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Committee on Development Information,
Science and Technology
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Status of Development Information, Science and Technology in Africa

ACRONYMS

ACS	African Centre for Statistics
AfDB	African Development Bank
AFREF	African Geodetic Reference Frame
AISI	African Information Society Initiative
AMCOST	African Ministerial Conference on Science and Technology
ARICEA	Association of Regulators of Information and Communication for Eastern and Southern Africa
AUC	African Union Commission
CEMAC	Central African Monetary and Economic Community
CePRC	Canadian e-Policy Resource Centre
COMESA	Common Market for Eastern and Southern Africa
ECCAS	Economic Community of Central African States
FAO	Food and Agriculture Organization of the United Nations
GIS	Geographical information systems
GNSS	Global navigation satellite system
GPS	Global positioning system
GTZ	Gesellschaft für Technische Zusammenarbeit, Germany
ICANN	Internet Corporation for Assigned Names and Numbers
ICT	Information and communication technology
ICT4D	Information and communication technologies for development
IDRC	International Development Research Centre
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
ISTD	Information and Communication Technology and Science and Technology Division, ECA
IT	Information technology
ITU	International Telecommunication Union
MDG	Millennium Development Goals
NEPAD	New Partnership for Africa's Development
OECD	Organization for Economic Cooperation and Development
STI	Science, technology and innovation
UNCTAD	United Nations Conference on Trade and Development
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USDA	United States Department of Agriculture
WSIS	World Summit on the Information Society
WFP	World Food Programme
WHO	World Health Organization

Introduction

1. With the restructuring of ECA in 2006, a new division was set up to implement the subprogramme “Harnessing information for development”. The Information and Communication Technology and Science and Technology Division (ISTD) replaced the Development Information Services Division. This subprogramme is geared towards supporting African countries in their efforts to participate fully in the rapidly evolving people-centred, inclusive, development-oriented information society and enable Africans to create, utilize and share information and knowledge based on science and technology to attain sustainable development.

2. ECA’s work under this subprogramme has focused on three broad interrelated areas:

- ***ICT (information and communication technology) for development*** - focusing on supporting strategies for building the African digital economy (comprising e-finance, e-transactions, e-commerce, e-trade and e-content) and creating an enabling environment for the knowledge economy (legal and regulatory frameworks - e-legislation, cyber laws and strategies). ECA will also endeavour to build e-security capacity for securing networks and infrastructure for the knowledge economy, improving government services to citizens and business and strengthening the role of small and medium-scale enterprises and other stakeholder groups in the digital/knowledge economy. The role of ICT in fostering regional economic integration, including the task of facilitating intraregional trade, will also be enhanced.

- ***Geoinformation for development*** - the use of geographical information systems (GIS) to collect data that can aid in policy-making and in boosting productive activity. Specific activities to be undertaken in this area include development of GIS for various socio-economic sectors (land, environment, agriculture and rural development) in member countries, development of an African Regional Geospatial Data Infrastructure and the deepening of ongoing work on the development and maintenance of the standards-based African Geoinformation Clearinghouse at ECA. The Commission will also provide support to member States in the area of GIS for peace and security and metadata creation, analysis and maintenance.
- ***Science and technology for development*** - promoting the use of science, technology and innovation in economic development by helping to articulate science, technology and innovation (STI) systems for Africa's development. Efforts will be made under the programme of the Division's Science and Technology Section to support the Science and Technology Consolidated Plan of Action adopted by the New Partnership for Africa's Development (NEPAD), and to promote establishment of science and technology parks and incubators in member States. Research and development activities will also be undertaken on selected emerging issues and topics of importance. As part of its work to promote the application of science and technology for development, ECA will provide support to selected centres of excellence in the various subregions and facilitate networking among them.

3. This report presents ECA's activities in the above three areas in three sections. The first is entitled "Status of development information in Africa" and the second "Status of science and technology for development in Africa", while the third presents some of the challenges and lessons learned in these areas.

A. Status of development information in Africa

1. Status of ICT policies

(a) Development of national information and communication infrastructure in Africa

4. Activities undertaken in this area hinge on the African Information Society Initiative (AISII), which serves as a framework for the formulation and development of national e-strategies. Developments since the fifth session of the Committee on Development Information, held in May 2007, are set out below.

- **Benin**

5. ECA provided advisory services to Benin in developing a sectoral e-education plan and a strategy for its implementation. The main objective of the strategy is to facilitate provision of education and teaching at all levels, content development and capacity-building to guide Benin through

the knowledge economy. The strategy has been submitted to the various ministries in charge of education.

- **Burkina Faso**

6. In support of the national ICT policy and e-strategy, the overarching goal of the ECA-supported project is the elaboration and subsequent activation of five sectoral e-strategies that will have as their aim the modernization of business practices, increased productivity, improved transparency, good governance, education and improved service delivery to citizens, especially in rural areas. The sectors covered are health, commerce, e-government, education and e-services for rural development. A national coordination body was established chaired by the Ministry of ICT, together with five groups of facilitators chaired by the Ministry of Economic Planning and National Development, each having a vice-chair from the ministry coordinating the sector. At the request of the Ministry of ICT, ECA provided a consultant to play a facilitating role between the coordinating bodies. The first consultation visit, from 24 March to 5 April 2008, produced a working methodology and a template for a common way of presenting the results to be derived from baseline studies of the sectoral strategies. Subsequent activities were postponed to 2009 owing to changes in ministerial portfolios.

- **Chad**

7. An ICT policy was adopted in June 2007, focusing on infrastructure development; ICTs and poverty reduction; a legal and regulatory framework; content development; capacity-building; e-governance; and ICTs and vulnerable groups.

- **Congo**

8. Following the adoption of a national ICT policy, ECA and its Subregional Office for Central Africa supported the roll-out of a youth e-employment project in Brazzaville to cover a period of 12 months from June 2007, in collaboration with UNDP and the Ministry of Works. Several multimedia centres were opened in 2008 to enable young people to receive ICT training and search for employment opportunities online.

- **Democratic Republic of the Congo**

9. The ECA-supported ICT policy development process has faced undue delays owing to the complexity of the administrative arrangements and various changes in the political landscape. Efforts are under way to secure the adoption of the draft policy document by 2009.

