Regional Progress and Strategies towards Building the Information Society in Asia and the Pacific

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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

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Preface

In line with the Geneva Plan of Action of the World Summit on the Information Society, the ESCAP Information and Communications Technology and Disaster Risk Reduction Division conducts activities designed to promote the application of information and communications technology for inclusive and sustainable development in Asia and the Pacific.

This publication is aimed at increasing awareness and knowledge among policymakers on how to create an enabling policy environment for enhancing regional connectivity and building a regional information society, taking into consideration the needs of the developing countries, especially the least developed countries, landlocked developing countries, small island developing States, and countries with economies in transition. The report takes stock of the progress made by the United Nations and other regional and international organizations, as well as civil society, in the implementation of the Plan of Action to build a people-centred, inclusive and development-oriented information society in the region.

The challenges posed by the recent economic downturn are also analysed in this publication, as are the opportunities offered by contemporary technology to address socio-economic issues such as insecurity and cybercrime, information monopolization, and environmental deterioration.

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Abbreviations

ADB	Asian Development Bank
ADBI	Asian Development Bank Institute
ADF	Asia Pacific Development Forum
APCICT	Asian and Pacific Training Centre for Information and Communication Technology for Development
APCTT	Asian and Pacific Centre for Transfer of Technology
APT	Asia-Pacific Telecommunity
APTITUDE	Asia-Pacific Technology Information Tracking and Unified Data Extraction
ASEAN	Association of Southeast Asian Nations
ACID	ASEAN CERT Incident Drills
AWF	Asia Pacific Wireless Forum
CAT	Communications Authority of Thailand
CERT	Computer Emergency Response Team
DAI	Digital Access Index
DSL	Digital Subscriber Line
DTH	Direct to Home
ECA	Economic Commission for Africa
ECE	Economic Commission for Europe
ECLAC	Economic Commission for Latin America and the Caribbean
ECO	Economic Cooperation Organization
e-Co Hub	e-Collaborative Hub
ESCAP	Economic and Social Commission for Asia and the Pacific
ESCWA	Economic and Social Commission for Western Asia
Eurostat	Statistical Office of the European Communities
FAO	Food and Agriculture Organization of the United Nations
ICT	information and communications technology
ICT4D	information and communications technology for development
ICT-OI	information and communication technology opportunity index
IDI	information and communication technology development index
IP	Internet protocol
ISP	Internet service provider
IT	information technology
ITU	International Telecommunication Union
MDGs	Millennium Development Goals
MICT	Ministry of Information and Communication Technology
NGN	Next Generation Networks
NGO	non-governmental organization
OECD	Organization for Economic Cooperation and Development
PIFS	Pacific Islands Forum Secretariat
PRF	policy and regulatory forum
PSTN	Public Switched Telecommunication Network

PIACs	public Internet access centres
SAARC	South Asian Association for Regional Cooperation
SATRC	South Asian Telecommunication Regulators' Council
SAVE	SAARC Audio-Visual Exchange
SME	small and medium-sized enterprise
TOT	Telephone Organization of Thailand
UIS	UNESCO Institute for Statistics
UNCTAD	United Nations Conference on Trade and Development
UNDL	Universal Networking Digital Language Foundation
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
UNL	universal networking language
UUM	Universiti Utara Malaysia
WTDC	World Telecommunication Development Conference
WSIS	World Summit on the Information Society
WRC	World Radio Conference

Executive Summary

The United Nations has long recognized the role of information and communications technology (ICT) as a tool for development. Strategic partnerships have been developed among governments, donors, the private sector, the civil society, supported by the establishment of United Nations working groups and task forces with the aim of enhancing collaboration throughout the United Nations system as well as with other international and regional organizations. The Millennium Development Goals (MDGs), which were adopted in 2000, underscored the urgency of ensuring that the benefits of new technologies, including ICT, are available to all.

To achieve this goal, the World Summit on the Information Society was planned in two phases, aimed at developing political will and establishing the foundation for the information society for all. WSIS Geneva, held in December 2003, adopted the Declaration of Principles and the Plan of Action and set specific goals. At WSIS Tunis, held in November 2005, commitments were made for the implementation of the Plan of Action through the adoption of the Tunis Commitment and the Tunis Agenda of the World Summit on the Information Society.

