- To train policy makers and create the social capital necessary for African countries to benefit from biotechnology

The programme's initial activities included national and regional dialogues and knowledge exchange sessions in different African countries. There have also been policy interventions to support discussions of the on-going efforts in Africa to craft biotechnology policies, biosafety laws and other regulatory instruments.

On 7 to 11 March 2005, ATPS collaborated with the ATPS Sierra Leone Chapter, the Technical Center for Agriculture and Rural Cooperation (CTA), Netherlands, the Science and Technology Council of the Ministry of education, Science and Technology, Sierra Leone, and the World Bank organized a one-week training and sensitization workshop in Freetown to discuss strategies of integrating science, technology and innovation into the planning, development and reconstruction of post-war Sierra Leone. The overall objective of the sensitization workshop was to create a foundation for sustainable development by harnessing relevant science and technology (S&T) issues in promoting S&T-led development in the transition from war to peace. The key outputs included formation of a task force to steer the development of biotechnology policy in Sierra Leone; and a science journalists association to inform the debate on the potential role of biotechnology and other emerging technologies in developing the country.

ATPS and the Ministry of Science and Technology, Mozambique, conducted a three-day regional workshop on Biosafety and Intellectual Property Rights in Africa, in Maputo, Mozambique, from 31 October to 2 November. Among the participants were high-ranking government officials, academicians, researchers, policymakers, farmers, the media, consumer groups and other stakeholders in the biotechnology industry from Southern Africa. The participants identified and

prioritized key issues that should be addressed by biosafety laws and policies that are in formative stages in most countries. They also identified and prioritized capacity building needs in for African stakeholders and institutions.

A summary of some of the national and regional dialogues on biotechnology and policy intervention efforts in 2006 are documented below.

a. Dialogue on Biotechnology, Trade and Sustainable Development in Eastern Africa, Jinja, Uganda, February 2006

The *Eastern African Dialogue on Biotechnology Policy-making, Trade and Sustainable Development*, held from 14-17 February 2006 in Jinja, Uganda, brought together a wide range of stakeholders – including from government, intergovernmental organisations, civil society groups, academia, industry and the media – from the Eastern African region[1] to deliberate on the formulation of coherent, informed and inclusive policies on trade, biotechnology and sustainable development at the national, regional and multilateral levels.

Countries in the Eastern African region are still in the process of formulating their national policies and strategies related to biotechnology and translating them into national and regional approaches and multilateral negotiating positions. The need to respond and adapt to the international developments – including a myriad of trade interests, obligations and pressures – threatens to dominate national agendas. This raises the urgent need for understanding and asserting the space for domestic policy-making in biotechnology supportive of the countries' self-defined sustainable development objectives.

Formulating Public Policy Objectives related to Biotechnology

Recommendations addressed to governments

African governments should be more proactive in analyzing and identifying their short, medium and long term needs, policy gaps and priorities. These priorities should ideally be developed with the participation of relevant actors in the public and the private sectors. Countries' policies and strategies for biotechnology development should be based on clearly identified **public policy objectives** that are specific and formulated through participatory processes. These could include:

- Ensuring **food security**, including access to safe and sufficient food
- Increase agricultural productivity, **rural development** and poverty alleviation
- Promote **economic growth** through diversification in to high-value products and technological development
- Promoting **public health** and food safety
- Conserve, sustainably use and equitably share the benefits of **biodiversity**

Making Sure Biotechnology Enhances Public Policy Objectives

Recommendations addressed to governments

Achieving these objectives will entail **addressing and integrating a range of policy areas and instruments** in order to develop a coherent biotechnology policy framework. Some areas and instruments to be addressed include:

[1] Including from Kenya, Uganda, Tanzania, Eritrea, Zambia and Zimbabwe.

- Science and technology development and mechanisms to identify and acquire strategic technologies
- Capacity building: establish technology targets to promote national capabilities, focusing on key industries (incl. infrastructure, institutional, human resources);
- Biosafety and quality standards
- Consumer protection and safety
- Agriculture, Environment and natural resources
- Trade, value addition and economic growth
- Private sector input on policy formulation
- Intellectual property rights: improve capabilities to mitigate the potential negative effects of stronger ownership rights on intellectual property
- Education/multidisciplinary human capital
- Information and communication
- Finance and resource mobilization

Recommendations addressed to national and regional actors

Action on these policy instruments will be required at both the national and regional levels. At the *national level*, countries could focus on:

- Mechanisms for labeling to facilitate consumer choice (incl. enforcement)
- An enabling policy environment for biotech development
- Inter-institutional / ministerial collaboration
- Raising public awareness
- Regulatory, human resources, institutional and infrastructure development
- Fostering partnerships (public-private, private-private)
- Providing sufficient funding for research and access to the technology

At the *regional level*, partnerships, such as NEPAD, and regional economic agreements should be considered as a means to achieving developmental goals. Commercial considerations should be balanced by social, environmental and cultural objectives. National governments and regional institutions should:

- Harmonize national policies and strategies for a regional agenda (incl. to facilitate trade)
- Develop joint negotiating positions by providing a common forum to formulate strategy, articulate and prioritize issues
- Set up a process of consultations to promote coherent interaction between the national regional actors to develop and promote:
    - Joint research and development activities
    - Joint standard-setting
    - Joint risk assessments
    - Joint monitoring of impacts and benefits
    - A regional biosafety clearing house

Ensuring Public Participation and Awareness

Successful implementation of domestic, regional and international policies and regulations can only be achieved through integration, coordination and cooperation among all stakeholders. This will involve raising awareness of the risks and benefits of biotechnology and promoting official national multi-stakeholder consultation processes that include networks of farmers associations and civil society groups. All parties concerned with science and technology – industrial leaders and researchers, academia, financial institutions and the government – should also be engaged to determine, over a period, the technological course and needs for their country.

Recommendations addressed to governments

- There is a need to strengthen dialogue among all national actors in the preparation of national public policy objectives and biotechnology policies
- Governments should involve local grassroots groups in reaching out to farming communities by creating broad awareness-raising programmes using mass media that target rural areas
- To ensure informed participation by the public, governments should articulate in understandable language the uses, benefits and underlying impacts of biotechnology and improve information dissemination to all stakeholders

Policy Coherence in Biotechnology

To support technology upgrading in Eastern African countries, governments must put in place institutional mechanisms for comprehensively evaluating and setting science and technology priorities and making sure responsibility for relevant policies is coordinated between ministries and institutions.

Building coherence with trade policy

National and regional biotechnology policies will need to be integrated with trade obligations (eg WTO rules) and trade interests. Some concerns and issues include:

- WTO rules do not necessarily reflect national trade interest due to limited capacities in developing counties to formulate and promote national negotiating positions
- WTO rules place the onus of justifying biosafety measures on the importer (in the absence of international standard); developing countries often lack capacity to do that
- Dumping of GM food aid can displace local producers
- Biotech standards in export markets can constitute trade barriers and hinder market access
- Inadequate intellectual property systems can foster the misappropriation of genetic resources and traditional knowledge, and hinder the fair and equitable sharing of benefits arising from their use

Recommendations addressed to governments

- Enshrine policy coherence between the different areas of policy to take into account biotechnology development and applications
- Entrust one body with analysing technology needs monitoring implementation at the broad economic level of S&T strategies
- Harmonise governments' financial support and align it with nationally or regionally defined public policy goals
- Devise a mechanism to promote coherent interaction between the national, regional and multilateral policies and trade regimes

Financial Resources and Funding for Biotechnology

Recommendations addressed to governments and financial institutions

One of the main constraints affecting the implementation of effective biotech regulations and the development of biotechnology has been inadequate funding. Governments should review and adapt laws and commercial regulations to enhance funding for biotechnology policy-making and development by:

- A commitment to dedicate a fixed percentage of government budgets to biotechnology. This could be a Biotechnology Fund to co-finance research and development by industry
- Offering special credit lines for biotechnology and providing both financial and non-financial services by entering into partnerships that enhance commercialization including through venture capital initiatives
- Providing incentives and encouraging banks to report on the composition of their loan portfolios dedicated to biotechnology

Technical Assistance and Capacity Building

Capacity building policies and programmes should be reviewed so as to make them work in support of public policy objectives through biotechnology development as an integral part of national and regional biotechnology policies. There is a need for an agreement on a common underlying vision for capacity building to provide sustainable capacity support for specific needs of the productive sector at various levels. Assessing local technological competence (SWOT analysis) to overcome weaknesses would serve a valuable function in raising awareness and building consensus.