- **Gambia**

10. In 2008 the Gambia adopted a plan for community access, education and human resource development in the field of ICT. The goal is to develop the information economy and to accelerate the process of transforming the country into an “African Silicon Valley” - a hub within the West African subregion for the development and production of high-income knowledge products and value-added services. Discussions have been held with the Office of the Vice-President with a view to the implementation of the e-government strategy, as well as the provision of support to the national gender machinery.

- **Mali**

11. In December 2008, Mali adopted sectoral strategies on health, education and e-government. The e-government strategy covers the following areas: regulation and enabling environment; Government commitment; resources; and internal procedures and subregional and regional harmonization. The e-education strategy covers the following areas: enabling environment; infrastructure and equipment; applications and usage; and human resource development. The e-health strategy covers infrastructure and equipment, content and applications and human resource development.

- **Niger**

12. The Niger adopted an e-government strategy in 2008 as one of the six pillars of the national for information and communication infrastructure plan. The strategy is aimed at facilitating the application of procedures and the exchange of information within central and local government as well as between government and users by enabling the latter to access public services without distance limitations. The areas covered are: infrastructure and equipment; applications and content; and standards and innovation and capacity-building.

- **Nigeria**

13. In 2008, Nigeria adopted a comprehensive implementation plan for its ICT policy covering the following 11 areas: ICT infrastructure, e-health, e-agriculture, e-government, ICT in education,

private-sector participation, human resource development, research and development, IT popularization and awareness, security and law enforcement and legal and regulatory framework.

- **Togo**

14. The ICT policy development process has experienced delays due to internal administrative factors.

- **Burkina Faso, Ghana, Kenya and Mozambique: cybersecurity policy initiatives**

15. Following requests from these countries for assistance in the development of their cybersecurity frameworks, ECA, within the framework of the Global e-Policy Resource Network (e-Pol-NET), commissioned a study to be conducted from July to October 2007 in the four countries in order to review current policy regimes in terms of cybersecurity and identify and analyse gaps. As a result, national cybersecurity frameworks were developed. The framework documents also review current infrastructure capacity and future requirements as well as possible linkages with existing international agreements and security strategies.

- **Legal and regulatory frameworks**

16. Activities to promote an enabling environment for the telecommunications sector are closely linked to policy processes in the field of national information and communication infrastructure and the objective of creating a legal and regulatory framework to facilitate ICT development. ECA and its partners helped Nigeria and Sierra Leone to assess the status of ICT policy and the regulatory

framework taking into account the various policy statements and action plans enacted by government and implemented by ministries and State agencies. The country assessments also examined ICT convergence and proffered recommendations on integrated institutional mechanisms.

- **Launching of an analysis of work accomplished in the field of ICT strategies**

17. During the “Science with Africa” conference held from 3 to 7 March 2008 in Addis Ababa, ECA officially launched a publication setting out best practices and lessons learned after almost a decade of national and subregional ICT policy-making. This publication (available at <http://www.uneca.org/aisi/nici/documents/NICI-book.pdf>) summarizes ICT policy processes in such countries as Ghana, Malawi, Nigeria and Rwanda and is intended to assist other countries to chart their course in harnessing ICTs to their development. It analyses the critical success factors and identifies challenges and obstacles that need to be addressed to ensure the effectiveness and sustainability of ICTs as a tool for development.

(b) Developing the capacity of regional economic communities to address information society issues: regional information and communication infrastructure

18. At the subregional and regional levels, the vision outlined in the African Information Society Initiative provides the framework for formulating policies and plans through regional economic communities for such purposes as harmonizing and coordinating national efforts. Major achievements

and progress have been made in harmonizing national ICT policies and plans, as well as in creating a subregional framework for regional economic integration.

- **ICTs and regional integration in the Arab Maghreb Union (AMU)**

19. ECA and its Subregional Office for North Africa assisted with the organization of a workshop on 27 June 2007 under the theme “ICTs and regional integration in North Africa” at the twenty-second meeting of the AMU Intergovernmental Committee of Experts held from 26 to 29 June 2007 in Rabat, Morocco. The objective of the workshop, which was attended by the representatives of the seven member States, international organizations, intergovernmental organizations and civil society, was to discuss a regional ICT programme for North Africa in order to consolidate and accelerate progress towards an information and knowledge society. The meeting began with an assessment of the state of national e-strategies in the subregion through country presentations from Egypt, the Libyan Arab Jamahiriya, Morocco, the Sudan and Tunisia. The workshop participants recommended that on the basis of a document presented by ECA on a “Regional programme for a knowledge society in North Africa”, as well as on experience from other subregions, ECA should undertake consultations and expert meetings in order to finalize the regional programme and a strategy for its implementation.

- **ICT strategy for the Economic Community of Central African States (ECCAS) and the Central African Monetary and Economic Community (CEMAC)**

20. ECA assisted the two communities to formulate an ICT strategy for Central Africa. The Ministers of ICT in the CEMAC region adopted a regulatory framework for ICT in November 2008 in Brazzaville, Congo.

- **ICT strategy for the Common Market for Eastern and Southern Africa (COMESA)**

21. A draft ECA-supported ICT strategy for COMESA was presented and discussed at an expert group meeting in February 2006. The final document was adopted at the fifth annual general meeting of the Association of Regulators of Information and Communications for Eastern and Southern Africa (ARICEA), and presented at the sixth meeting of the ARICEA/COMESA Telecommunications and IT Committee in Cairo in February 2008. The strategy is awaiting adoption by the COMESA political organs. A COMESA regional framework for ICT indicators was adopted at the same meeting. A regional framework for e-government and guidelines for e-legislation were adopted at the fourth meeting of the COMESA Technical Committee on Information Technology, held in Khartoum, Sudan in March 2008.

- **e-government strategy for the East African Community**

22. Within the framework of the Global e-Policy Resource Network (ePol-NET), ECA assisted the Community in developing an e-government strategy for the subregion. The regional e-government framework is viewed as a road map for action in strategic areas supported by an enabling legal environment, secure information infrastructure and adequate human resources. On the policy front, the strategy outlines the agreements and protocols that should be in place to sustain e-government services, applications and content in a harmonized manner across the region. A workshop on e-government was organized by ECA in May 2008 under the framework of ePol-NET in collaboration with the Community and the Government of Burundi.