Several organizations were designated by WSIS to act as moderators/facilitators or co-facilitators in the follow-up implementation of the WSIS Actions Lines contained in the Plan of Action. Accordingly, the Economic and Social Commission for Asia and the Pacific (ESCAP) focuses on the implementation of the following action lines: C1. The role of public governance authorities and all stakeholders in the promotion of ICT for development; C6. Enabling environment; and C11. International and regional cooperation.

Review of progress in the implementation of the WSIS action lines and goals

During the past decade, the Asian and Pacific region has experienced extraordinary growth in ICT uptake. The region has become the world leader in terms of the number of fixed telephone lines, the number of mobile cellular telephone subscriptions, and broadband Internet access and use.

At the same time, the region is extremely diverse in terms of income distribution, population size and the geographical features of countries. Accordingly, ICT uptake also differs considerably among economies in the region.

The creation of an enabling environment, which includes a regulatory framework offering incentives to investment and providing supportive, transparent and pro-competitive ICT policies, has been achieved through the establishment of independent regulators in the majority of the countries in the region. This has resulted in the phenomenal growth of mobile telephony and other services.

ICT applications are pervading society at all levels, including government. They have become commonplace in such sectors as trade, commerce, banking, education, health, employment, environment and agriculture. Systems enabled by information and communication technologies have been set up in some countries in the region to assist assess, reduce, monitor, early warning the risks and impact of natural and man-made hazards, and to support effective response to disasters.

The preservation of cultural and linguistic diversity and the generation of local content are important for deriving the benefits of the information society. However, the proliferation of global TV programmes and the use of the Internet are influencing social and cultural behaviour globally and may weaken diversity and cultural identity. In general, an increasing volume of local content is available; however, it remains an important issue in many countries, especially in rural and remote areas. To increase the contribution of ICT to cultural exchange and interaction at the regional level, some regional and subregional organizations facilitate the bilateral exchange of cultural programmes.

Radio, television and print media continue to be widely used in many parts of the world, where access to Internet and more sophisticated ICT are not yet readily available or affordable. At the same time, ICT pervades print media, television and radio broadcasts in all countries. Many countries have established or plan to establish nationwide ICT networks and community information centres in order to reach rural and remote areas.

Regional and subregional cooperation

Regional and subregional cooperation activities have been undertaken by ESCAP, ITU, UNESCO, APT, ASEAN, SAARC and the ECO and other regional and international organizations. ESCAP has undertaken several activities, including coordinating, in cooperation with APT and ITU, the Regional Interagency Working Group on Information and Communications Technology, conducting symposiums to discuss Internet governance and protocol, contributing to the measurement of the information society, building individual and institutional capacity, and servicing the ESCAP Committee on Information and Communications Technology, which aims at promoting regional cooperation towards the implementation of the goals agreed at WSIS.

In the area of disaster risk management using space technology, a technical cooperation project on space technology applications for development and disaster reduction was conducted by ESCAP in collaboration with the Japan Aerospace Exploration Agency. Regional cooperative mechanisms on applications of ICT, particularly space-based, have been developed to assist national disaster management authorities on the effective use of space technology for disaster management.

At the symposiums and workshops organized by ESCAP and organizations mentioned above, representatives of ESCAP members and associate members discussed the progress made in the implementation of the WSIS action plan in the region and identified priorities for future work. The priority areas identified included:

(a) Providing or enhancing access to ICT in rural areas;
(b) Enhancing ICT access in the Pacific;
(c) Monitoring the implementation of the outcomes of WSIS;
(d) Using ICT for disaster risk reduction.

Accordingly, the ESCAP secretariat has undertaken studies to analyse ICT access in rural areas and in the island countries of the Pacific in order to identify policy options and formulate specific recommendations for national and regional stakeholders, while facilitating the implementation of the WSIS outcomes at the regional level. In order to provide value-added and high-impact ICT capacity-building programmes to the members and associate members, the Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT) will expand its capacity for human resources development and the national rollout of the Academy of ICT Essentials for Government Leaders, among other activities.

