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**Report on ECA activities in the area of science and technology since
the fifth session of the Committee on Development Information**

1. Introduction

1. This report covers the activities undertaken since the Science and Technology Section was moved to the Information and Communication Technology, Science and Technology Division after the repositioning of the United Nations Economic Commission for Africa (ECA) in 2006. The report focuses on a major conference undertaken to launch the Commission's work in science and technology (S&T), as well as follow-up to the conference. In its new strategic orientation, which includes helping to meet Africa's special needs, ECA's work programme now includes a major science and technology component, which is aimed at:

- Ensuring that science is targeted at the economy, and particularly the productive sectors;
- Managing capacity-building programmes for science institutions, especially in harnessing innovation;
- Facilitating collaborative partnerships in science; and
- Promoting the role of science and innovation in decision-making and in development processes.

2. Advocacy for science, technology and innovation in Africa (2006-2007)

Creation of the Science and Technology Advisory Group

2. To assist it in its S&T work, ECA created the African Science and Technology Advisory Group to provide a strategic and conceptual input into the work of the Commission and champion S&T issues on the continent. The major functions of the Group are as follows:

- To assess the impact of the implementation of ECA's Science and Technology for Development programme in Africa;
- To advise the ECA secretariat on the content of its work programme;
- To suggest ways and means of resource mobilization for programme implementation;
- To suggest ways and means of improving ECA's work programme and its implementation; and
- Through its members, to act as advocates of African S&T both in Africa and elsewhere.

Joint African Union/ECA S&T Exhibition 2007

3. The African Union (AU) and ECA mounted an exhibition during the Summit of African Heads of State and Government held from 26 to 30 January 2007 in Addis Ababa, Ethiopia, with the theme "Science, technology and scientific research for development". The exhibition was opened by Professor Paul Kagame of Rwanda, Professor Alpha Oumar Konare, AU former Chairperson, and Mr Abdoulie Janneh, UN Under-Secretary-General and Executive Secretary of ECA, on 29 January 2007. Exhibitors included S&T organizations from 13 African countries - Algeria, Egypt, Ethiopia, Kenya, the Libyan Arab Jamahiriya, Nigeria, Senegal, South Africa, the United Republic of Tanzania, Tunisia, Uganda, Zambia and Zimbabwe - which displayed products and services from the S&T sectors.

Launch of the Science with Africa conference at the European Parliament

4. ECA participated in the launch of the Science with Africa conference in the European Parliament in Brussels, Belgium, in June 2007. The launching event was sponsored by Jerzy Buzek, a Polish member of the European Parliament. The event, which was organized by Intelligence in Science and ECA, brought together members of the European Parliament, European Commission officials, industry representatives, African and European research and development (R&D) organizations, international and multilateral institutions and the European media. See http://cordis.europa.eu/fetch?CALLER=EN_NEWS&ACTION=D&SESSION=&RCN=27934.

Visit to Brussels by the Executive Secretary

5. On 29 November 2007, the ECA Executive Secretary addressed a public hearing on the Science with Africa conference at the European Parliament. He stressed the importance of S&T in Africa's development, stating that "we need no less than a scientific revolution in Africa". The event was attended by members of the European Parliament as well as representatives from the Council, Commission officials, industry representatives, stakeholders and policymakers. The Executive Secretary stated that the aim of the conference was to add momentum to a process started by African heads of State and government when they dedicated their January 2007 summit meeting to the issue of science, technology and scientific research for development.

6. The purpose of the hearing was to explore ways to help African scientific organizations to gain better access to collaborative R&D projects in industrialized countries. It also provided background information for the future adoption by EU parliamentarians of a resolution on scientific collaboration with Africa.

7. The hearing was chaired by Pilar del Castillo Vera, a member of the European Parliament, who called for the establishment of a practical mechanism that could bring African and European scientists together.

3. The Science with Africa conference

8. ECA, the AU Commission and their partners organized a well-attended and highly successful conference entitled "Science with Africa" from 3 to 7 March 2008 in Addis Ababa, Ethiopia. The main objective of the conference was to provide a platform for in-depth exploration of ways in which science, technology and innovation (STI) can be of service to the African population, especially as an engine for accelerated economic growth and poverty reduction.

9. The high-level panel of the conference, which included ministers and speakers of national parliaments from several African countries, emphasized the recognized importance of STI as a tool for socio-economic development. They argued that the current low financial investment in STI activities in Africa is mostly due to low annual national economic growth rates, and therefore urged African countries to pursue greater regional and international cooperation in STI for sustainable development.

10. The conference dealt with the following issues pertaining to Africa's socio-economic development: STI policy; innovation and the production of ideas; intellectual property rights; patents and technology transfer; the future of STI in Africa; international programmes to support STI; energy, water, transport and infrastructure; information and communications technologies (ICTs) and innovation; agriculture, health and life sciences; a "Science with Africa marketplace"; and developing guidelines for health research in Africa. Cross-cutting issues such as STI

capacity-building and climate change in Africa formed part of the lively discussions. Outcomes and recommendations from the conference are described below.