- **ICT legal framework for the Economic Community of West African States (ECOWAS)**

23. Since September 2005, ECA has been assisting ECOWAS in developing an ICT policy and harmonized legal frameworks for the subregion which would address the challenges of building the information society. The ministers in charge of telecommunications and ICT in the subregion adopted a harmonized ICT legal framework at their seventh meeting, held in Praia, Cape Verde, from 13 to 16 October 2008. The framework, developed with Government of Finland support, includes guidelines on cybercrime and personal data protection.

(c) Development of sectoral strategies in selected areas

- **E-government policies and programmes to address the specific needs of women in Africa**

24. Within the framework of the Global e-Policy Resource Network (ePol-NET), ECA and the Canadian e-Policy Resource Centre (CePRC) are implementing a project on gender and e-government. The main objective of the project is to facilitate the use of ICTs as tools for empowering and benefiting women and men for full inclusion in e-government programmes and service delivery. The activity, comprising two workshops held in Tunisia and Mozambique in June 2006 and March 2007 respectively, culminated with a validation workshop held in Ethiopia in March 2008. The workshop adopted an Action Plan Framework for Gender and e-Government. Furthermore, the project resulted in a soon-to-be-published document entitled Handbook on Gender and e-Government, a useful resource

for African policy-makers, gender focal points and other stakeholders to ensure women's participation in the information society and exploit the benefits of ICTs.

- **Knowledge networks for disadvantaged communities**

25. The five regional commissions of the United Nations, including ECA, launched a project for creating knowledge networks through ICT access points for disadvantaged communities. The aim of the project was to explore ways of redesigning community ICT access points in the form of nodes of knowledge networks, while continuing to make use of a flexible structure for supporting non-formal processes as sustainable and autonomous entities. Following country assessments in Kenya, Uganda and the United Republic of Tanzania in early 2007, ECA conducted a regional stakeholders' workshop on knowledge network strategies, mechanisms and tools in December 2007. As a result, a regional knowledge network strategy for the Africa region was developed in December 2008, and a knowledge network comprising up to 10 community ICT access points (telecentres) will be piloted in Kenya, Rwanda, Uganda and the United Republic of Tanzania and launched at the end of the first quarter of 2009.

- **ICT standards for African teacher training institutions: Validation meeting**

26. A ministerial review meeting was organized by ECA and the Global e-Schools and Communities Initiative in Accra, Ghana in May 2008 in preparation for the e-Learning Africa 2008 conference on the theme "ICT for development, education and training". Participants were drawn from 21 countries and international and regional organizations. The review meeting identified:

- A need for collaboration and experience-sharing through the development of resource portals and online learning tools such as the AISI e-learning initiative
- A need to forge partnerships at the regional and international level by engaging all stakeholders in a consultative process of policy formulation
- A need for resource mobilization to support ICTs in education, mainly through national budgets and the promotion of public-private partnerships
- A need for capacity-building and awareness-raising for high-level policy makers and the setting of standards for ICTs in education.

(d) Developing information society indicators (Scan-ICT)

27. With the adoption of the AISI in 1996, it was recognized that efforts being undertaken on the continent to harness ICT for development could bear fruit only if supported by sustained efforts to design and implement effective and appropriate tools to measure the impact of ICTs in various sectors of the economy and in society at large.

28. ECA has been assisting countries in the identification, development and collection of ICT4D (information and communication technologies for development) indicators for measuring the information society through an initiative called Scan-ICT, a project that commenced in 2001. The first

phase of the programme, involving six countries, Ethiopia, Ghana, Mozambique, Morocco, Senegal and Uganda, was completed in 2004.

29. Scan-ICT Phase II was launched in July 2005 in five countries: Cameroon, Gambia, Ghana, Mauritius and Rwanda. Each of the countries identified the core ICT4D indicators and methodology and adopted the institutional arrangements necessary for the process by involving all stakeholders. National statistical offices took the lead in this process. The main objective of the second phase was to ensure the sustainability of the Scan-ICT process and to integrate it as an essential part of policy related to national information and communication infrastructure. National statistical offices or other government agencies needed to be closely involved in the process so as to realize the goal of creating a pan-African ICT network that would collect, analyse and disseminate ICT4D indicators. The Scan-ICT Phase II process commenced with consultative workshops leading to the development of a document detailing the priority theme areas, selected core ICT4D indicators, data collection and analysis, survey instruments and geographical coverage. Cameroon completed the project in 2006 and the Gambia, Ghana and Mauritius in 2007. Rwanda undertook data analysis and database/website development in June 2008.

30. At the international level, ECA and other United Nations regional commissions and organizations, such as the United Nations Conference on Trade and Development (UNCTAD), the International Telecommunication Union (ITU), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the United Nations Development Programme (UNDP), as well as the Organization for Economic Cooperation and Development (OECD), the World Bank and the Statistical Office of the European Communities (EUROSTAT), are actively participating in the Partnership on

Measuring ICT for Development launched in June 2004. Within the Partnership, ECA is leading the Task Group on e-government indicators and participating in other task groups on ICT4D indicators, capacity-building and database development. In April 2008, the Partnership issued a publication entitled. The Global Information Society: a Statistical View, which presents a worldwide perspective of the information society.

(e) Leveraging through partnerships

31. Collaboration among continental institutions, United Nations agencies and development partners is key to harnessing the required resources, ensuring coherence and avoiding duplication of activities. Building and strengthening partnerships in the information society is therefore integral to ECA's strategic orientation.

32. Bilateral partnerships continued to be strengthened. The second phase of the programme of cooperation between ECA and Finland for ICT development in Africa, covering the period 2009 to 2011, a continuation of the first phase from 2004 to 2007, is now being implemented. The programme will focus on three components: developing national information and communication infrastructure plans in selected countries; evaluating and monitoring the ICT sector and its impact on the information society in selected countries; and supporting capacity-building among stakeholders in the field of ICT and STI. In all three areas, apart from providing support to a few newly selected countries, the second phase will continue support to countries currently receiving support from Finland in developing implementation plans and capacity-building.