Recommendations addressed to governments, regional actors and international institutions

Build capacity to ensure adequate human and institutional capacities for biotechnology development and mainstream biotechnology policy by:

- Strengthening linkages and understanding between the scientific and policy-making communities
- Enhancing capacities needed to articulate and assess policy choices and options related to biotechnology
- Developing and putting in place a system to address issues related to liability and redress
- Taking an integrated approach to biotech-related capacity building by engaging a broad range of actors, including scientists, policy-makers, economists, regulators, agricultural producers, industry and the media
- Providing adequate laboratory capacity and high quality personnel with necessary skills needed to effectively exploit the opportunities offered by the biotechnology, including by building regional and sub-regional testing and certification facilities
- Fostering close interaction between education and industry for assessing and communicating evolving needs is a basic feature of human capital development
- Focusing capacity building strategies towards long-term education programmes through universities and strategically selected on-the-job training to build a critical mass of technological expertise
- Develop a critical mass of experts at all levels through organized long-term theoretical and practical training both formal and informal
- Ensuring that Research & Development meets international standards and quality;

- Providing analytical input into policy-making, *inter alia* on the risks and benefits of biotechnology, esp. in Africa; environmental impacts in different ecosystems; impacts on trade; market opportunities; and market entry and market access barriers
- Developing capacity on intellectual property rights issues and its institutionalization

b. Regional Assessment on Biotechnology, Trade and Sustainable Development in Eastern Africa, April – July 2006

Building on the priorities and key issues identified in the Eastern Africa Regional Dialogue on Biotechnology, the following case studies were commissioned:

- Status of biotechnology policy-making, regulations and development in Eastern Africa, *by Dr. Charles Mugoya, ASARECA*
- Developing integrated science and technology policies in Eastern Africa, *by Dr. Zerubabel Nyiira, NEPAD regional representative East Africa*
- Poverty alleviation through agricultural development: A role for biotechnology?, *by Dr. Joseph Wekundah, Biotechnology Trust Africa*
- Food security, agrobiodiversity and biotech R&D: Implications of intellectual property rights, *by Prof. Moni Wekesa, Kenyatta University*
- Capacity building for biotechnology and trade: Status and needs, *Dr. John Bananuka, Bio-EARN*
- Public and media awareness and participation in biotechnology policy-making in Eastern African countries, *by Henry Kimera, Consumer Education Trust and Duncan Mboya, Biosafety News*
- Labelling and traceability: Constraints and opportunities in Eastern Africa, *by Samuel Ochieng, Consumer Information Network*
- Standard-setting on biotechnology and trade in the Eastern African region, *by Dr. Francis Nang'ayo, African Agricultural Technology Foundation*
- Implications of GMOs on market access and imports in Eastern Africa, *by David Wafula, ACTS–Rabesa Initiative*
- Risk management and liability under the Cartagena Protocol – Priorities for Eastern Africa *by Dr. David Hafashimana, Ministry of Water, Lands and Environment, Uganda*

- **Programme on Biotechnology Policy Dialogue in Africa – Dialogue on Biotechnology, Health and IPRs in Africa, Dakar, March 2006**

ATPS collaborated with the International Service for the Acquisition of Agri-biotech Applications (ISAAA) and NEPAD to host a workshop on Biotechnology, Health and IPRs on 14–16 March in Dakar, Senegal. The workshop provided a forum for African scientists, policy makers, civil society, private sector players and researchers to objectively debate the issues and voice their concerns on the potential of modern biotechnology to solve Africa's problems. Participants came from Senegal, Mali, Cote d'Ivoire, Benin, Burkina Faso and Cameroon.

The participants deliberated on the potential of biotechnology to solve Africa's problems, and more specifically health and were provided with a forum for knowledge exchange between African experts/resource persons and the participants on the threats and promises of modern

biotechnology. At the end of the workshop, it was decided that each chapter represented would hold a national dialogue with a diverse group of local stakeholders with a view to discussing the debate and eliciting their concerns.

Popularization and Outreach

The African Technology Policy Studies Network (ATPS) has initiated deliberate steps to make the transition from being a network that generates academic papers (little or no policy relevance and impact) to one whose research operations and focus are to improve public policies. In this regard, a number of specific activities have been initiated or are being proposed to link research to policy making.

In the area of improving the policy environment, ATPS publishes a set of research output series that define components of research portfolio. These publications include Technology Policy Briefs, Research Paper Series, Working Paper Series, Annual Reports, ATPS Newsletters, among others. This strategy to maximise programme impact is based on versioning, so critical in the information age, where a great deal of information can impair attention spans. Therefore ATPS provides value to the policy environment by generating, filtering and communicating targeted information to policy makers and other relevant audiences. Reports on dissemination of publications and other advocacy activities are discussed in this section.

(a) African Scientific Revival Day, Accra, Ghana June 2006

The ATPS Secretariat collaborated with the Ghana Chapter to mark this important day declared by the OAU/AU in 1987 to remind all the stakeholders on the importance of science in Africa's economic and social transformation. The event that featured a lecture on *Biotechnology: Hope or Disaster for Africa* by Dr Yaa Difie Osei was held at the La Palm Beach Hotel, Accra, Ghana on 30th June 2006.

The aim of holding this lecture was to focus Ghana and Africa on the real issues in Science and Technology. The chapter had targeted the policy makers to enable them have an influence during the policy making process.

Prof Aboagye Menyeh, Provost of the College of Science, KNUST gave the keynote address while the guest of honour was Prof E. Owusu Bennoah the Director-General of CSIR. In his speech, the Director General said that marking this day was a reminder to all African countries of the importance of Science and Technology in our development process. He said that observing the African Renaissance Day was making a statement that the African continent has had a history and tradition of Science and Technology. The word "renaissance" or "revival" simply means that there has been at one time or the other a SCIENTIFIC AFRICA, which needs to come alive again.

The ATPS-Ghana Chapter has been at the forefront of the attempts to stimulate a more science and technology-friendly environment in the country. Apart from organizing lectures on science advocacy the members have also been pushing for Ghana to move towards science, technology and innovation.

The Technology Policy Brief: Nanotechnology: The developments and implications for Africa

Summary

Science has now advanced to the point that those on the cutting edge of research work with individual molecules. This is the defining characteristic of the new metafield of nanotechnology, which encompasses a broad range of both academic research and industrial development. At this small scale, the familiar classical physics guidepost of magnetism and electricity are no longer dominant; the interactions of individual atoms and molecules take over (Foster, 2005). At this level the applicable laws of physics as Newtonian mechanics gives way to quantum mechanics.

Nanotechnology hold the promise of advances that exceed those achieved in recent decades in computers and biotechnology. It applications will have dramatic infrastructural impacts, such as building cancerous tumours still invisible to the human eye, or generating vast amount of energy from highly efficient solar cells.

Nanotechnology offers tremendous potential for several key reasons. Materials and processes at that size have unique properties not seen at larger scale, offer proportionately greater reactive surface area than their larger counterparts, and can be used in or with living organisms for medical applications. As a result, familiar materials can have completely different properties at nanoscale. For example, carbon atoms form both coal and diamonds, but with different molecular arrangements. We now know that carbon molecules at nanoscale can form cylindrical tubes, called carbon nanotubes (CNT), which are much stronger than steel, and conduct electricity neither of which is possible with the carbon

found in coal or diamonds. Since their discovery by Iijima (1991) carbon nanotubes have fascinated scientists with their extraordinary properties. Carbon nanotubes may one day provide the key breakthroughs in medicine and electronics. Another rnanomaterial that is changing the face of the tire industry is carbon black a material composed of nanoparticles of high-grade carbon "soot". This material is incorporated into tires, resulting in greatly improved durability. By the year 2000 carbon black for tires was a 6 million to per year global market (Thayer, 2003)

Another reason nanotechnology holds so much promise is that is enables solutions at the same size scale as biological organisms, such as individual cells in our bodies. Engineered materials, such as ultrasmall particles made in the exact size to perform like "smart bomb" can deliver drugs in the blood stream. Further convergence of nanotechnology and biotechnology may combine biological and man made devices in a variety of applications, such as batteries for implanted heart pacemakers that draw electrical current from the wearer's glucose rather than from surgically implanted batteries.