Science, technology and innovation policies in Africa

11. Many countries around the world have been using STI to shape their socio-economic development. The situation in Africa is unsatisfactory, despite the proclamation of national development visions. Most of these visions have components dealing with the development of S&T and its relation to economic development. The African Union's Consolidated Plan of Action of 2005, which is a continent-wide blueprint for accelerating economic growth through the application of S&T, is being implemented. This is expected to help African Governments give priority to STI for development. In the face of the continent's current challenges, implementation of the Plan needs to be accelerated, while African Governments also need to scale up investment in STI. Linkages between STI policy, research products and business enterprises need to be strengthened. Consequently, Africa requires STI policies which are founded on its basic needs, especially poverty reduction through sustainable economic growth.

12. Conference recommendations included the following:

- African governments should establish enabling environments for the sustenance of local STI experts and for the creation of a critical mass of STI experts and knowledge communities in each country;
- African governments should develop mechanisms to profitably address the brain drain and encourage brain circulation through South-South and North-South scientific cooperation;
- African countries should incorporate climate change issues in their S&T priorities, particularly in their partnership projects with the European Union, the G8 and other development partners, including emerging economies such as Brazil, China, the Republic of Korea, India and Malaysia;
- ECA, in collaboration with the AU, should assist African countries and their regional economic communities to prepare or review national and harmonized regional STI policies. Such policies should have adequate STI development indicators;
- The AU, with the support of its partners, needs to foster the development of the African S&T policy framework;
- African countries need to give priority to innovation as part of their S&T strategy for job creation, market competitiveness and wealth creation. Hence they should develop national innovation systems that have clear development indicators and a clear interface between education, research, STI policy and business enterprises;
- African governments should strengthen their will and commitment to give priority to sustainable funding for STI activities. R&D funds should be mobilized from both the government and the private sector; and
- The AU and ECA, in consultation with governments, should create a mechanism to assist African scientists to access funds for R&D.

Intellectual property rights, patents and technology transfer

13. Although numerous African countries are improving their science base, further effort is needed to secure economic benefits from publicly financed S&T. Innovation is commonly understood to represent this process. Since the adoption of the Lisbon Agenda, the European Union and its member States have launched numerous initiatives to improve the commercialization of research results covering all stages of the development chain: the protection of research results via

intellectual property rights,¹ the transfer of knowledge² and technology through the exchange of scientists, the creation of spin-offs, the conclusion of research contracts and the licensing of technology, and finally financing schemes for the commercialization of research results such as venture capital and start-up funds.³ Cooperation in science and investment in African science-based organizations can benefit the African economy and people only if mechanisms are in place to help transfer the knowledge into the economy and the general knowledge base. The Conference recommended that ECA and the AU Commission, in collaboration with the United Nations S&T Cluster and other international partners, such as the European Union, should establish an African cluster for S&T to foster the coordinated implementation of the Consolidated Plan of Action adopted by the AU in the context of the New Partnership for Africa's Development (NEPAD). This cluster should seek to harmonize and monitor the implementation of S&T initiatives on the continent in order to avoid duplication, and serve as a permanent forum for interaction between Africa-based scientists, engineers and technologists and their international partners.

14. Some of the recommendations were as follows:

- The African Regional Intellectual Property Organization, the African Intellectual Property Organization, the Pan-African Intellectual Property Organization and the national bodies dealing with intellectual property rights should embark on intensive capacity-building and awareness-raising campaigns on intellectual property rights and patent issues;
- African countries and their institutions should enhance their role as custodians of Africa's indigenous knowledge and traditional artefacts by enforcing protection laws related to intellectual property rights;
- The AU and ECA need to enhance awareness among policymakers, the public and the private sector about patents and intellectual property issues and how they can contribute to research and development; and
- For Africa to enjoy the benefits of intellectual property systems, African countries should ensure that intellectual property institutions are sufficiently funded so that they can obtain, maintain and enforce property rights.

Energy, water, transport and infrastructure

15. It was reported that 75 per cent of the population of sub-Saharan Africa has no access to electricity. This has a negative impact on attainment of the Millennium Development Goals, especially in the fight against poverty on the continent. However, Africa has abundant primary energy resources (water for hydropower, oil, natural gas, coal and nuclear), as well as enormous amounts of renewable energy sources, such as solar, wind, ocean waves and tides, geothermal and biofuels. It is commonly found that not much emphasis is placed on the nexus of energy production, utilization and environmental protection issues in Africa. R&D in the energy sector has yet to focus on energy resource assessment, conversion technologies, low-cost transport and distribution technologies, and energy efficiency.

16. On average, about 60-80 per cent of the population has access to clean and safe water in urban areas, and about 30-50 per cent in rural areas. Sanitation levels in the urban and rural areas stand at about 55 per cent and 25 per cent respectively. This promotes the prevalence of high levels of water-borne diseases on the continent. The main concerns in the water sector in Africa include variable precipitation due to climate change, water scarcity, the uneven geographical distribution of

¹ E.g. Communication on Knowledge Transfer; Community Patent Strategy.