33. ECA works in partnership with the United Nations Department of Economic and Social Affairs (UNDESA) in a number of joint initiatives, including the following:

- ECA, UNDESA and the Parliament of Rwanda are collaborating under the aegis of the Pan-African Parliament to strengthen the capacity of African parliaments to promote a people-centred and equitable information society in Africa. This partnership started with an international conference held in Kigali, Rwanda, from 3 to 5 March 2009 to provide a platform to enable parliaments to dialogue on legislative and financial issues and priorities in the context of the establishment of an equitable information society at the national and subregional levels.
- Prior to the conference, ECA, in collaboration with the United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development, launched the online platform of the Academy of ICT Essentials for Government Leaders in Africa. Members and ICT staff of parliaments were introduced to the platform, which consists of a core ICT4D curriculum with eight stand-alone modules ranging from basic to more advanced topics. Participants were also trained in knowledge management and the Africa Parliamentary Knowledge Network, an initiative launched by African parliaments in June 2008.
- ECA, UNDESA and the United Nations Public Administration Network organized a workshop on “Electronic/Mobile Government in Africa: Progress Made and Challenges Ahead” in Addis Ababa, Ethiopia from 17 to 19 February 2009 for African senior policy

makers, practitioners, experts, the private sector and other stakeholders, which explored regional knowledge on the issues and challenges of electronic/mobile government development in Africa and developed partnerships for capacity-building in the region. The workshop concluded by identifying priority areas for Africa in order to promote electronic/mobile government, which included infrastructure, capacity development, monitoring and evaluation, citizen engagement, an enabling environment and funding, which will be followed up through the Network and work with ECA and other partners.

34. ECA continues to leverage a number of bilateral and multilateral partnership mechanisms to undertake its activities effectively. ECA serves as the secretariat for the Partnership for ICTs in Africa, an informal group of partners working to leverage resources and expertise to build Africa's information society.

35. ECA also serves as the African regional focal point for the Global Knowledge Partnership and plays an important role in ensuring African stakeholder participation in the Partnership's activities in the fields of resource mobilization, poverty reduction, access to knowledge and education. ECA together with the Partnership, the International Development Research Centre (IDRC), the International Institute for Communication and Development and the Swiss Agency for Development and Cooperation, presented awards to African journalists at the third Global Knowledge Conference, held in Kuala Lumpur, Malaysia from 11 to 13 December 2007. These 2007 AISI Media Awards focused on Conference-related themes: emerging people, emerging technologies and emerging markets. Over 125 applications for awards were received, and the panel of judges selected first and second prize winners in eight categories from Benin, Burkina Faso, Egypt, Ghana, Kenya, Malawi, Mali, Nigeria, Uganda, the United Republic of Tanzania and Zambia.

36. Within the framework of AISI, ECA was one of the organizers of the Connect Africa Summit held on 29 and 30 October 2007 in Kigali, Rwanda, which ended with the adoption of five goals to bridge the digital divide in Africa. The summit was organized by the International Telecommunication Union, the African Union, the World Bank Group and the United Nations Global Alliance for ICT and Development, in partnership with the African Development Bank, the African Telecommunications Union, ECA and the Global Digital Solidarity Fund. To help achieve these goals, many participants announced major commitments, totalling approximately US\$ 55 billion. To prepare for the summit, ECA, in cooperation with the Canadian e-Policy Resource Centre (CePRC) and in partnership with the African Union, the Internet Society, the Internet Corporation for Assigned Names and Numbers (ICANN) and the Open Society Initiative for Southern Africa, organized two parallel workshops respectively on “Regulation and public access” and “Internet governance” on 24 and 25 October 2007 which were attended by over 100 policy makers and stakeholders from member States. The workshops adopted a series of recommendations, which were tabled at a ministerial meeting of African Governments held on 26 October 2007.

37. With support from IDRC and in cooperation with the World Health Organization (WHO), ECA commissioned a joint regional needs assessment and scoping study on the “Africa Health Infoway”, a district-based public health information network and geospatial health system. The Africa Health Infoway's objective is to provide affordable access to reliable health information and knowledge for policy makers, providers and citizens; improve public health by unifying surveillance systems and streamlining quality and health status monitoring; make epidemiological surveillance information available for analysis and use as soon as it is collected; and support data and knowledge mining. In

order to discuss the data requirements as well as the methodology of the study, ECA and WHO organized a needs assessment workshop on 9 and 10 August 2007 in Addis Ababa, Ethiopia. The first report on needs assessments undertaken in Kenya, Mozambique, Rwanda, Swaziland, Uganda and the United Republic of Tanzania has been published.

38. Together with the African Development Bank (AfDB) and Microsoft, ECA organized the first ICT Best Practices Forum from 7 to 9 June 2007 in Ouagadougou, Burkina Faso. It was attended by more than 350 participants, including three heads of state, more than 40 ministers and representatives from government, the private sector, civil society, academia, the press and international financial institutions. The delegates discussed strategies and practical solutions that would improve the efficiency and effectiveness of public-sector institutions through the use of ICTs. The Forum provided a practical platform for high-level officials from different regions of Africa and other developing countries to share experience and demonstrate examples of the successful use of ICT solutions in their countries. ECA and AfDB also organized a panel discussion on technology in government in Africa for the purpose of raising awareness of the work of African Governments in the effective use of ICTs for public services delivery in pursuance of ECA's African Information Society Initiative (AISII). The panellists included eight recipients of the 2007 Technology in Government in Africa awards, who shared details of projects to illustrate best practice in the use of ICTs for improving public services in Africa.