ITU has several projects for implementation in Asia and the Pacific in accordance with the decision of the World Telecommunication Development Conference, which was held in Doha in 2006. Five regional initiatives developed during Conference, among others, are presently being implemented:

- Telecommunication/ICT Policy and Regulatory Cooperation in the Asia Pacific Region
- Rural Communications – Infrastructure Development
- Next Generation Network Planning
- Unique Telecommunication/ICT Needs of Pacific Islands and Small Island Developing States
- Strengthening collaboration within ITU.

A self-sustaining training mechanism in Asia and the Pacific in the form of virtual centres of excellence has been established by ITU.

APT, which is an organization created in 1979 by ITU and ESCAP to foster regional cooperation specifically in the field of ICT, continues to hold regional meetings, such as the APT Ministerial Conference on Broadband and ICT Development held in 2004, at which the Bangkok Agenda for Broadband and ICT Development was adopted.

SAARC, ASEAN and ECO have working groups and committees which deal with common issues and work towards the harmonization of policy, regulatory practices, providing a platform for meetings and the exchange of experiences. Additionally, they undertake subregional infrastructure projects, such as the Trans-Asia-Europe Fiber-Optic Cable System project.

Challenges and the way forward

Achieving the goals set by WSIS and continuing with the expansion of ICT connectivity in the region presents challenges for policy- and decision-makers. A list of issues for governments to address the challenges and take suitable measures is presented below.

Economic issues. There is insufficient investment aimed at expanding ICT to rural areas.

To prioritize ICT usage in their activities, and promote local IT industry, including the establishment of IT parks, Governments may consider providing more fiscal incentives. Governments may also consider instituting a personal income tax exemption for expenditures on purchase of computers so as to create an incentive for general ICT use.

It is suggested that broadband Internet service providers develop local content and application services whose benefits may be easily appreciated by the target groups of customers, with the resulting demand making their operations commercially viable and sustainable in the long run. Awareness campaigns on the benefits of broadband should be undertaken, particularly in rural areas through private and government funding. The use of the universal service fund for implementing broadband, including common infrastructure, could be promoted.

Technological issues. To meet the major challenge of migration to Next Generation Network (NGN) infrastructure, and planning for the future of the Internet, governments may undertake suitable measures to foster regional cooperation for the adoption of new technologies, particularly for rural connectivity, as well as to evolve strategies for migration to NGN and IPv6. Additionally, increasing investment in research and development on low-power and affordable computing technologies would be beneficial.

In order to expand the network infrastructure, Governments may promote investment by both private and public sector and collaboration among experts in order to develop policies and technology which is relevant to the region, for example in the domain of tools for language translation and the use of open source software.

Social and cultural challenges in implementing ICT. Ensuring the availability of ICT services in the local language for all demographic levels of society; avoiding the erosion of local culture as well as the misuse of digitization, disinformation and the destruction of information.

Governments should be encouraged to intervene to preserve local cultures, languages, texts and ethical values. The public interest should be safeguarded through appropriate national laws to prevent the monopolization of data and misuse of digitization that can occur when large corporations buy and control access to vast collections of knowledge.

Impact on the environment. On the one hand, ICT helps conserve the environment, by reducing the need to travel, thus reducing atmospheric pollution caused by the burning of fossil fuels. On the other hand, ICT creates e-waste and carbon emissions from the generation of the electricity needed to power the equipment.

Governments may encourage the use of alternate energy sources and low-power-consuming systems for which technology exists within the region and internationally.

Cybercrime. Dealing with cybercrimes committed against a country from outside its national borders is currently a major challenge.

With the support of ESCAP, Governments may consider (a) drafting and undertaking preparatory actions for the adoption of a cybercrime treaty covering countries in the region on a regional or subregional basis in order to provide safeguards against cybercrimes committed by perpetrators located outside a country's jurisdiction, and (ii) enhancing the role of the national Computer Emergency Response Teams (CERT) and expand the Asian and Pacific regional CERT to fight cybercrime.