² Communication on Knowledge-Transfer; European Institute of Technology.

³ Competitiveness and Innovation Framework Programme.

water resources, water governance and transboundary aquifers. The other challenges facing Africa in this sector include the unavailability of reliable data and the lack of adequate well-trained human capital and functioning research infrastructure.

17. The main challenges in the transport sector in Africa include poorly functioning transport systems, as a result of weak infrastructure and poor maintenance schemes. There is a big mismatch between demand for and supply of transport services in many African countries. There is also a mismatch between population growth, land use and transport networks, while the transport industry in Africa does not make sufficient use of modern techniques such as ICT tools - GPS (the Global Positioning System) and GIS (geographical information systems).

18. Recommendations were as follows:

- African institutions dealing with the energy, water, transport and infrastructure sectors should establish professional networks for sharing information, knowledge, skills and experience in these sectors;
- African countries should harness their enormous energy resources for socio-economic development, paying special attention to renewable energies, which are amenable for use in rural areas; and
- ECA should continue to work with the African energy institutions, such as the African Energy Commission, as well as the AU and its NEPAD energy initiative.

ICTs and innovation

19. The Conference acknowledged that ICTs constitute a solid foundation for harnessing STI for development. They support research activities that deal with data capture, storage and dissemination. Consequently, the application of ICTs facilitates access to knowledge and the creation of networked communities and business enterprises. Unfortunately, the low level of ICT penetration, the absence of national and subregional innovation systems due to a lack of affordable infrastructure, and an inappropriate legal and regulatory environment to support market competition and participation by all stakeholders (e.g., the widely-dispersed rural community and disenfranchised groups), constitute the main challenges that most African countries face. The lack of technological innovation to support growth of small and medium-sized enterprises limits their contribution to national economies in Africa.

20. Recommendations included the following:

- ECA should continue its assistance to African countries and regional economic communities for the development, implementation and monitoring of harmonized national and subregional ICT policies. Greater emphasis should be put on reinforcing implementation mechanisms and on meeting the needs of rural communities, young people and women;
- African countries should develop ICT and innovation policies and strategies;
- African countries should establish an enabling environment for partnerships for knowledge-sharing and networking; and
- The AU Commission and ECA, in collaboration with their partners, should support the implementation of the African Regional Action Plan on the Knowledge Economy.

Agriculture, health and life sciences

21. About 70 per cent of Africa's workforce is employed in the agriculture sector, most of them being smallholder farmers and traditional pastoralists, while African countries derive 40 per cent of their gross domestic product from agriculture. About 80 per cent of the African population depends on traditional medicine; hence African biodiversity is very important to livelihoods in Africa. Despite this prominence, investment in agricultural research has been declining, leading to reduced capacity to address issues of agricultural productivity. Agriculture in Africa is heavily dependent on rainfall, but as a result of climate change, rainfall patterns have become erratic. The migration of the productive workforce (i.e., young people) to urban centres, the ageing of rural populations, malaria and the HIV/AIDS pandemic have drastically reduced the human resource potential in the agriculture sector. Consequently, famine remains a major problem facing many countries on the continent. Currently, Africa is not fully benefiting from biotechnology, despite its potential to contribute to the achievement of the Millennium Development Goals. This is partly due to the perceived risks of biotechnology (especially those surrounding genetic modification), including concerns over a reduction in biodiversity, a fear of possible dominance by multinationals, and human health issues.

22. The Conference participants proposed the following recommendations:

- African governments should support R&D programmes which aim at modernizing the agriculture sector so as to increase productivity, industrialization and commercialization. At the same time, indigenous and simple technologies should be harnessed so that they can contribute to poverty alleviation;
- African governments should establish adequate policy frameworks to support the modernization and commercialization of traditional medicine products;
- African countries should focus on identifying more viable seed storage systems for indigenous African plants, the roll-out of a more user-friendly legislative framework for biosafety, and improved support and service conditions for African scientists;
- South-South and North-South collaboration should emphasize biotechnology; and
- The paucity of data and weak data collection infrastructure remain a considerable impediment to the development of scientific and technical research in Africa. Accordingly, real-time Internet-based data collection infrastructure should be developed to assist African researchers to better study climate change and its impacts, and formulate mitigation strategies.

Science with Africa marketplace

23. Prior to the Conference, there was a call for papers on the major Conference themes of energy, transport and infrastructure, health, life sciences, agriculture, climate change and ICTs. There was a considerable response to the call, and subsequently some of the accepted abstracts were featured in the marketplace of ideas, where participants defended their ideas in a peer-to-peer environment. Participants cautioned that research activities in Africa should focus on a few niche areas based on comparative advantage, and should be carried out with a view to industrialization and commercialization. The research environment needed risk-taking for cutting-edge R&D and engagement with partners, including inter-country collaboration. Currently, Africa has insufficient human resources in the field of technology development, acquisition, adaptation and commercialization. These are necessary for adequately dealing with the social and cultural factors favouring or impeding scientific and technological progress. It was also observed that research in the human and social sciences often exists, but is not applicable because of cultural constraints, and that the experience and lessons of Asian countries can be useful to African planners. Furthermore,

in the area of scientific outputs, it was observed that the number of scientific publications by Africans is increasing but remains low outside Egypt, Nigeria and South Africa. Furthermore, bibliographical databases do not take into account many publications in Africa.