Yet another important facet of nanotechnology one that underpins both its promise and challenges is that it embraces and attracts so many different disciplines that researchers and business leaders are working in, among them chemistry, biology, material science, physics and computer science. Communication and research between academic disciplines and between researchers and their business counterparts is critical to advancement of nanotechnology.

(b) ATPS Uganda Marks the Scientific Revival Day of Africa

The ATPS Uganda Chapter partnered with Makerere University, the Uganda National Council for Science and Technology (UNCST), the Uganda National Academy of Sciences (UNAS) and the Uganda National Commission for UNESCO to commemorate the Scientific Revival Day on 14 December, 2006 at the Grand Imperial Kampala Hotel, Uganda.

The day was marked in tandem with the UNESCO World Science Day for Peace and Development and aimed to increase stakeholders' awareness of the role of science, technology and innovation in national development. There were interesting exhibitions on display including science and technology innovations on traditional medicines, healthcare products and different ICT innovations as part of day's activities. The day also offered an opportunity to disseminate the report on the Finnish Study Tour. Eng Joseph Mutambi, who was part of the Ugandan team that visited Finnish Science parks, presented the report on the Finland Study Tour explaining how lessons from Finland can be incorporated into Uganda's Industrial Park Development Programme.

The day marked under the theme "*Science and Technology Innovations for Development*" attracted guests from the Uganda Private Sector Foundation, science and technology producers and users, researchers, academia, policy makers, staff from the Uganda National Council for Science and Technology (UNCST) and participants in the innovations systems and clusters project in Uganda.

Other key dignitaries at the meeting included the Hon minister for ICT in Uganda, Dr Ham Mulira, The presidential advisor on science and technology, Mr Ananias Tumukunde, the senior industrial officer in the Ministry of Tourism, Trade & Industry Eng Joshua Mutambi, and the Executive Secretary of the UNCST, Dr Peter Ndemere.

The Hon Minister for ICT in Uganda, Dr Ham Mulira, who was the chief guest lauded the chapter for organizing the event and requested for a much bigger commemoration of the scientific revival day in 2007. The Minister was enthused by the science park concept learnt during the ATPS Finnish study tour and was keen to lobby for its incorporation into Uganda's Industrial Park Development Programme.

In his opening remarks, the ATPS Uganda National Coordinator, Prof Joseph Obua, applauded the close collaboration between the chapter and other stakeholders in various science and technology programmes in Uganda. The presidential advisor on science and technology in Uganda, Mr Ananias Tumukunde, expressed his appreciation for ATPS and its role in promoting science and technology policies in Africa. Mr Tumukunde also pledged to brief the president on ATPS, its activities and the available collaboration opportunities in developing Science and industrial parks in Uganda

The Scientific Revival Day was dedicated, during the 46th Ministerial Conference of the Organization of African Unity (OAU), to deliberate on the role of science and technology in addressing socio-economic challenges in Africa. The Ministerial Council made a resolution requiring member states to mark the day with programmes befitting the event.

ATPS has been on the forefront in popularizing and marking this day since 2002 by bringing together stakeholders to discuss how science and technology can be re-deployed to improve Africa's development.

(c) ATPS Nigeria Marks the Scientific Revival Day of Africa

The ATPS Nigeria chapter celebrated the 19th anniversary of the scientific revival day for Africa on July3rd July, 2006 at Rockview Hotel, Wuse II, Abuja.

Eng. (Prof.) A. P. Onwualu, the Director General of the Raw Materials Research and Development Council (RMRDC) represented the minister of science and technology Nigeria as the chief guest at the meeting. Other key guests at the meeting included Dr. Osita Ogbu, Former Economic Adviser to the President, Prof. B.A. Solomon, Director-General of National Biotechnology Development Agency (NABDA), Khalid Timamy, African Union representative, professor, and M.C. Madukwe and Prof O.A. Olukesusi both National coordinators of the ATPS Nigeria Chapter. The event also attracted the RMRDC directors, ; representatives from other organizations under the Federal Ministry of Science and Technology; the Press (Print and Electronic media) and Secondary School students.

The ATPS Nigeria chapter enjoys a warm relationship with the Ministry of Science and technology in Nigeria through the RMRDC and the two institutions have a Memorandum of understanding (MoU) on issues such as policy studies and discussions, dissemination of information designed to give science priority in Africa.

The minister's representative, Professor Onwualu said that Africa was underrepresented in the world of science and the continent had not yet appreciated the role of science for development. Professor Onwualu said that the Federal ministry of science and technology in Nigeria had revised its policy on science and technology and had birthed agencies such as National Space Research and Development Agency (NASRDA), National Information Technology Development Agency (NITDA) and National Biotechnology Development Agency (NABDA).

The scientific revival day was set aside during the 46th Ministerial Conference in Addis Ababa to commemorate Science and Technology in Africa. ATPS Nigeria National Coordinator, Prof Michael Madukwe pointed out that the aim of the anniversary was to sensitize Africans, Governments and Institutions on the indispensable role of science and technology in national development. He further pointed out that this year's Scientific Revival Day presents an opportunity to examine the policies put in place to harness the benefits of science and technology with emphasis on the policy that drives the development and application of science and technology in national development.

Professor Madukwe reiterated the need for all Government Ministries, Parastatals, NGOs, Schools, Civil Societies and the Press to create a Science and Technology Policy Unit within their organizations to enable them analyze, keep track and operate within emerging practices in science and technology applicable to their respective mandates.

The Guest Lecturer, Prof. 'Bola Ayeni of the Geography Department, University of Ibadan, gave a lecture titled "*The Challenge of Economic Development and Creation for Science and Technology in Nigeria*" pointed out that the industrial sector in Nigeria was producing at far from optimum levels with reduction rather than expansion becoming a characteristic feature of the sector.

He said that a country's respect in international circles depends partly on its technological bases and effective harnessing of existing and emerging technologies, would both reduce costs, and increase the likelihood of job creation and poverty reduction in Nigeria.

In his comments, Dr Osita Ogbu, former Economic Adviser to the President, said that Scientists assume that everybody knows the importance of science and technology in the development of a nation. He pointed out that in governance; everything (policies, projects, and budget) was contested for, and then called scientists to project themselves so as to attract attention. He further said that wealth and infrastructure were driven by science and technology; therefore there was a need to link science and technology to economics. Dr Ogbu called for a more elaborate ceremony to mark the scientific revival day in future which would involve students' exhibitions/essay competitions.

Professor Onwualu, Director-General, RMRDC, agreed that there need to expand the scientific revival day programme, to include all stakeholders in science and technology including school children. He called for formation of a Local Organizing Committee (LOC) to organize the 2007 Scientific Revival Day for Africa. He also said that the organizers should place special emphasis on students' participation.

(d) Strengthening Communication and Journalism in Agricultural, Natural Resource and Rural Development in Central, South and Eastern Africa, Lusaka, September 2006

ATPS in collaboration with Media for Environment Science Health and Agriculture (MESHA) and PANOS Southern Africa, organized a journalist training workshop from the 18th to 22nd September 2006 at Mwiza Corporate Lodge in Lusaka, Zambia under the theme *Strengthening Communication and journalism for Agricultural, natural Resource and rural development in Central, South and Eastern Africa.*

ATPS sponsored five well respected Kenyan and Ugandan journalists to the workshop that was attended by 36 media professionals from 12 African countries. Additionally, ATPS sponsored a resource person and contributed to coordination of the event.

It emerged during the workshop that reporting on science, environmental, agriculture and natural resources is often trivialized and superseded by sensational political stories in most African countries. This was attributed largely to stringent editorial policies, lack of resources, in addition to lack of interest and capacity by reporters on these issues. The meeting further discussed approaches for better reporting and information management particularly on developmental issues.

During the thematic field trip, workshop participants visited Kasisi Agricultural Training Centre (KATC), that provides training in organic farming and sustainable agriculture to small scale farmers in Zambia and the Golden Valley Agricultural Research Trust which is a leading agricultural research institution in Zambia.

The workshop built on the efforts made in South, East and Central Africa to profile the pivotal role of scientific and development journalism and to ensure that journalists have the tools they need for effective reporting.