Introduction

The role of information and communications technology (ICT) as a tool for development has long been recognized by the United Nations. Strategic partnerships have been developed with donors, the private sector and civil society, and working groups and task forces have been established to enhance interagency collaboration throughout the United Nations system as well as with international and regional organizations. The Regional Interagency Working Group on ICT (for Asia and the Pacific) is one such example. In 2000, the Economic and Social Council adopted the Ministerial Declaration on Development and international cooperation in the twenty-first century: the role of information technology in the context of a knowledge-based global economy.[1] In 2001, the Secretary-General established a high-level Information and Communication Technologies Task Force to provide overall leadership to the United Nations on the formulation of strategies to put ICT at the service of development.

The United Nations Millennium Declaration, adopted in 2000 (see General Assembly resolution 55/2), underscored, among other things, the urgency of ensuring that the benefits of new technologies, especially ICT, are made available to all. To achieve this goal, the World Summit on the Information Society (WSIS) was planned in two phases. The first phase, the Geneva Summit in December 2003, was aimed at developing political will and establishing the foundations for an information society for all. A total of 175 Governments endorsed the Geneva Declaration of Principles and Geneva Plan of Action during the first phase. The second phase of WSIS was held in Tunis in November 2005, at which the commitments were made.

ICT comprises a complex and diverse set of equipment, infrastructure, applications and services, used to produce, process, distribute and transform information. The ICT sector comprises diverse segments, such as telecommunications, television and radio broadcasting, computer hardware, software and services and electronic media, but ICT is also present in some way in many other sectors, such as education, health and trade, among others. Information and communication needs can be met by traditional means, such as print media, and by more recent technologies, such as fixed telephone lines, mobile phones, terrestrial networks, space technology, and the Internet. The advancement of technology and market dynamics are bringing about the convergence of information, communication and entertainment. The vast potential of these technologies for socio-economic development needs to be fully exploited.

Technological innovation and convergence in information and communications have led to the development of so-called information or knowledge societies, with resulting changes in social interaction, economic and business practices, political engagement, education, health, leisure and entertainment. Over the past decade, there has been

[1] United Nations Economic and Social Council "Development and international cooperation in the twenty-first century: the role of information technology in the context of a knowledge-based global economy", Draft Ministerial Declaration (E/2000/L.9) Accessed from un.org/documents/ecosoc/docs/2000/e2000-l9.pdf

a growing understanding that these technologies can be powerful instruments for advancing economic and social development through the creation of new types of online and offline activities, economic activities, employment opportunities, education and training, improvements in health-care delivery and other services, and the enhancement of networking, participation and advocacy within society and above all transparency and efficiency through e-governance. ICT has great potential to improve interaction between governments and citizens, fostering transparency and accountability in governance. While the potential of ICT for stimulating economic growth, socio-economic development and effective governance is well recognized, the benefits of ICT have been unevenly distributed within and between countries.

The term "digital divide" refers to the differences in resources and capabilities to access and effectively utilize ICT for development that exist within and between countries, regions, sectors and socio-economic groups.[2] The digital divide is manifested by low levels of access to ICT. Inadequate network infrastructure, insufficient content in local language, the inability of people to afford it, poverty, illiteracy, lack of computer literacy, are among the factors impeding access to ICT, especially in the developing countries.

The gender dimension of the digital divide is also a serious issue. The Secretary-General of the United Nations, in his address to WSIS in Geneva in December 2003 indicated that the so-called digital divide was actually several gaps in one. There was a technological divide—great gaps in infrastructure. There was a content divide. A great deal of web-based information was simply not relevant to the real needs of people. And nearly 70 per cent of the world's websites were in English, at times crowding out local voices and views. There was a gender divide, with women and girls enjoying less access to information technology than men and boys. This could be true of rich and poor countries alike.