39. Other partnerships included:

- With the Government of Canada, support for e-policy formulation and implementation through the ePol-Net project, of which ECA is the African regional node, from December 2003 to March 2008
- Partnership with the UNESCO International Institute for Capacity Building in Africa on a study on “ICT standards for African teachers” published in June 2008
- Partnership with ITU on a joint study on “The impact of ICTs on employment and poverty reduction in Africa” in five countries (Egypt, Ethiopia, Kenya, Mozambique and Nigeria), published in 2008.
- With the Swiss Agency for Development and Cooperation and its German counterpart GTZ, providing support for outreach and building stakeholdership for the information society
- With the Governments of Canada and the Republic of Korea, on land information policies and other geoinformation initiatives
- Collaboration with UNEP through Task Group on Interoperable Services of the United Nations Geographic Information Working Group in piloting an innovative spatial data interoperability platform .

40. In pursuance of its commitment to creating and managing knowledge in the continent, ECA continues to partner African universities and research institutions as well as civil society, youth and

media organizations and African parliaments. Activities include policy analysis, consensus-building and advocacy on information society issues. Other outreach materials and services produced by ECA to help promote public awareness of ICTs for development issues included a series of policy briefs and publications. In addition, two video programmes were produced to highlight the opportunities and challenges ICTs present to Africa.

(f) Capacity-building activities

41. Capacity-building activities remain central to ECA's mission of promoting awareness of the importance of harnessing and exploiting ICTs for socio-economic development. Through the activities of the Information Technology Centre for Africa, an ICT-focused exhibition and learning centre at ECA, a significant number of government agencies, national parliaments, academic and research institutions and non-governmental organizations in the region have benefited from training in the use and application of ICTs.

42. The African Virtual Learning Academy provides the Centre with additional means to address training needs and provide online capacity-building training to policy makers and decision makers. Other online courses are available on Internet governance.

43. Capacity-building workshops on the implementation of the AISI are continuously being conducted for various stakeholders, including central and local government officials, members of parliament, women, young people, academia, media and the private sector. Some of the workshops have led to the creation of stakeholder networks on ICTs for development issues supporting partnership development in building the information society.

(g) *Publications and studies*

- **ICT Standards for African Teachers, Needs Assessment: Teachers Training Institutes in Focus**

44. A study entitled “ICT standards for African teachers” was commissioned by the UNESCO International Institute for Capacity Building in Africa on behalf of ECA and under the auspices of the Global e-Policy Resource Network (ePol-NET). The main goal of the study was to develop a set of guidelines and standards to enable the African education system to handle new technologies and benefit from them. The objective of the current needs assessment was to identify, analyse and collect existing policies and guidelines related to the introduction of ICT in teacher training at country level and to report on the perceived need for and benefits of continental guidelines on ICTs in teacher training. The resulting publication sought to capture the ICT needs of teachers in sub-Saharan Africa and to demonstrate how different countries on the continent could benefit from a common framework to implement ICTs in the education sector, with emphasis on teacher training.

- **ICT, trade and economic growth in Africa: opportunities and challenges**

45. To address the role of ICTs in enhancing trade leading to economic growth, ECA, under the auspices of the Global e-Policy Resource Network (ePol-NET), convened a Forum in 2006 to discuss a study entitled “ICTs, trade and economic growth initiative”. This Forum culminated with the launching

of the ICTs, Trade and Economic Growth Initiative in the form of studies in six countries – Egypt, Ethiopia, Ghana, Kenya, Senegal and South Africa.

46. While much progress has been made with regard to recognizing the importance of the ICT sector and its contribution to national development in African countries, not much is known about the application of the technology in facilitating domestic and international trade. The main goal of these studies was therefore to assess the utilization of ICTs to facilitate domestic and international trade. The study identified the public-sector policies required for the formulation and implementation of e-strategies in support of trade and economic growth.

47. The country studies pointed to the need for a study of mobile commerce: some countries identified mobile telephony as vital in poverty reduction since it facilitated trade and economic services directed towards the rural poor. ECA commissioned studies mobile commerce and mobile banking in Kenya and in Senegal and survey of m-commerce in South Africa, and collated them into a separate report.

- **An overview of m-commerce in Africa, with specific reference to Kenya, Senegal and South Africa**

48. This study on the role of mobile phones in banking and commercial transactions emerged from a six-country study on “e-trade and economic growth in Africa: opportunities and challenges”. Given the explosion of mobile telephony across the continent, this has become an important area of study, particularly with respect to the policy elements needed to sustain this area of development so that this sector contributes fully to economic development. The focus is on the emergence, status and future of

m-commerce, including mobile-phone-enabled banking, and draws on country studies from Kenya, Senegal and South Africa.

49. The study's recommendations to governments and other stakeholders include the development of inclusive policies that foster communication services which reach remote rural areas and are affordable and accessible to both rural and urban poor; introducing branchless banking and ensuring customer protection, including the regulation of deposits and the tracking of financial transactions; and balancing the market between mobile operators and financial service institutions.

- **Joint issues paper on employment and poverty reduction**

50. ECA and ITU commissioned a joint "Issues paper on the impact of ICTs on employment and poverty reduction in Africa" covering five countries (Egypt, Ethiopia, Kenya, Mozambique and Nigeria) in the framework of the implementation of the outcomes of the World Summit on the Information Society (WSIS), and particularly action line C7 in the annex to the Tunis Agenda for the Information Society and the Millennium Development Goals. The objective of this study was to analyse the impact of ICTs on employment and poverty alleviation, with emphasis on ICT as an economic sector which is currently witnessing unprecedented growth and has generated huge employment opportunities over the past decade, and one which can leverage the growth and competitiveness of other economic sectors.

51. The study reviewed national and regional policies in the field of ICT, poverty reduction, employment, investment, intellectual property rights, industry and competition, gender, youth, etc., and

identified and analysed gaps which precluded the application of ICT in the employment sector. It also reviewed current policy regimes in terms of ICT access and use (telecommunications, IT and broadcasting), taxation, network security, privacy protection, e-trade, customs and excise, business promotion, e-commerce, etc. An assessment of the capacity of the private sector (with particular attention to small and medium-scale enterprises) to generate ICT-related employment opportunities was also undertaken.