In the context of the workshop these tools were defined as access to issue and problem orientated information; contacts with colleague reporters (together with an awareness of their specialisations and geographical coverage) as well as knowledge of the newspapers, magazines, bulletins, websites and other media active in their field of interest.

(e) ATPS Publications

Working Paper Series

- An Assessment of the Effects of Technology Transfer on Gender Roles within a Community: The Development of Tea and Cofee Production among Smallholder Farmers in Kiambu District, Central Province Kenya, by Winifred Karugu

Special Paper Series

- Technology Transfer in a Globalizing World: Many Promises, Lack of Responsibility, and Challenges for Africa, by M.H. Khalil Timamy
- Integrated Value Mapping for Sustainable River Basin Management, by Kevin Urama
- Wastewater and Irrigated Agriculture Lessons Learned and Possible Applications in Africa, by Frans Huibers, Lucas Seghezzo and Adriaan Mels
- Imbalance in Water Allocation Stability and Collaboration within the Nile Basin, by Kinfe Abraham
- Survey of Indigenous Water Management and Coping Mechanisms in Africa: Implications for Knowledge and Technology Policy, by Femi Olokesusi
- Water Management and Conflict in Africa: The Role of Management and Technology, by Chris Huggins
- Markets, Institutions and Agricultural Performance in Africa, by Julius Mangisoni
- The Biotechnology Revolution and its implication for Food Security in Africa, by Victor Konde
- Why Africa has Fallen Short of Building Dynamic Agro-processing Capabilities: Constrains, Options and Prospects, by Wellingtn A. Otieno and Ada Mwangola

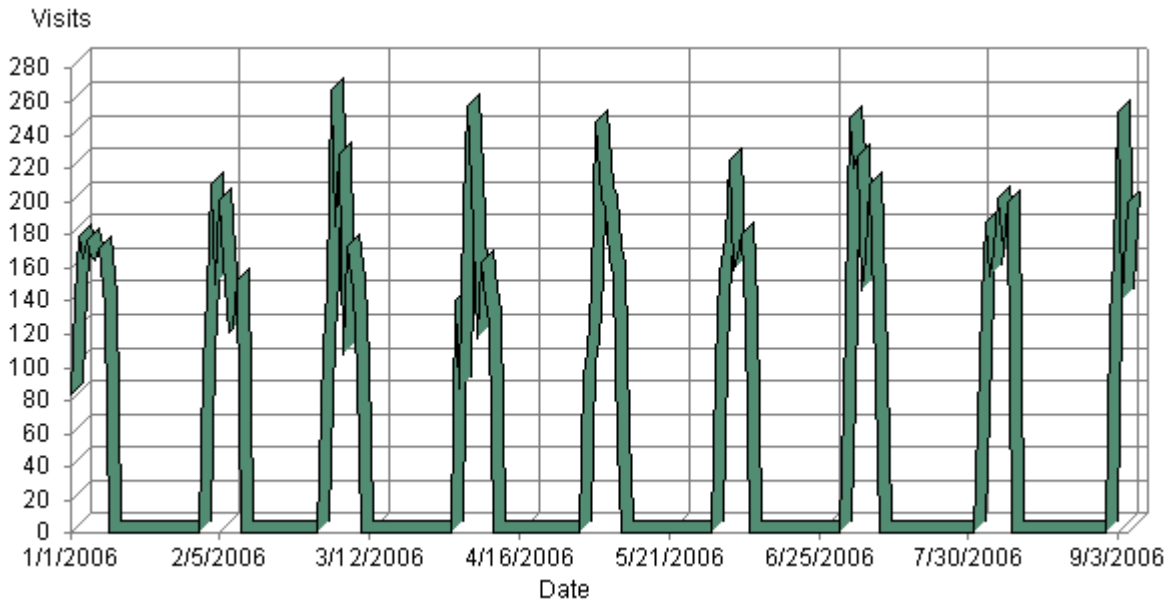
Technopolicy Brief Series

- What is sui generis System of Intellectual Property Protection?, by Moni Wekesa
- Research Priorities for Kenya's Cut-flower Industry: Farmer's Perspective, by Maurice Bolo, Nancy Muthoka, Racheal Washisino, Virginia Mwai and Daniel Kisongwo

Reports and Newsletters

- ATPS Newsletter, Jul – Dec 2005 (Issue No. 18)
- ATPS Newsletter, Jan – Jun 2006 (Issue No. 19)
- 2005 ATPS Annual Report

(f) ATPS Website Report



Hits	
Total Hits	85,663
Average Hits per Day	345
Average Hits per Visit	7.21
Cached Requests	0
Failed Requests	6,194
Page Views	
Total Page Views	6
Average Page Views per Day	0
Average Page Views per Visit	0.00
Visits	
Total Visits	11,874
Average Visits per Day	47
Total Unique IPs	4,792
Total Visitor Stay Length	408:55:45
Average Visitor Stay Length	2:03
Bandwidth	
Total Bandwidth	2,566.45 MB
Average Bandwidth per Day	10.35 MB
Average Bandwidth per Hit	30.68 KB
Average Bandwidth per Visit	221.33 KB

Partnerships

New models of research collaboration are emerging as part of the gradual shift in the organizational structure of science and technology (S&T) policy towards more collaborative modalities and participatory approaches. In this new context, the strategic importance of cooperation, networking and research partnerships is significantly increasing. The African Technology Policy Studies Network (ATPS) facilitates and promotes new and innovative research partnerships that can play a key role in the process of building research on S&T policies in many spheres. The Network fosters collaborative programmes, projects or activities initiated, developed and implemented by recognized stakeholder groups, and which remain open to participation by other stakeholders as and when they find a suitable niche. ATPS seeks to exploit the comparative advantages of participating stakeholders at the most effective level – local, regional or global. Discussed in this section are some initiatives where ATPS has played a key role.

A. The ATPS Youth Programme

a. Youth Consultative Meeting, Nairobi, April 2006

Following the successful Youth Congress and Exposition in June 2005, ATPS collaborated with the Centre for Rural Cooperation (CTA), Netherlands to hold a consultative meeting of youth experts on 6-7 April 2006, in Nairobi. At this meeting, it was decided that the theme of the 2nd African Youth Congress would be Food Security and Health for Sustainable Development: Perspectives of the Youth. To ensure objectivity, a Steering Committee, made up of youth from nine African countries, decided that youth participation would be based on application and/or the submission of an abstract of work done in the thematic area. An overwhelming number of applications were received and the abstracts were reviewed externally. The Congress took place on 26–29 June 2006 in Accra, Ghana.

b. The 2nd ATPS Youth Congress and Workshop, Accra, Ghana

The agricultural sector plays a major role in the economies of most African nations in terms of contribution to GDP, export earnings and employment. However most of these countries are food insecure. The AU defines food security as physical and economic access to sufficient and safe food to lead a healthy and productive life. Despite pockets of success in various regions of the continent, food security has remained an elusive goal in Africa. The current food insecurity in Africa is significantly worse on average than it is in other parts of developing world. 27% of the African population is estimated to be 'undernourished' or 'hungry' and this percentage has only declined by 2% over the 10 year period of 1990/02 – 2000/02.*(State of Food Insecurity in the World ,2004 FAO)*

Food production in the period of 1993-2003 has declined as the population soars in the continent and Africa has to increase its agricultural production by 4-6% per annum on a sustained basis to meet the needs of a rapidly growing population that is expected to increase from about 900million to 1.3 million by year 2020. (*Status of food security and prospects for agricultural development 2005)*

The African Union (AU) Commission has noted that the number of hungry persons has increased from 176 to 210 million over the ten year period of 1990-92 to 2000-02 due to the population surge. In North Africa, an estimated 4% of the population are undernourished due to periodic hunger rather than life threatening malnutrition and the figure has not changed substantially over the past 10 years. On the opposite end, 55% of the population in the southern sub-region is undernourished and this regional average is highly influenced by the especially large population of Democratic Republic of Congo (61% of the sub-regional population). (FAO, State of Food Insecurity in the World, 2004).