24. The following recommendations were made:

- African countries should initiate the free circulation of scientists, engineers and technicians within Africa to share capacities and spur STI progress;
- African scientists should pool available resources and capacities through networking in order to compete with the rest of the world;
- Issues related to gender and STI have to be better taken into account in STI policymaking;
- There is a need to improve systems of observation and information, and to strengthen the link between knowledge acquisition and the transformation of reality; and
- There is also a need for prevention and mitigation of natural disasters and a need to enhance R&D activities related to climate variability.

R&D Idea factory

25. The Idea Factory was an innovative method for generating ideas and selecting and implementing those which were innovative during the Conference. Industrial Idea Production is a unique process of stimulating innovative and lateral thinking in a systematic – industrial – process, at dazzling speed, promoted by the BrainStore company. Idea Production tapped the creativity and expertise of the Science with Africa participants to develop those ideas in only three days. The resulting strategy should stimulate and support the strengthening of African R&D by looking at issues such as capacity needs, increasing the usability of research output, fostering interaction among African scientists and other stakeholders, and enabling African scientists to participate in international research projects. Supported by the Swiss Agency for Development and Cooperation, this project is an example of meaningful international collaboration among members of the Global Knowledge Partnership, the world's first international multi-stakeholder network. This innovation aims at establishing concrete measures to boost R&D in Africa. In the context of this Conference, the Idea Factory facilitated the generation of selected research ideas, which will be jointly implemented by BrainStore and African scientists, engineers and technologists. Conference participants developed practical ideas for concrete initiatives to foster scientific development and research in Africa.

26. The Conference recommended that the AU, ECA and the United Nations family, in collaboration with other implementing partners, should work with Africa-based S&T entities to generate many more ideas using the Idea Factory method in order to boost R&D in Africa.

4. Follow-up to the Science with Africa conference

Ministerial resolution on the Science with Africa conference

27. At its forty-first session, held jointly with the African Union in Addis Ababa, Ethiopia, in April 2008, the ECA Conference of African Ministers of Finance, Planning and Economic Development recognized the importance of science and technology for Africa's accelerated development and welcomed the Science with Africa initiative. In their ministerial statement, African Finance Ministers "[recognized] that scientific knowledge is a critical factor for growth, employment and poverty reduction and for the competitiveness of our economies in the twenty-first

century and are therefore concerned by the weaknesses of our higher education, science and technology sectors. We will work closely with other sector ministers to mobilize adequate resources to improve the quality and relevance of education, and to disseminate knowledge, science and technology, in order to develop and create new skills and capacities while building on existing capacities to prepare our economies for successful engagement with the twenty-first century. We also recognize the important role the private sector could play in that regard and will continue to explore and adopt measures to elicit and enhance the contribution of the private sector to growth and employment".

28. The Ministers also passed a resolution (856 XLI) entitled "Science with Africa: Strengthening research and development, and innovation for Africa's socio-economic development", in which they:

"[Commended] the leadership of ECA and the African Union Commission for undertaking this timely and major event, namely the Science with Africa Conference, and its far-reaching impact for strengthening the African scientific community;

"[Invited] the African Union Commission and ECA, in collaboration with the United Nations Science and Technology Cluster, the African Development Bank and other international partners, to establish an African cluster for science and technology to foster the coordinated implementation of the Science with Africa conference outcomes and recommendations as a mechanism to support the implementation of the African Union and its NEPAD Science and Technology Consolidated Plan of Action as well as the science and technology activities outlined in the ECA Business Plan and the ECA work programme and priorities for the 2008-2009 biennium and beyond;

Requested ECA and AU to report to the next meeting of the Joint Conference of AU Ministers of Economy and Finance and ECA African Ministers of Finance, Planning and Economic Development.

Science with Africa Roadmap Workshop

29. On 6 June 2008, ECA in collaboration with the AU organized a Roadmap Workshop to develop 20 ideas which had been raised at the Science with Africa Idea Factory into implementable projects that would help boost R&D and operationalize STI at member State level in the next seven years to 2015. Government officials and ECA and AU experts as well as representatives of the African diaspora identified potential lead institutions and possible partners for each core idea. They also discussed funding constraints and reviewed fiscal systems in place to ensure a thorough assessment of the costs involved. The criteria governing the practical ideas which had been developed by Conference participants were that they should:

- Reflect current challenges facing the continent and build the foundation for strengthening and expanding its R&D capacities;
- Increase the visibility of African R&D capabilities at the international level and lay the groundwork for sustainable partnerships; and
- Increase the usability, practicability and commercial appeal of products generated by researchers.