- Report on progress in the implementation of the decision of the World Summit on the Information Society (WSIS) in Africa

52. ECA circulated a questionnaire to focal points for national information and communication infrastructure in the 53 member States to assess progress in WSIS implementation. Responses from 18 member States (Benin, Côte d'Ivoire, the Democratic Republic of Congo, Egypt, Ethiopia, the Gambia, Ghana, Guinea-Bissau, Kenya, Madagascar, Mali, Mozambique, the Niger, Nigeria, Senegal, the Sudan, Togo and Uganda) and 1 regional economic community (COMESA) formed the foundations of a WSIS monitoring database. An analysis of the responses has been published and will be presented at a workshop to be held in Ethiopia in April 2009 in preparation for the first session of the Committee on Development Information, Science and Technology, where a follow-up mechanism and road map on the implementation of the WSIS action lines by 2015 will be developed.

- **Study on private-sector investment to support ICT research and development in Africa**

53. In 2008 ECA commissioned a study on private-sector investment to support ICT research and development in Africa. The main objectives of the study were: to identify companies supporting ICT

research and development 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 for ECA in harnessing such resources in the context of an ICT research and development strategy for Africa.

2. Geoinformation for development

(a) Development of national spatial data infrastructure policies

54. There are several economic benefits to be gained through leveraging geographical information services (GIS). Wide dissemination of geoinformation and data will facilitate improved government services. Communities will be able to access information and take part in the adoption of decisions that affect their socio-economic well-being. Service delivery industries that depend on location and spatial knowledge will benefit from reduced transaction costs, leading to increased economic activity. The present report reviews geoinformation activities related to policy issues, technical issues and international liaison and cooperation.

- **National spatial data infrastructure policies**

55. ECA has been providing advisory services to member States developing spatial data infrastructure. Funding constraints have stalled some of the implementation activities relating to technical components, but a number of countries have taken steps aimed at developing policies relating

to spatial data infrastructure and geoinformation. ECA has also been providing assistance to member States in developing national geoinformation policies and frameworks.

56. ECA's intervention has included assistance in the following countries.

- **Botswana**

57. In its efforts to develop spatial data infrastructure policy, ECA assisted in the organization of a stakeholders' workshop in November 2007.

- **Burundi**

58. In May 2007, ECA provided advisory services for the preparation of a project to strengthen geoinformation capacities in Burundi, involving capacity-building to ensure better structuring and management of the informational heritage leading to a good flow of data and information resources in the country.

- **Cameroon**

59. In January 2009, ECA provided technical assistance for the drafting of a proposal document for a "national geomatics plan".

- **Côte d'Ivoire**

60. In May 2008, ECA provided advisory services and technical assistance to the Comité National de Télédétection et d'Information Géographique to develop a project document for the national geomatics plan. The plan will be contained in a document detailing the governance of the production and management of geospatial data and information products to support the delivery of government and commercial services for the benefit of citizens. Elements of the plan will include policy and governance frameworks and technical components to ensure that efforts and costs are not duplicated in the production and management of geospatial data and information products, and that users have easy access to them for effective decision-making and service delivery. The ultimate objective of the project will be to develop a consensual plan for the integration of geospatial data into decision-making and service delivery processes.

- **Niger**

61. In August 2008, ECA provided technical assistance for the drafting of a proposal document for a national geomatics plan. The final output will be a document setting out standards and guidelines on interoperability, data quality and related issues; specification of the content of the geospatial metadata clearing-house node and digital geospatial fundamental data sets; specification of the content of a series of federated GIS thematic databases, with a data flow protocol providing guidelines for sharing data with different providers at various levels of government, and with the private sector; and policies and guidelines on custodianship responsibilities, data access and utilization, etc. A management/steering committee composed of representatives of the major stakeholders (or another suitable management arrangement) will have its secretariat at the Institut Géographique National du Niger.

- **Sierra Leone**

62. ECA also assisted Sierra Leone in 2007-2008 by providing reference materials and reviewing a draft policy document relating to the integration of the national spatial data infrastructure into the national information and communication infrastructure. Ongoing support is being provided in mapping, land administration and other areas. Training in the capture and dissemination of geospatial metadata was delivered to staff of the Ministry of Lands, Community Planning, Environment and Statistics and partners from the local GIS community in late 2008. Technical assistance is currently being provided in developing national geoinformation resources, and will continue throughout 2009.

(b) International cooperation and partnerships in the area of geoinformation

63. Partnerships with regional and international organizations continue to be sustained through contributions to and participation in various forums on geoinformation at the national and subregional levels – for example, the capacity-building process being pursued through the Group on Earth Observations, UNESCO/African Union high-level activities relating to the critical role of remote sensing applications for Africa’s sustainable development, and the Inter-Agency Meeting on Outer Space Activities for coordination and cooperation in space-related activities within the United Nations system.

64. ECA has also assisted the African Union, member States and regional economic communities in the establishment of the African Monitoring of the Environment for Sustainable Development project and the design of a conceptual framework for the Global Monitoring for Environment and

Security programme. ECA provided support to member States in establishing a regional network aimed at strengthening the integration of space-based and in situ earth observations of land cover dynamics in West Africa.

(c) *Publications and studies*

- **Role of information management in formulating land policies**

65. ECA published a guide on the role of information management in formulating and implementing land policies for decision makers, researchers, academics and others dealing with land issues in Africa. The publication underscores the importance of geospatial technology for the collection and maintenance of data needed for sound land administration.

- **Report on the determination of fundamental data sets for Africa**

66. ECA published this report defining fundamental geospatial data sets for Africa in a first attempt to provide a common definition of what constitutes a minimally necessary core of geospatial data and information products to which policy makers can add other sectoral data sets to ensure geographical consistency in making decisions on socio-economic development issues.

- **GIS development**

67. **Metadata clearing-house node:** metadata records are continuously included in this data bank.

The five metadata nodes established by the end of December 2008 contained more than 10,000 geospatial metadata records.

68. **Second Administrative Level Boundaries (SALB) database:** ECA has been developing the African component of the SALB geodatabase. Data on administrative limits were recorded in 9 countries, bringing the number of countries with maps fully validated to 17, with a further 8 awaiting final validation by national mapping agencies.