The overall food situation, however, remains precarious with high malnutrition rates reported in several countries arising from effects of war, displacement and past droughts. *(AU Status of food security and prospects for Agricultural development in Africa Report)*

Further complicating this grim situation is the health burden the continent has to bear. Africa's quest for rapid and sustainable economic development is undermined by its huge and growing disease burden. The enormous cost of health care, lack of effective drugs, high costs of medicine and lack of access to affordable drugs, weak health care systems, drug resistance and slow pace of behavioral change ensures that a huge proportion of the population are faced with the reality of early deaths from potentially preventable and treatable diseases. The range of diseases hampering the continents efforts is very wide. However, Malaria, HIV/AIDS, Tuberculosis and

other communicable diseases top the list of diseases that weigh down the economic recovery efforts of most African countries.

The 2nd Africa Regional Youth Congress on Science and Technology *"Food security and health for sustainable development in Africa"* brought together young professionals, scientists, youth leaders and representatives from national, regional and international institutions and civil society who are committed to the promotion and application of Agriculture, Science, Technology and Innovation in meeting social and economic development goals in Africa. The congress benefited from the imagination, creativity and innovativeness of youth dovetailed with the experience, guidance and mentorship of the resource persons in seeking solutions to the persistent challenges food insecurity and burden of disease in Africa. During the Congress, the African Youth Forum on Science and Technology (AYFST) (and its website) was officially launched to provide a united voice for the youth on science and technology in Africa.

The youth issued a strong communiqué targeted to African governments, regional organizations and development partners. During the Congress, AYFST and the AYFST official website were officially launched to provide a united voice for the youth on science and technology in Africa. Hon Major Courage E.K. Quashigah, Minister for Health, Ghana and Hon Ernest Debrah, Deputy Minister for Agriculture and Food Security officially opened the Congress.

Congress Objectives

The overall objective of the Congress was to empower the youth by according them the opportunity to learn, network, debate, exchange ideas and add their collective voice to the policy discourses on how best to tap science and technology for food security and improved health in their respective countries and the continent at large.

The specific objectives were:

- To provide a forum for young African professionals, practitioners, policymakers, government officials and other stakeholders to interact and share knowledge on the situation - challenges and opportunities facing the agriculture and health sectors in Africa
- To deliberate on the emerging science and technology issues in attaining food security and improved health, with emphasis on perspectives from the youth and determine their roles in contributing to the on-going initiatives
- To expose the youth to strategies for influencing policy discourses and ensuring that their views are incorporated in the policy processes and resources are made available for achieving the expected outcomes.
- To provide an opportunity for peer-to-peer networking amongst the African youth

Expected Outcomes

- AYFST (and its website) officially launched during the meeting
- African youth networked and committed to playing a greater role in attaining food security in Africa
- Congress communiqué capturing key conclusions and recommendations and proceedings published and disseminated in print and electronic format. Key papers were presented and published in the AYFST website with links to the websites of strategic partners.
- African youth encouraged to take agriculture and related careers to improve agricultural productivity

The papers presented were:

- Emerging Issues in Science and Technology for Food Security in Africa – Perspectives from the African Youth by *Lydia Olaka*, Regional Centre for Mapping of Resources for Development, Kenya and *Sally Chikuta*, University of Zambia, Zambia
- The Use of Biotechnology to enhance the Nutritive Value of Alternative Feedstuffs for Livestock Feeding by *Andrew Adegboyega Fatufe*, Obafemi Awolowo University, Nigeria
- Participatory agricultural technology development and transfer initiatives: Experiences and lessons from Malawi by *George Kanthiti*, Agricultural Economist, Ministry of Agriculture, Malawi and *Isaac Fandika*, Irrigation Agronomist,Department of Agricultural Research Services Ministry of Agriculture, Malawi
- Critical factors hampering agricultural productivity in Africa: The case of Ethiopian Farmers by *Yezihalem Tesfa*, St. Mary's University College, Ethiopia
- Drying of agro-produce: towards reduction of post harvest losses by *Joseph Kihedu*, University of Dar es Salaam, Tanzania
- Youth Leadership for Science and Technology: The missing link? By *Dr Osita Ogbu*, Chief Economic Advisor to the President, Federal Republic of Nigeria
- The Role of Indigenous Knowledge in Enhancing Household Food Security: A case Study of Mukungwe, Masaka District in Uganda by *Jacob Agea*, Makerere University, Uganda
- Role of Higher Education in Attaining Food Security in Africa: The need for a paradigm shift by *Andrew Adwera,* African Center for Technology Studies, Kenya
- Food Security for Sustainable Development: A case of Rural farmer Groups in Uganda by *Caroline Patience Odongo*, St. Francis SS Kamwokya, Kampala, Uganda.
- Intellectual Property Rights (IPRs) in Health and Agriculture: Opportunities and Challenges for Africa by *Linda Opati*, Attorney General's Office, Kenya
- Youth leadership in Response to Africa's Dual Epidemics: Food insecurity and HIV/AIDS in sub-Saharan Africa by *Vincent Okullo*, African Youth Parliament, Kenya
- Gender Relations and Decision-Making: Implications for Food Security in Nigeria by *Olufunso Adeola Akinsanmi*, CETEP University, Nigeria
- Building the Competence of Youth on Sustainable Livelihood Skills and Reproductive Health using e-technologies by *Desmond Okoro*, Youth Action Rangers of Nigeria (YARN), Nigeria
- UGACAD Foundation Interventions in the Health Sector focusing on HIV/AIDS and Economic Empowerment: Lessons from Uganda by *Musulo Muhammed*, UGACAD Foundation, Uganda
- Economic Impacts of HIV/AIDS on Food Security in Ghana by *Richard Aidoo,* Ghana
- Assessment of the Effects of HIV/AIDS on Rural Agricultural Systems and Livelihoods: A Comparative Study of Rakai and Kabale Districts in Uganda by *Jackson Tumwiine*, Makerere University, Uganda
- The Impact of HIV/AIDS on Agriculture and Food Security in Malawi by *Janet Hilda Kabuli, Research Officer,* Department of Agricultural Research Services, Ministry of Agriculture and food security, Malawi

c. Youth Programme – ATPS/CTA launches the AYFST

Following the inaugural congress in 2005, the youth continued to deliberate on how best to build and sustain a vibrant S&T constituency amongst the youth in Africa. Through extensive consultations with fellow youth and some senior leaders and professionals, the youth determined that they require a vehicle to empower them to actively contribute to Africa's socio-economic development through greater application and involvement in agriculture, science, technology and innovation. ATPS and CTA supported these youth initiatives that resulted in the official launch the African Youth Forum on Science and Technology (AYFST) and its website (www.ayfst.org).

This Forum will provide the youth with an opportunity to contribute and share ideas and views on topical and policy issues in science and technology as they relate to Africa's development.

d. MAXFACTA, April 2006

ATPS and Maximizing Facts on HIV/AIDS Youth Group (MAXFACTA) held a one-day youth forum on the 1 April 2006 at a youth centre in Nairobi. The forum that was attended by about 30 youth who are either affected or infected with HIV/AIDS, disseminated important lessons on issues, such as the importance of behaviour change that would protect the youth from contracting HIV/AIDS and leading responsible lives, behaviour change to prevent the spread of HIV/AIDS, literacy on the more common HIV/AIDS treatment terms, and nutrition for people infected and affected by HIV/AIDS.

Ruth Wanjala, ATPS Communications Assistant, made a presentation titled, *Youth Empowerment in HIV/Aids Prevention and Management* and further discussed ATPS health technology programme that aims to contribute to improved health care delivery and access in Africa, she also highlighted the ATPS youth programme that seeks to develop youth leadership for HIV/AIDS management and prevention.

e. Young Professionals Platform in Agriculture Research for Development, Netherlands, May 2006

Three members of the African Youth Forum on Science and Technology (AYFST), Maurice Bolo (ATPS), Winnie Alum (NARO-Uganda) and Jane Bisanju (UN-Habitat-Kenya), received sponsorship from the Technical Centre for Agricultural and Rural Cooperation (CTA) to attend the strategic planning meeting of Youth Professionals Platform in Agriculture Research (YPARD). YPARD is a platform of young professionals involved in agricultural research and development (R&D) under the aegis of the Consultative Group of International Agricultural Research (CGIAR) system. The strategic planning meeting was held on 2–5 May 2006 to formulate the vision, mission, objectives and strategies YPARD. The planning meeting brought together young professionals from 16 countries worldwide.