30. Various proposals were developed by the workshop to focus on five critical areas of STI for development:

- Funding: Fundanidea.com; African philanthropists for science club; step-by-step science funding; luxury donation fund;
- African innovation: African pioneer challenge; research areas made in Africa; African science TV; yearly focus topics; African research yearbook;
- Building human capital: science scouts; One science kit per school; Science camp for girls; diaspora community;
- Business development: African R&D Ltd; test in Africa; open science laboratory; business incubation programme; and
- Outreach and advocacy: patenting indigenous knowledge programme; Olympic science games; Invest a per cent.

31. Roll-out starts immediately for some, while others require more preparation before launch within the next five years.

Developing health research guidelines in Africa: AfroGuide

32. This is an ECA collaboration with the AU Commission and the Good Clinical Practice Alliance – Europe, which brought together about 25 health researchers, professors and experts from Africa and Europe to launch the process of developing guidelines for health research in (Afro Africa Guide). This was a follow-up activity to the Science with Africa conference, during which calls were made for establishing commonly accepted African and international standards for the promotion of research and the protection of human subjects. This pointed to the need for the African continent to develop its own guidelines for ethics and good clinical practice. Agreed steps to be taken by AfroGuide experts and stakeholders under the auspices of ECA are: raising resources for the project; networking to provide for capacity-building and ensure cross-fertilization and impact across all regions and sectors of African communities; and an implementation strategy for model laws, policies and practices at the continental, regional, national and local levels (www.uneca.org/sciencewithafrica).

The African Science to Business Challenge

33. This a pioneering initiative launched in December 2008 by ECA and the research institute RTI International with the aim of strengthening links between scientific research and business development. The Challenge is designed to meet the need for scientific research that addresses immediate social and economic needs while building Africa's capacities in science and technology. Launched as a result of the Science with Africa conference, the initiative places emphasis on business development in scientific fields. Consequently, a major aim is to support the African development process through application of the notion that science is a key strategy for business and enterprise development, which creates employment and wealth. Specific aims include:

- To provide African scientists and researchers with an understanding of commercialization know-how, as well as the technical aspects, such as financial management, intellectual property, project management and market research;
- To build strong ongoing connections between researchers and research institutions and industry and investors who can help to bring ideas, inventions and innovations to market, or otherwise into economically productive use; and
- To bring research and outputs to the market, or into productive use, in a timely and effective manner, so as to yield tangible benefits and ensure that the research contributes to the economy and the broader community.

34. The inaugural Challenge in 2009 focuses on two categories: biomedical engineering, which integrates physical, chemical, mathematical and computational sciences and engineering principles for the study of biology, medicine, behaviour and health; and water quality, which is central to the human rights and personal dignity of every person.

35. A panel of judges composed of prominent African and United States scientists will review proposals and select the winner, on the basis of the significance of the research and the potential for the proposed technology's marketability and commercialization. The winner will be invited to travel to the headquarters of RTI International to receive training in methods of commercializing the research (information available at www.uneca.org/sciencewithafrica).

Operationalization of the Mozambique Science, Technology and Innovation Strategy

36. Following a request from the Government of Mozambique and in line with the Memorandum of Understanding signed between the Government and ECA on cooperation and implementation of joint activities and programmes in the area of ICT, S&T for development, ECA is providing support to the Ministry of Science and Technology in the implementation of the country's STI strategy. ECA appointed an international consultant for three months beginning in January 2009 to advise and coordinate with the Ministry on the operationalization of the Strategy. Mozambique has integrated its ICT plans in the overall national STI strategy. The operationalization of the Strategy will involve four different groups of activities:

- Programming the implementation of the Strategy;
- Budgeting for programme implementation;
- Development and application of a methodology for project formulation under the Strategy with a view to financing; and
- Establishment of systems of resource mobilization and application, implementation and management under the Strategy.

Technology Planning and Technology Governance in Africa Initiative

37. In collaboration with the AU Scientific, Technical and Research Commission, the International Council for Science Regional Office for Africa and the Kenya National Council for Science and Technology, ECA organized a training workshop on technology planning and technological governance in Africa in Nairobi, Kenya, from 24 to 27 February 2009. The purpose was to implement the recommendations made at the Science with Africa conference for the development of effective strategies and policies for technology transfer, adaptation and domestication. The workshop was the first of its kind, and brought together more than 50 economists and scientists from the continent and the diaspora, following a conference recommendation. It was convened against the background of a lack of integration of technology planning in national development plans and a lack of strong technological governance. It was agreed that ECA, the AU Commission and the International Council for Science would conduct a study on African S&T strengths, weaknesses, opportunities and threats, and develop and implement subregional technology planning and governance strategies and an online training platform for policymakers and other stakeholders. It was also recommended that action should be taken:

- To institute legal and policy reform, including legal training, to explicitly address S&T governance;
- To establish clear-cut institutional structures for technology governance;
- To adopt a sector-wide approach for technology governance in which all core sectors and stakeholders agree on roles and responsibilities in technological governance;