69. The **Programme of Infrastructure Development in Africa geospatial database** covers all existing and planned infrastructure facilities in the continent, including all networks and development corridors – railways, airports, roads, ports, harbours and waterways – as well as power plants (hydro, nuclear, oil and gas-fired thermal, geothermal, coal, wind, etc.) and power system interconnection networks for the energy sector. More than 43 particular feature data sets were created and customized in the form of an interactive digital atlas. The database is being built into the ECA node of the African Regional Geospatial Data Infrastructure.

70. **MDG mapper:** Since 2007, ECA has been developing a geovisualization and analytical tool to monitor and assess Africa's progress towards the Millennium Development Goals (MDGs) at the national_level – the MDG mapper (<http://geoinfo.uneca.org/mdg>). A subsidiary project has been initiated to develop a subnational geovisualization and decision support tool to visualize the subnational variation of socio-economic indicators. If funded, the project will facilitate the collection and validation of administrative and socio-economic data at the subnational level.

71. **Agricultural commodity value-chain database and interface.** An inventory of available data and information resources was conducted through an extensive survey involving international and regional partners (Food and Agriculture Organization of the United Nations (FAO), World Food Programme (WFP), International Fund for Agricultural Development (IFAD), International Food Policy Research Institute (IFPRI), ECA African Centre for Statistics (ACS) and United States Department of Agriculture (USDA). Data collected so far have been processed, analysed and validated. All spatial data-sets and other auxiliary data are integrated, stored and managed in a standard geodatabase. A seminar was also organized to present the work thus far and establish the way forward.

72. **Security database.** A prototype was developed which can generate a route map showing the shortest or most convenient route to a specific place of interest, including directional route descriptions. A field survey was conducted to record the location of landmarks and other important facilities in Addis Ababa and elsewhere in Ethiopia. A presentation was made to ECA's Security and Safety Section and field security management in Ethiopia.

- **The African Geodetic Reference Frame (AFREF)**

73. This project is being overseen by an international steering committee, which is an expanded version of a working group of the Geoinformation Subcommittee of ECA's Committee on Development Information, Science and Technology. The main objective of the project is to coordinate ongoing and new activities aimed at computing the parameters of an African geocentric datum and implementing and maintaining the AFREF network of points and making data freely available to users. Trimble, the world leader in professional GPS (Global Positioning System) equipment manufacturing

and positioning solutions, donated equipment for five GPS reference stations to Africa through ECA. The reference stations will form part of the GPS network that will define a uniform African geodetic reference frame.

74. The agreed installation sites are: Maun (Botswana), Kinshasa (Democratic Republic of Congo), Asosa (Ethiopia), Niamey (Niger) and Moshi (United Republic of Tanzania). Custodianship agreements are due to be signed by the national authority with primary responsibility for geodetic control and surveys or organizations that have authority to conduct precise differential GPS surveys. In 2008, two stations were installed and operationalized. The installation sites for two other stations have been prepared and the installation process is under way. For the remaining one, the custodianship agreement is still under negotiation with the host country.

75. A special meeting of the project steering committee was organized during the 2008 Africa Array Workshop. The meeting agreed on some changes in the AFREF management structure, reviewed progress in implementation and recommended efforts to explore the scope for multiple uses and co-location of GNSS (global navigation satellite system) and other earth observation equipment and infrastructure. A survey questionnaire was designed for the purpose of conducting an inventory of ongoing GNSS projects across the continent. A training course on GNSS station establishment and maintenance is being organized in partnership with Trimble Corporation and the Regional Centre for Mapping of Resources for Development. ECA is assisting in the identification and selection of appropriate skilled technical staff in the countries to participate in this activity.

B. Status of science and technology for development in Africa

1. Promoting the application of science, technology and innovation for development

76. In light of ECA's recent repositioning, more emphasis is being placed on strengthening member States' capacity to harness STI potentials for their socio-economic development. Consequently, ECA has assumed a more active role of leadership in accelerating Africa's science agenda. In 2007, it appointed a Science and Technology Advisory Group of eminent persons to advise the Executive Secretary on ECA's science and technology programme. It also plans to enhance its links with the African scientific community and build consensus on emerging African STI issues, which in turn will serve to inform the Commission's science- and – technology-related activities, including the following:

- **Science with Africa initiative**

77. ECA, the African Union Commission (AUC) 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. Approximately 800 participants attended the Conference, mostly from African Governments, academia, the business community, the media, civil-society organizations and students, as well as the science and technology community. The main objective of the conference was to explore how African science-based entities could increase their collaboration with and participation in international science and research and development projects.

78. The Conference recommended that ECA, in collaboration with the AUC and UNESCO and within the framework of the African Union/NEPAD Science and Technology Consolidated Plan of

Action, should set up a working group to define programme priorities for the implementation of the recommendations and ideas emanating from this conference at the regional, subregional and national levels within the established mandate of each institution.

79. Resolution 856 (XLI), entitled “Science with Africa: Strengthening research and development, and innovation for Africa’s socio-economic development”, was adopted at the first session of the Joint Annual Meetings of the African Union Conference of Ministers of Economy and Finance and the ECA Conference of African Ministers of Finance Planning and Economic Development, which took place in Addis Ababa, Ethiopia from 31 March to 2 April 2008. The resolution invited the African Union and ECA, in collaboration with the United Nations Science and Technology Cluster, AfDB and other international partners, to establish an African Cluster for Science and Technology to foster the coordinated implementation of the outcomes of the Science with Africa conference and report to the next meeting of the Joint Conference.

80. In December 2008, ECA launched the **Science with Africa e-newsletter** (available at <http://www.uneca.org/sciencewithafrica/main.html>). This quarterly e-newsletter 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. Follow-up activities included:

- **Roadmap for science, technology and innovation in Africa**

81. ECA in collaboration with AU followed up with a road-map workshop held on 6 June 2008 to develop 20 ideas put forward during the “ideas factory” sessions organized in conjunction with the science with Africa conference into implementable projects that would help boost research and

development and operationalize STI at member State level in the next seven years to 2015. These projects focused on five critical areas of STI for development: funding, African innovation, building human capital, business development and outreach and advocacy. Roll-out commences immediately for some, while others require more preparation before launch within the next five years.