B. Programme on ICT/S&T Knowledge for Development

(a) ATPS/KIF/KICTANET parliamentary empowerment

ATPS joined forces with the Kenya ICT Federation (KIF), Kenya ICT Action Network and other private sector stakeholders to facilitate a parliamentary roundtable on the pending ICT Bill and other preceding activities. As a start, ATPS has contributed toward the Power Up with ICT campaign that seeks to stimulate application of ICTs among all citizens and to catalyse the ICT industry to serve Kenya's' development needs. The activities will promote usage of ICT-based solutions across key socio-economic sectors, as well as stimulate interest in ICT applications by decision-makers in key cities and towns. The lessons learnt from this activity will be published as an ATPS technopolicy brief and will be disseminated at the jointly organised parliamentarian policy roundtable. The campaign took place between 20 and 30 November 2006 and covered five cities and towns in Kenya.

(b) Tour of Science Parks in Finland

ATPS has used the Finnish model in its training and sensitization exercises as an example of a country that quickly transformed from a resource-based to knowledge based economy. There are significant lessons for Africa including: how Finland's S&T infrastructure is organized; how the strong industry-knowledge institutions linkage works; the Nokia example; and how science/technology parks and the innovation process drive the Finnish economy.

It was in this regard that ATPS, supported by the Embassy of Finland, organised a study tour to Finland from 27 August to 2 September for delegates from Kenya and Uganda. The purpose of the trip was to help policy makers; government officials and academia understand the crucial role of science parks in sparking socio-economic development. Finland was chosen as the country offers one of the most successful and renowned examples of how science parks can be used to spearhead industrial growth as in the case of Nokia.

The delegation which comprised various stakeholders included Members of Parliament, senior government officials and university dons from Kenya and Uganda. In the week the team was in Helsinki, they visited the Finnish Science Park Association (TEKEL), Helsinki University, ICT Turku Ltd, Technopolis group and the Finnish Funding Agency for Technology and Innovation (TEKES).

The team comprised of the following:

- Mr Arthur Bwire Tukahirwa, Director, Industrial Parks Development Division, Uganda Investment Authority (UIA)
- Hon Pereza G. Ahabwe, Member of Parliament (MP) and Chairman of the Parliamentary Sessional Committee on Tourism, Trade and Industry, Uganda
- Prof Joseph Obua, National Coordinator, ATPS Uganda Chapter;
- Mr Joshua Mutambi, Senior Industrial Officer, Ministry of Tourism, Trade and Industry (MTTI), Uganda.
- Dr Kevit Desai, Director of Engineering, Centurion Systems, Kenya
- Hon Jakoyo Midiwo, Member of Parliament (MP), Kenya
- Prof George King'oria, Executive Secretary, National Council of Science and Technology (NCST), Kenya
- Prof Isaac Nyambok, Professor of Geology, University of Nairobi, Kenya
- Mr Kennedy Auka, the Finance and Administration Manager, ATPS

Overall, the team was extremely pleased and gained a great deal of useful information. Plans for two dissemination workshops are underway in both countries.

C. Demand-led Research in Kenya's Floriculture Industry

Local research institutions can participate in demand-led research to come up with solutions that will benefit the flower industry and alleviate some of the major challenges facing smallholder floriculture farmers.

The African Technology Policy Studies (ATPS) and the Technical Center for Agriculture and Rural Cooperation (CTA) in collaboration with leading stakeholders, such as the Horticulture Crops Development Association (HCDA), the Kenya Agricultural Research Institution (KARI), the Kenya Plant Health Inspectorate Service (KEPHIS), the Ministry of Agriculture (MoA), the CAB International Africa and smallholder farmers' representatives have been actively involved in bridging the gap between floriculture farmers and research systems in Kenya.

In 2004, ATPS conducted a national case study on *Agricultural Science, Technology and Innovations Systems: The case of Kenya's floriculture industry* that indicated that, given the desirable conditions, there was a high potential for small scale growers who make up about 3% of the flower industry in Kenya. Principally, the study found that there were weak interactions between the flower industry and the local research system, leading to under-utilization of research capacity and an over-reliance on costly external knowledge from international research bodies.

The study further indicated that there were weak linkages in the innovation system due to poor collaboration between relevant actors in the system and recommended closer partnership between the local research system and the flower industry to allow farmers and exporters to set the research agenda.

To address these gaps, ATPS, CTA and CABI-Africa facilitated a one–week training workshop, from 25-29 July 2005, at Safari Park Hotel in Nairobi addressing the theme *Demand-led Research: Bridging the gap in the agricultural, science, technology and innovation systems***.** The main objective of the training workshop was to build the capacity of actors in the floriculture industry and assist them to conduct demand-led research that would contribute to strengthening the Agricultural Science Technology and Innovation (ASTI) systems in Kenya

The participatory workshop recognized the value of farmers' experimentation, innovations and involvement in the prioritizing and implementing agricultural research and development in Kenya. A key output of the training workshop in line with the recommendations of the ATPS 2004 study led to an offer for further support by CTA for a follow up case study in "Demand-led research in Kenya's floriculture industry" that ran from January to June 2006.

ATPS set up a consultative taskforce that would spearhead the study as a part of a wider process intended to improve the interface between farmers, policy makers, researchers and other stakeholders. The taskforce was selected to represent the different categories of stakeholders in the flower industry, such as research and training institutions (The Kenya Agricultural Research Institute (KARI)); regulatory and quality control institutions (The Kenya Plant Health Inspectorate Services (KEPHIS) and the Kenya Bureau of Standards (KEBS)); farmers and entrepreneur representatives (Karen Growers Ltd); marketing and investment bodies (HCDA), policy organs (MoA) and ATPS, as the overall coordinating body. The inclusion of over 50% of small scale growers and technical representatives in each regional consultative meeting was also stressed.

The members of the ATPS floriculture taskforce were Ms Nancy Muthoka, KARI –Thika; Ms Rachael Washisino, the Depot Manager of HCDA-Limuru; Ms Virgina Mwai, the Assistant

Director, Flowers and Ornamentals, MOA; Mr Daniel Kisongwo, Karen Roses Limited and, Mr. Maurice Bolo, ATPS.

The first consultative meeting was held on 9 March 2006 at KARI- Macadamia Center in Thika, followed by the second consultative meeting in Limuru on the 21 March 2006 and the third and final consultative meeting in Naivasha on the 9 June 2006.The consultative meetings attracted multi-stakeholder participation to bring forward pressing issues to the attention of the relevant stakeholders in the floriculture industry.

Poor infrastructural networks, inadequate financing, currency fluctuations, stringent/limited market access, inferior flower breeds, poor information dissemination, pest and disease control in the floriculture industry were some of the significant challenges identified during these meetings. The participants in these consultative fora suggested training on post-harvest crop handling, development of new flower varieties, government support through subsidies to farmers and lower tax rates on inputs as solutions to some the problems faced by floriculture farmers. Additionally, formation of cooperatives, information dissemination especially on market trends coupled with more government involvement would move the industry forward in Kenya. Small-scale floriculturalists suggested the inclusion of exporters, the Fresh Produce Exporters' Association (FPEAK) and the Kenya Flower Council (KFC) to have an integrated demand-led research. Moreover, the participants suggested that farmers should know about research findings through easy access to information centers to build capacity and empower them.

Soon after the final stakeholder meeting, the taskforce team presented a technical report to CTA incorporating the recommendations of small-scale farmers which will be distributed to all the stakeholders. The taskforce additionally produced a technopolicy brief titled: ***Research priorities for Kenya's cut flower industry: Farmers' perspectives***. The study will culminate with a national dissemination seminar where the results of the demand-led study will be presented to a variety of stakeholders in the floriculture industry.

Floriculture dominates Kenya's horticultural sub-sector accounting for up to 60 per cent of the total earnings from horticulture and 8 per cent of the country's total export revenues. Data from the Kenya Flower Council indicate that the floriculture industry contributes about US$ 200 million to Kenya's national economy every year, employs 100,000 people directly and a further 2 million indirectly.

National Chapter Activities

On of the unique features of ATPS is the existence of well-functioning national chapters. This not only caters for demand driven programmes, but also firmly establishes the ownership of the network from the bottom upward. The national chapters have become the wellspring of new ideas and the bedrock of policy linkages and capacity building. With closer supervision and support from the secretariat, the national chapters are increasingly delivering more output with fewer resources. In some of the more established chapters like in Gambia, Ghana, Kenya, Nigeria, Swaziland, Zambia and Zimbabwe, the national chapter offices have been established with the help of the various governments. ATPS currently boasts of 23 national chapters. The activities of the various chapters are discussed in this section.