- To establish national institutional frameworks to monitor, harness and supplement initiatives, strategies and programmes that support the more effective development, use and diffusion of technology throughout the economy;
- To establish national technology and economic planning committees;
- To promote the establishment of technology, innovation and transfer agencies to harness the potential of indigenous knowledge and support community-based (home-grown) innovations and ensure that fair regulations are adopted and equitable agreements reached;
- To develop a dynamic multi-stakeholder dialogue to identify and agree on the challenges to be addressed and draw up an action plan with drivers at leadership level;
- To undertake and publish a study on “Capable State of Governance in Africa and lessons from elsewhere: Challenges and opportunities”;
- To strengthen the institutional effectiveness of the Pan-African intellectual property rights systems; and
- To strengthen national systems of innovation with respect to technological governance, clarify the governing stakes (government and non-government) and forge links/interactions to make the system functional.

38. Actions were also called for:

- To enhance awareness among policymakers and planning institutions of the need to subject foreign direct investment to comprehensive technologization criteria;
- To assess and evaluate investment proposals and feasibility studies against a set of technologization targets;
- To establish a robust monitoring system to ascertain whether technological targets are being reached;
- To train technical personnel and build the capacity of institutions in S&T policy matters to ensure implementation, enforcement and compliance with technologization;
- To devise ways and means of reversing the general tendency to cede too much control to overseas contractors;
- To ensure that investors sign a technologization quality control and assurance form as evidence of both their technological commitments and their expectations; and
- To consider establishing an apex body, preferably in the office of the President, to provide leadership and oversight (planning, monitoring and coordination) on all matters related to STI.

African Science Philanthropy Initiative

39. As a result of the Science with Africa conference and the Ideas Factory, the notion of an African Philanthropists for Science Club was mooted. ECA was requested by the Conference of Ministers of Finance to develop strategies for arriving at home-grown solutions to Africa’s scientific challenges as a priority. This led to the African Science Philanthropy Initiative, which is soliciting the support of leading African business leaders. The idea is to pioneer a new trend in African science philanthropy based on a workable business model. The key aim of the Initiative would be to cultivate indigenous resources that support the continent’s own priorities for S&T development, leading to the creation of industries and employment opportunities. The overall objective would be to link African research institutes and local companies in a mutually beneficial relationship.

5. Studies on science, technology and innovation

40. In 2008 a study was commissioned on private-sector investment to support ICT R&D in Africa. The main objectives of the study were: to identify companies supporting ICT R & D in Africa; to evaluate the contributions being made by such companies in this regard; to clearly highlight trends and differences in various sectors; and to recommend a vision, goals and activities that ECA will use to harness such resources in the context of an ICT R&D strategy for Africa.

41. ECA also commissioned a study on the development of a business model for S&T institutions. African countries have shown growing interest in the creation of science and technology parks, business incubators and centres of excellence, fairly often within an STI policy framework. The objective of this study is to present a comprehensive and comparative analysis of the overall situation and the evolution of technology parks, centres of excellence and business incubation centres in countries in northern and southern Africa, highlighting the lessons learned, examining best practices in Africa and worldwide and developing a comprehensive business model that can be used as a policy tool for development actors and decision makers. The study revealed the following:

- The establishment of technology parks finds its rationale in the wish of African countries to enhance the competitiveness of their economies through better exploitation of their scientific and innovation potential. The development of technology parks and technopoles can pursue the two major objectives of territorial development and integration into the international economy by attracting international companies;
- The development of business incubators in African countries is expected to meet the need to commercialize research results from universities and research institutes, increase job opportunities and catalyse investment; and
- Research centres are major components of national STI systems. The countries studied have made strenuous efforts in this area. They have established research governance structures at the national level and increased their research expenditure, which relies mainly on public funding. Their research centres vary in size from a few dozen to several thousand researchers. The total number of research centres is 298, of which 221 are located in Egypt, followed by Tunisia with 32 centres.

42. The study concluded by setting out a business model including a policy and strategies to strengthen the linkage between S&T performers and the country development agenda.

43. Another study commissioned was on promoting STI in Africa. It identified four levels of action which should be taken by African governments. First, political and scientific leaders in each African country must take immediate steps to work together to design national policies for the development of STI based on each nation's technological and industrial needs and the best available STI knowledge. Second, it is essential that science policy should be fully integrated into each nation's development plan. This will help ensure that the scientific and technological knowledge generated by the nation's research institutions is responsive to the socio-economic needs of the country. Third, governments must ensure that adequate and stable funding is provided for the implementation of the national S&T plan. Without a firm commitment by African governments to increase the level of funding for R&D to at least 1 per cent of gross domestic product, as recommended by the AU Summit in January 2007, no science policy will be able to effectively build indigenous S&T capacity, let alone transform that capacity into concrete action that helps to alleviate poverty and grow the economy. Fourth, recent pan-African initiatives for capacity-building in STI, launched by such diverse organizations as ECA, AfDB, AU/NEPAD, the Network

of African Science Academies and others, must be encouraged and supported. Rapid and sustained progress in STI in Africa will never take place unless Africans take joint action in the design and execution of the strategies that are pursued.