- **Guidelines for health research in Africa: AfroGuide**

82. An expert group meeting on the development of guidelines for health research in Africa was held in Addis Ababa on 25 and 26 November 2008. It was organized by ECA in collaboration with the AUC and the Good Clinical Practice Alliance-Europe, as a follow-up to the round table on the same theme which took place during the Science with Africa conference. Recommendations made by the expert group included: raising the necessary resources for the project; networking to provide for essential capacity-building; ensuring cross-fertilization and impact across all African regions and sectors; and adopting an implementation strategy for model laws, policies and practices at the continental, regional, national and local levels.

African Science to Business Challenge

83. The Challenge is a pioneering initiative launched on 6 December 2008 by ECA and the research institute RTI International with the aim of strengthening links between scientific research and business development. The Challenge builds on the capacity of African scientists to commercialize their research results through sponsorship provided by RTI International.

- **Technology planning and technology governance in Africa**

84. ECA in collaboration with the African Union Scientific, Technical and Research Commission, the Regional Office for Africa of the International Council for Science and the Kenya National Council for Science and Technology organized a training workshop on technology planning and technological governance in Africa in Nairobi, Kenya, from 24 to 27 February 2009, in pursuance of a recommendation adopted by the Science with Africa conference for the development of effective strategies and policies for technology transfer, adaptation and domestication.

2. *Support to member States*

- **ECA support to Mozambique: operationalization of the Mozambique Science, Technology and Innovation Strategy**

85. Following a request from the Government of Mozambique and in line with the Memorandum of Understanding signed between ECA and the Government of Mozambique on cooperation and implementation of joint activities and programmes in the area of ICT, science and technology for development, ECA is providing support to the Ministry of Science and Technology in the implementation of the country's Science, Technology and Innovation Strategy. ECA appointed an international consultant for three months beginning 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 science, technology and innovation strategy.

3. *Strengthening access to scientific knowledge*

86. ECA has launched the “Access to Scientific Knowledge in Africa” initiative to support and promote access to scientific knowledge by African scientists, decision makers, students and researchers. It will mainly provide a mechanism for African scientists to tap into global scientific knowledge as well as the production of indigenously owned knowledge that supports economic and industrial growth.

4. *Partnerships in the area of science and technology*

87. ECA is working closely with the African Union, NEPAD and the African Ministerial Conference on Science and Technology (AMCOST) in the implementation of the Consolidated Plan of Action adopted by the Conference. Following a recommendation by the Bureau of the Conference on 2 May 2008 for the creation of an African Cluster on Science and Technology as a mechanism to coordinate activities under the Consolidated Plan of Action, in a bid to eliminate duplication and resource wastage, ECA serves as vice-chair of the cluster. ECA also participates actively as vice-convenor and focal point in the activities of the United Nations Science and Technology Cluster and the African Cluster. It also serves as the focal point of the science, technology and the productive sectors of the United Nations Executive Committee of Economic and Social Affairs in active collaboration with science and technology communities, notably the African Network of Scientific and Technological Institutions and the International Council for Science. ECA received support from the Swiss Agency for Development and Cooperation to bring scientists from least developed countries to the conference.

5. *Science and technology stakeholders*

- **STI4D forum – towards building an African science 2.0**

88. Since May 2007, ECA has been managing an ongoing e-discussion on STI for development in Africa (<http://www.dgroups.org/groups/sti4d-africa>), which is supporting the building of an electronic community of stakeholders around Africa's science agenda and ECA's programme. The over 600 contributors have identified and mobilized a core set of African science and technology policy makers, experts, consultants and other stakeholders who have a keen interest in this topic. Discussions have been held and knowledge and experience shared on such issues as: the current role of the scientific community in Africa - gaps and challenges in science and technology development on the continent, and major science and technology issues; the role of ICT in advancing science and technology in Africa, and the role of science and technology in advancing ICTs – road map, opportunities, challenges; issues relating to access to scientific knowledge - status of access, limitations to access, areas concerned; and what resources are required for building an African science and technology base including research, publishing, resource mobilization, science and technology management, etc.

6. *Publications and studies*

- **Compendium of policies, institutions programmes and practices in science and technology in Africa**

89. ECA initiated work on this non-recurrent publication to assist member States to benchmark their own situations and share experience and best practices for promoting STI in the continent. The publication will be finalized in 2009.

- *STI activities in Africa: the experience of the East African Community*

90. ECA has also initiated work on this non-recurrent publication, for which participation is sought from member States. It is also scheduled to be finalized in 2009.

- **Promoting science, technology and innovation for sustainable development in Africa**

91. This publication discusses the opportunities and challenges that Africa faces in seeking to accelerate science-based sustainable development. It also outlines the specific steps that need to be taken to build STI as key elements for overcoming Africa's chronic and often debilitating development problems. It aims to provide a blueprint for action designed to help many of the world's most impoverished countries to build a sustainable economic future. The primary focus is on the 43 countries in sub-Saharan Africa that have been identified as lagging behind in science and technology by TWAS, the academy of sciences for the developing world, on the basis of a careful assessment of their scientific output and the impact that STI are having on development.

C. Challenges and lessons learned in ICT, geoinformation, science and technology activities

92. By and large African countries have shown impressive results in the development of their national ICT policies. Several countries have also developed implementation plans and further extended their efforts in developing sectoral policies. The challenge remains the implementation of the policies. Policy reforms are constantly needed to extend access within countries, facilitate national, subregional and regional cooperation and enhance the capacity of African countries to respond to the global challenges of the emerging knowledge economy. African countries therefore need to continue to tackle numerous challenges, among which are the following:

(a) Prioritizing national funds and mobilizing internal and external resources to implement national ICT policies and plans;

(b) Sustaining geospatial technology through the adoption of relevant standards by the geographical information community so as to assist countries in developing sound national policies on geoinformation woven into the overall strategies relating to the national information and communication infrastructure;

(c) Increasing the accessibility and use of spatial data and information technologies in government's day-to-day business processes and service delivery;

(d) Enhancing the installation of spatial data infrastructure, which would entail the development of spatially enabled government services where geoinformation is used to assist member States to perform online delivery of location-based services;

(e) Building national science and technology innovation ecosystems to address the challenges of the emerging knowledge economy.