A. NATIONAL/IN-COUNTRY DIALOGUES

In order to anchor the policy debates on biotechnology and bring the issues closer to the policymakers and implementers, ATPS supported and facilitated national dialogues in select countries. The choice of the countries was based on the state of biotechnology laws and policies in the countries, the level of polarization, the state of biotechnology research and development and regional distribution. Based on these criteria, the following countries were supported:

a) Cote d'Ivoire

The ATPS-Cote d'Ivoire Chapter held a biotechnology seminar under the theme, *Biotechnology: issues for Agriculture, Health and Environment* on 21 June 2006 at the Ivorian Association of Agronomy Sciences (AISA), Abidjan, Cote d'Ivoire. The chapter held the seminar in collaboration with the University of Cocody, the Centre Nationale de Recherché Agronomique (CNRA), the Ministry of Agriculture and the Ministry of Health and Environment.

During the opening ceremony, Dr Arsene Kouadio, National Coordinator, ATPS Cote d'Ivoire chapter said that biotechnology is key to solving the main impediments to sustainable development. He said that the seminar organizers had invited experts in agriculture, health, environment and the civil society to discuss the benefits of biotechnology to development. Dr Kouadio said that it was time that African scientists expressed their views on biotechnology so that Africa could move towards food security like the United States and other developed countries that had embraced biotechnology.

Dr Kouadio argued that biotechnology held the key to alternative solutions to famine, pollution, poverty, contagious diseases, pandemics and conservation of natural resources. "Africa," he continued, "must improve the populations' livelihood by using new technologies to guarantee the survival of future generations."

Dr Kouadio informed the participants that organizations like the Canadian Consultative Committee on Biotechnology could assist African governments to create national biotechnology institutions because their mission is to counsel governments on ethical, social, regulatory, scientific, environmental and health aspects of biotechnology. He added that such steps would help Africa identify the major areas of focus in biotechnology and take appropriate actions to form a credible and responsible society.

The five themes that were addressed during the debate were:

- Biotechnology and Agriculture
- Food Biotechnology
- Biotechnology and the Environment
- Biotechnology to the Service of Microbiology: The example of IPCI; molecular techniques and the HIV virus
- Biotechnology and Regulation

The participants were concerned about the ultimate risks that biotechnology, especially the genetically modified organisms (GMOs) could present. However, some of them supported the merits of biotechnology in their areas of specialty. The precision with which the speakers presented biotechnology research work was convincing to the participants, but the panelists

requested that future debates should not be limited to GMOs but should also address other areas of biotechnology.

The ATPS-Cote d'Ivoire Chapter has been in the forefront of filling a void that policy makers often ignore. The chapter has sought to allay the general concerns on biotechnology through adapted solutions for the present and future situations.

The seminar that was widely covered by the local media was honoured by the presence of the Minister for Health, Minister for Higher Education and Research, Vice-President, University of Abidjan-Cocody, among others.

b) Swaziland

ATPS supported a dissemination workshop organized by the ATPS-Swaziland and the University of Swaziland on "*Determination of the Use of Biotechnology in the Agricultural Industry in Swaziland*". This research was initially funded by ATPS under its small grants scheme. Its objectives were relevant to this programme and the findings have been incorporated in the draft national biotechnology policy for Swaziland.

c) National dialogue on Biotechnology and Intellectual Property Rights: Basis for responsible and democratic promotion of science and technology in Benin

The Benin workshop, held on 3 – 4 October 2006 in Cotonou, aimed to lay the foundation for national dialogue on biotechnology in Benin through the dissemination of the findings of ATPS Regional Workshop held in Dakar 13-15 March 2006. The workshop was aimed at the national leaders capable of engaging themselves in a transparent process of leadership of citizens and national institutions on strategic issues such as those of biotechnology and property intellectual rights.

The themes of the workshop were:

- Biotechnology, Biosafety, health and intellectual property rights in Africa : Brief draft on the reason for, objectives and expectations of this workshop
- Biotechnology : economic issues and ethical problem
- Biotechnology and health in Africa : Prospects for Benin
- The question of GMO and risk evaluation : progress achieved in Africa and prospects for Benin
- Intellectual property rights, biotechnology and international conventions : prospects for Benin
- The potential of biotechnology and the needs in training and capacity building for Benin

d) Mali

As a follow up to the regional francophone dialogue, ATPS-Mali conducted a national follow-up dialogue on biotechnology and its applications in agriculture, health and breeding; biosecurity and intellectual property rights in December 2006. The full workshop report will follow shortly.

e) ATPS Monitors Cluster Initiatives in Uganda

Introduction

The African Technology Policy Studies (ATPS) Network has a key mandate to support the development and strengthening of policies that increase the integration of science and technology in national development programmes.

ATPS aspires to make a difference in the livelihood of people by enhancing their capacity to produce goods and services that can compete internationally and globally through utilization of appropriate and affordable technologies. The institution is more so a key stakeholder in the development and promotion of innovative systems and clusters in Uganda, Tanzania and Mozambique that are currently piloting ISCP-EA.

ATPS shares commonalities with the ISCP-EA programme, and so it was deemed necessary to involve the ATPS Uganda Chapter in the monitoring of the seven cluster initiatives namely (1) Metal Fabrication, (2) Pineapple processing, (3) Basketry, (4) Fashion and Textiles, (5) Management Consultancy, (6) Ethanol and Bio-fuel and (7) Lake Katwe Salt processing.

Objectives

The overall objective of the monitoring exercise is to present an independent opinion on the performance of the cluster initiatives in Uganda. The specific objectives are:

(i) To establish the current status and progress made in establishment of the cluster initiatives and whether they are on course.
(ii) To assess the expectations of the stakeholders about the Cluster Initiatives.
(iii) To identify bottlenecks and challenges being faced by the Cluster Initiatives.
(iv) To establish whether the Cluster Initiatives are being developed within the policy frameworks.
(v) To recommend actions that would enhance the development and performance of each cluster initiative.

Clusters and the Poverty Eradication Action Plan (PEAP).

In the absence of a national innovation policy, the cluster initiatives in Uganda should be developed within the provisions of the national economic planning and development strategies contained in the Vision 2025 (strategy for national development) and the Poverty Eradication Action Plan (PEAP). PEAP provides an overarching framework to guide policy action to eradicate poverty (Ministry of Finance, Planning and Economic Development, 2004). It is hypothesized in the PEAP that "in order to achieve middle-income status, Uganda needs to industrialize by enhancing its competitiveness." This hypothesis is in congruence with the goal of cluster initiatives development.

The Poverty Eradication Action Plan (PEAP) aims at contributing towards transforming Uganda into a middle-income country. Such a transformation process will involve industrialization based on private investment in competitive enterprises. Uganda recognizes that the best way to industrialize is not to protect domestic industry, but to enhance competitiveness. Uganda is therefore implementing economic development programmes aimed at expanding the country's ability to compete in international markets. The development of cluster initiatives is both timely and essential because it will augment the implementation process.

Guiding Questions

The following questions guided the monitoring process of the cluster initiative in Phase 1 between July and September 2006.

- Have the cluster initiatives been formed and are functional?
- Was a baseline survey carried out to reveal the profile of each firm/institution in each cluster?
- Is the cluster concept clearly understood and well embraced in each cluster initiative?
- Do cluster members feel that the concept of cluster initiative is feasible to implement in Uganda?
- What are the challenges encountered so far in each cluster initiative?
- To what extent has each cluster initiative linked its current and proposed activities to relevant policies in Uganda?

Recommendations

The following recommendations came up at the conclusion of the monitoring and evaluation exercise.