44. The study proposed a strategy whereby African States will promote STI through the following 10 actions, among others: institute educational reforms that make science more interesting and attractive to the young; support programmes to increase scientific literacy among both children and adults; reform and strengthen universities and establish at least one research university; train a new generation of problem-solving scientists and turn science into a demand-driven exercise; build and sustain scientific centres of excellence in at least one field of national importance; learn to share “successful experience” in the application of science and technology; bolster merit-based science academies that provide policy advice; establish and support science foundations to support research and training; turn the brain drain into brain gain by devising effective strategies to engage the diaspora; and build and maintain up-to-date electronic communication systems.

6. Advisory Services in science and technology

45. A mission visited Uganda from 13 to 15 June 2007 at the request of the Uganda Parliament. It worked with the parliamentary committees on ICT and S&T to examine how to improve the role of Parliament in promoting ICT and S&T for development. It built upon another mission carried out with the Uganda Industrial Research Institute in December 2006, which advised the Uganda Government on building its STI systems, policies and programmes and accelerating its industrialization strategy through the application of S&T.

7. Knowledge-sharing and outreach

Online discussion

46. ECA continues to enhance member States’ capacity to harness STI potential for their socio-economic development. To enhance ECA’s links with the African scientific community and build consensus on emerging STI issues from the continent’s vantage point, which in turn will serve to inform the Commission’s S&T activities, ECA has initiated the following activities.

47. Since May 2007, ECA has been managing an ongoing online discussion on STI for development in Africa (<http://d2.dgroups.org/Community.aspx?c=8b27c3b4-738b-4abf-93c4-8401f45b6e88>), which is helping build an electronic community of stakeholders around Africa’s science agenda and ECA’s programme. With over 600 contributors and over 900 messages exchanged so far, it is probably the biggest e-community ever assembled on this theme in Africa. It has identified and mobilized a core set of African S&T policymakers, experts, consultants and other stakeholders who have a keen interest in STI for development.

48. This group has discussed and shared knowledge and experience on such issues as: the current role of the scientific community in Africa - gaps and challenges in Science and Technology development on the continent, major S&T issues on the continent, and the way forward; the role of ICT in advancing S&T in Africa, and S&T for advancing ICTs – road maps, opportunities and challenges; issues related to access to scientific knowledge - status of access, limitations to access, and areas concerned; and building an African S&T base: what is required in research, publishing, resource mobilization, S&T management, etc.

Access to Scientific Knowledge in Africa

49. In the same vein, ECA is also developing the “Access to Scientific Knowledge in Africa (ASKIA)” initiative to support and promote access to scientific knowledge by African scientists, decision makers, students and researchers. This is because African researchers, scientists and students have had little or no access so far to the rich scientific knowledge readily available to their counterparts in developed countries. The initiative will also provide a mechanism for African scientific institutions to tap into global scientific knowledge as well as the production of indigenously owned knowledge that supports economic and industrial growth.

50. Specific activities in rolling out the initiative will include the creation of a repository of S&T initiatives and activities in Africa, accessible by STI policymakers and the scientific community. The repository will be a compendium of scientific knowledge resources pertinent for supporting R&D activities, and will promote strategic links between R&D, universities and industry. It will be hosted by ECA and will have searchable collections of material for the target groups. Access will be provided to all African scientific institutions.

ASKIA 2.0: Science with Africa Commons Innovation Platform

51. This will be an improvement on ASKIA, with a new e-platform hosted by ECA as a major new initiative that will catalyse innovation through new social networks focused on innovation in S&T across Africa. This platform will facilitate all dimensions of policy formulation and the implementation of cyber-strategies across ECA’s activities, and serve as a “convergence platform” that can bring diverse stakeholders (scientists, technologists, policymakers and business communities) together and address innovation bottlenecks throughout the continent. During 2008 ECA initiated the Science with Africa programme, whose task is to develop creative strategies to enhance the ways in which STI can provide greater benefits to the African population. ECA believes that through the creation of new social networks via our e-platform, it will be possible to harness the distributed wisdom of African scientists, technologists and policymakers and the public to accelerate innovation through novel forms of collaboration that new social media or Web 2.0 technologies can facilitate. This initiative will build on the social infrastructure and networks that ECA has developed in the science, technology and policymaking arenas across Africa to maximize the productivity of these already existing networks. The goal is to create a new “Science with Africa commons” capable of bringing together the most important stakeholders in Africa and catalysing innovation in new, more networked ways that can transcend the linear models of innovation that are most commonly found in Africa at the moment.

Science with Africa e-newsletter

52. On 1 December 2008, ECA launched its Science with Africa e-newsletter. Published on a quarterly basis, it provides information and news on the follow-up to the Science with Africa conference, as well as other news items closely related to the themes and objectives of the event. The African scientific community expressed tremendous interest in receiving this newsletter.