- There is a need for each cluster initiative to conduct a baseline survey to compile the profile of the firms/member organizations and individual members. This is important because the planning of activities of each cluster should be based on knowledge of the characteristics of the firms and members.
- There is a need for refresher training in cluster management and to ensure continuous flow of information among cluster firms and individuals.
- The National Steering Committee should develop a programme of meetings (a year planner) that brings together all cluster facilitators and leadership to share experiences, challenges and develop the way forward.
- There is a need to fully sensitize the members and explain the concept of cluster initiatives so that they do not mistake it for a 'new project' in which they are being involved.
- There is a need to maintain the momentum in the clusters through innovative programme activities that are explicitly beneficial to members so that they do not drift away.
- There is need for each cluster initiative to develop strategies for its activities within the provisions of relevant sector policies and laws e.g the Uganda Investment Policy and Statute, the Environment Statute, PEAP, Plan for Modernization of Agriculture, National Forest Plan and Uganda Forest Policy, Trade Policy, Energy Policy, Science and Technology Policy, National Biodiversity Strategy etc.
- There is a need to teach innovation systems and innovation clusters in the Business, Technical and Vocational Education Training Institutions e.g. Community-based Polytechnics, Colleges of Commerce, Technical Institutes and Colleges, and in the universities. The national Curriculum Development Centre and the National Council for Higher Education need to be involved in the integration of the subject in the curricula of the different post secondary and tertiary institutions.
- There is need for a national innovation systems and clusters policy

There is need for continued monitoring of the clusters activities in 2007 in the context of technical feasibility and sustainability, adherence to environmental standards and policy linkages.

f) The ATPS Tanzania Chapter Undertakes Study on Pilot Cluster Innovation Systems and Clusters

"The Tanzanian policy environment is conducive for cluster initiatives because most of the clusters attract the Government's interest under the poverty alleviation strategy programme," indicates the evaluation of eight pilot cluster initiatives.

The objective of the evaluation was to present an independent opinion on the performance of cluster initiatives in Tanzania. During the Swedish International Development Cooperation Agency (SIDA) funded 2004 regional conference on *Innovation Systems and Innovative Clusters in Africa* held in Tanzania, it emerged that information regarding the existence and functioning of the innovation systems and innovative clusters in Africa was scarce. It was also clear that some ATPS Network activities overlap with those of the Innovations Systems and Clusters Programme in Eastern Africa (ISCP-EA). This led to collaboration between SIDA and ATPS where some of the latter's funding from SIDA would be used for ISCP-EA activities. A consultative meeting organized by the Tanzania chapter where a plan of action that included identification and study of innovation systems in the Tanzania and Uganda was developed followed soon afterwards.

Eight clusters in Tanzania were selected on the basis of limited information, such as their growth potential and contribution to poverty reduction. These clusters are: Metal working in Morogoro; Mushroom in Dar es Salaam, Pwani and Morogoro; Vegetable seed in Arusha and Kilimanjaro; Seaweed in Zanzibar; Cultural heritage and tourism in Bagamoyo; Nutriceuticals in Dar es Salaam; Sisal in Tanga; and Vegetable and fruit in Morogoro. The clusters were evaluated by gathering information from existing cluster theories and case studies to develop monitoring and evaluation indicators.

The evaluation revealed that good governance played a big role in the development of cluster initiatives because most of the clusters involved small and medium enterprises (SMEs), forcing the policy level at the national level to be supportive. However, it was also apparent that support from the local government was also necessary. In the case of the cultural heritage and tourism cluster, the negotiation between the cluster leadership and local government on land allocation is at an advanced stage. On the other hand the mushroom cluster through the local government acquired a building in Kibaha town to among other activities act as the mushroom collection centre. The vegetable and fruit cluster has also negotiated TShs 100 million under poverty reduction programme to put up common processing facilities. The metal work cluster has acquired land so that the members can work together thus improve the cluster performance.

The evaluation also recommended the conducting of a baseline survey to establish the status of the clusters before selection. The evaluators also recommended the appointing of facilitators with no vested interests but with demonstrated commitment and passion for the success of cluster initiatives.

The 2004 regional conference on *Innovation Systems and Innovative Clusters in Africa* was jointly organized by the College of Engineering and Technology (CoET) of the University of Dar es Salaam, Tanzania, College of Engineering and Technology and Faculties of Engineering of Makerere University in Uganda and Eduardo Mondlane University in Mozambique. SIDA provided the funding while resources persons came from the African Technology Policy Studies Network (ATPS).

ANNEXES

Annex I: Financial Report

Deloitte.

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INDEPENDENT AUDITORS' REPORT ON THE FINANCIAL STATEMENTS OF AFRICAN TECHNOLOGY POLICY STUDIES NETWORK (ATPS)

We have audited the financial statements of African Technology Policy Studies Network (ATPS) set out on pages 12 to 23 which comprise the balance sheet as at 31 December 2006, and the income statement, statement of changes in equity and cash flow statement for the year then ended, together with the summary of significant accounting policies and other explanatory notes, and have obtained all the information and explanations which, to the best of our knowledge and belief, were necessary for the purposes of our audit.

Respective responsibilities of directors and auditors
The company's directors are responsible for the preparation and fair presentation of these financial statements in accordance with International Financial Reporting Standards and the provisions of the Kenyan Companies Act. This responsibility includes: designing, implementing and maintaining internal controls relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error, selecting and applying appropriate accounting policies, and making accounting estimates that are reasonable in the circumstances. Our responsibility is to express an opinion on these financial statements based on our audit.

Basis of opinion
We conducted our audit in accordance with International Standards on Auditing. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance as to whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on our judgment and include an assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, we considered internal controls relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by directors, as well as evaluating the overall presentation of the financial statements.

We believe that our audit provides a reasonable basis for our opinion

Opinion

In our opinion, proper books of account have been kept by the organisation and the financial statements, which are in agreement therewith, give a true and fair view of the state of affairs of the organisation at 31 December 2006 and of its surplus and cash flows for the year then ended in accordance with International Financial Reporting Standards and comply with the Kenyan Companies Act.

Deloitte & Touche

28 March 2007

AFRICAN TECHNOLOGY POLICY STUDIES NETWORK (ATPS)

INCOME STATEMENT
FOR THE YEAR ENDED 31 DECEMBER 2006

	Note	2006 US$	2005 US$
INCOME	2	1,165,177	1,282,495
EXPENDITURE			
Project expenditure	3	(862,753)	(985,974)
General administration	3	(191,281)	(192,779)
		(1,054,034)	(1,178,753)
SURPLUS FOR THE YEAR		111,143	103,742

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AFRICAN TECHNOLOGY POLICY STUDIES NETWORK (ATPS)

BALANCE SHEET
31 DECEMBER 2006

	Note	2006 US$	2005 US$
ASSETS			
Non current assets			
Motor vehicles and equipment	5	34,878	35,303
Intangible assets	6	3,313	764
		38,191	36,067
Current assets			
Receivables	7	45,809	98,390
Bank and cash balances		631,534	685,081
		677,343	783,471
Total assets		715,534	819,538
FUNDS AND LIABILITIES			
Funds			
Accumulated surplus/(deficit)		1,963	(109,180)
Current liabilities			
Payables and accruals	8	89,072	93,578
Undisbursed grants payable	9	211,539	282,431
Unexpended grants	10	412,960	552,709
		713,571	928,718
Total funds and liabilities		715,534	819,538

The financial statements on pages 12 to 23 were approved and signed by the Directors on 23 March, 2007 and were signed on their behalf by:

..... EXECUTIVE DIRECTOR

..... DIRECTOR

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AFRICAN TECHNOLOGY POLICY STUDIES NETWORK (ATPS)

STATEMENT OF CHANGES IN EQUITY
FOR THE YEAR ENDED 31 DECEMBER 2006

	General Fund US$
At 1 January 2005	(212,922)
Surplus for the year	103,742
At 31 December 2005	(109,180)
At 1 January 2006	(109,180)
Surplus for the year	111,143
At 31 December 2006	1,963

AFRICAN TECHNOLOGY POLICY STUDIES NETWORK (ATPS)

STATEMENT OF CHANGES IN EQUITY
FOR THE YEAR ENDED 31 DECEMBER 2006

	General Fund US$
At 1 January 2005	(212,922)
Surplus for the year	103,742
At 31 December 2005	(109,180)
At 1 January 2006	(109,180)
Surplus for the year	111,143
At 31 December 2006	1,963

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Research Officer

Lucy Mwangi
Programme & Publications Administrator

Carol Thuku
Senior Secretary

Ruth Wanjala
Communications Assistant

Neema Nzimbi
Secretary/Administrative Assistant

Susan Hinga
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Richard Muchesia
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Mary Satsiru
Office Assistant

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