8. International cooperation, liaison and partnerships

53. In the runup to the Science with Africa conference, ECA held a hearing in Brussels on 27 November 2007 – for European parliamentarians as well as representatives from the European Council, European Commission officials, industry representatives, other stakeholders and policymakers. Following this interaction, the European Parliament took a significant policy

decision in this area. On 21 February 2008, it adopted a resolution calling for more participation by African scientists in international R&D. It emphasized the importance of supporting measures to improve international scientific cooperation with Africa, and underlined the need to increase the involvement of African scientists in international collaborative science and R&D projects in order to keep and develop R&D knowledge in Africa, in particular in specific sectors such as food, health and energy. The European Parliament acknowledged the increasing trend amongst policymakers in Africa to prioritize STI for development (See http://www.europarl.europa.eu/news/expert/infopress_page/030-21750-049-02-08-903-20080219IPR21739-18-02-2008-2008-false/default_en.htm).

54. ECA is working closely with the AU, NEPAD and the AU Ministerial Council on Science and Technology for the implementation of Africa's Science and Technology Consolidated Plan of Action. For example, it participated actively and gave technical assistance in the following events:

- AU Summit and Exhibition on S&T, 26-30 January 2007, Addis Ababa, Ethiopia;
- Third meeting of the Ministerial Council, Mombasa, Kenya, 12-16 November 2007;
- Bureau meeting of the Ministerial Council, Addis Ababa, 30 April 2008;
- AU African S&T Cluster meeting, Addis Ababa, 18 July 2008. ECA was elected Vice-Chair of the Cluster; and
- Bureau meeting of the African Cluster and the Ministerial Council, Abuja, 1-4 December 2008.

55. ECA organized a meeting of experts on promoting R&D in North Africa in Rabat, Morocco, from 15 to 17 July 2008.

56. ECA also participated in the following:

- Symposium on Science and Technology held in advance of the Commonwealth Heads of Government Meeting, 13 – 15 September 2007, Mbarara, Uganda;
- First AU Conference of Women in Science and Technology, 29-31 August 2007, Johannesburg, South Africa;
- First Pan-African Bioethics Congress, Yaoundé, 28-30 May 2008;
- First meeting of the African Intergovernmental Committee on Science, Technology and Innovation Indicators, 17 and 18 September 2007, Maputo, Mozambique;
- 2nd African Leadership Conference on Space Science and Technology, 2 – 5 October 2007, Pretoria, South Africa;
- AU Scientific, Technical and Research Commission Workshop on Science and Technology Policy Training, Capacity-building and Advocacy and Meeting of Experts to Discuss Monitoring and Evaluation of the Implementation of Technology Transfer Policies, 12-17 May 2008, Dar es Salaam, United Republic of Tanzania; and
- Twenty-ninth General Assembly of the International Council for Science, 20-24 November 2008, Maputo, Mozambique.

57. ECA participates actively as vice-convenor and focal point in the activities of the United Nations S&T cluster.

58. ECA also serves as focal point of the United Nations Executive Committee of Economic and Social Affairs for science, technology and productive sectors.

59. *Working with networks of centres of excellence.* ECA continued to serve on the Governing Council of the African Network of Scientific and Technological Institutions (ANSTI). It continued

to help steer the work of the Network through its Governing Council meetings as well as its Conference of Vice-Chancellors and Deans of Science, Engineering and Technology. Thus ECA participated in:

- Second Conference of Vice-Chancellors, Provosts and Deans of Science, Engineering and Technology, 25 – 27 September 2007, Midrand, South Africa;
- Eleventh meeting of the Governing Council of the Network, 28 and 29 September 2007, Midrand, South Africa; and
- 12th meeting of the Governing Council, Mombasa, Kenya, 26 and 27 November 2008.

9. Future activities for the period 2009 – 2011

60. ECA will continue to help to articulate STI systems for Africa's development and to assist member States to formulate and implement policies and programmes related to S&T. R&D activities will also be undertaken on selected emerging issues and topics of importance to member States. As part of its work to promote the application of S&T to development, ECA will provide support to selected centres of excellence in the various subregions and facilitate networking among them. It will continue to follow up the Science with Africa conference and to assist member states in their follow-up. There will be a strong focus on linking S&T to economic development and the productive sector, emphasizing the importance of innovation for Africa's development.

61. In so doing, the S&T component of the subprogramme will be implemented in close collaboration with ECA's subregional offices and other organizations within and outside the United Nations system, as well with the African scientific community and the diaspora. Also, linkages will be strengthened between the scientific community and other stakeholders such as economists, political leaders and the private sector. Such collaboration will ensure dialogue and broad consultation for promoting STI in Africa.

62. The subprogramme is expected to achieve its objectives on the assumption that:

- (a) Government development policies continue to include S&T as a priority;
- (b) Governments attach priority to budget allocations for identified activities in STI;
- (c) Partners continue their support in various activities; and
- (d) The involvement of stakeholders at the national, subregional and global levels continues.