Important outcomes of WSIS Phase I held in Geneva in 2003 included:[3]

(a) The Geneva Declaration of Principles: extend benefits of the information society to countries and regions with special attention to the needs of least developed countries, landlocked developing countries, small island developing States, etc., and those vulnerable to threats to development, such as natural disasters;

(b) The WSIS Plan of Action covering 11 action lines that adopted a multi-stakeholders participatory approach and included network infrastructure, access, capacity-building, cyber security, enabling environment, ICT applications, cultural diversity, local content, and linguistic diversity, media, ethical dimensions and international and regional cooperation;

(c) A common vision and agenda aimed at mainstreaming ICT for development to achieve MDGs and the WSIS goals for connectivity, adaptation of schools' curricula to include ICT usage, access to television/radio for all, content and access to ICT for over 50 per cent of the world's population, connecting all communities by 2015;

[2] United Nations, Division for the Advancement of Women, Department of Economic and Social Affairs, *Women 2000 and beyond, Gender Equality and Empowerment of Women through ICT* (September, 2005).

[3] Detailed documentation related to the World Summit on the Information Society can be found on the website of the Executive Secretariat of the Summit at www.itu.int/wsis/index.html.

(d) The Secretary-General of the United Nations was to look into unresolved issues: Internet governance and financing.

WSIS Geneva in 2003 unfolded the common vision, enunciated the Principles and adopted the Plan of Action with the objective of building an inclusive information society and applying the potential of ICT in development for achieving the agreed goals, including the MDGs. Subsequently, WSIS Phase II at Tunis in 2005 served to concretize and build commitment to the Plan of Action. All along the WSIS process, ESCAP played an active and direct role by bringing out the Regional Road Map towards an Information Society in Asia and the Pacific based on, among other things, the Tokyo Declaration adopted at the Regional Preparatory Meeting to WSIS, and the Regional Action Plan towards the Information Society in Asia and the Pacific[4] adopted at the High-level Asia-Pacific Conference for the World Summit on the Information Society held in Tehran from 31 May to 2 June 2005. Such regional initiatives reflected the priorities of the various subregions by consolidating the recommendations made during subregional workshops conducted at Bishkek, Suva, Bali (Indonesia) and Kathmandu prior to WSIS Tunis.

This publication presents a review of the progress on WSIS action lines made by Asia-Pacific countries. The progress on the activities reported includes the actions, policies and strategies conducted by: (a) subregional intergovernmental organizations such as ASEAN, the South Asian Association for Regional Cooperation (SAARC), the Pacific Islands Forum Secretariat (PIFS) and the Economic Cooperation Organization (ECO); (b) United Nations and other international and regional organizations; and (c) civil society and the private sector. Finally, this publication presents current challenges to achieving progress in the WSIS plan of action at the regional level and indicates possible measures to address them.

[4] ESCAP, *Regional Action Plan towards the Information Society in Asia And the Pacific* (New York, 2006) (ST/ESCAP/2415), available at unescap.org/idd/Pubs/st_escap_2415.pdf

Chapter I

WSIS Plan of Action: Progress in the Asian and Pacific Region

1. Review of the progress of WSIS action lines

In accordance with the commitments made at WSIS Tunis, governments and stakeholders have undertaken many initiatives and projects to bridge the digital divide. The results have shown positive developments in all matters covered under the action lines in the majority of countries. During the past decade, the Asian and Pacific region has experienced extraordinary growth in ICT uptake. The region has become the world leader in terms of the number of fixed telephone lines, the number of mobile cellular telephone subscriptions, and broadband Internet access and usage. The region is home to economies that are leading development worldwide in terms of embracing ICT.

The region is extremely diverse in terms of income distribution, population size and geographical features, which is why ICT uptake also varies significantly among countries in the region, for example, Internet usage penetration rates range from 70 per cent in the more advanced economies to about 1 per cent in the region's least developed economies. Broadband availability is also unevenly distributed, while a country in the region leads the world in terms of households with fixed broadband with close to 80 per cent, fixed broadband prices are often unaffordable for the majority of people, for example in some low-income economies, the price is as high as the monthly Gross National Income (GNI) per capita.[5] Globally, the number of mobile subscribers has increased at a rapid rate: there were over 4.1 billion by the end of 2008,[6] corresponding to a mobile penetration rate of 61.1 per cent.

A. C1 – The role of public governance authorities and all stakeholders in the promotion of ICT for development

National telecommunication and information technology policies are useful instruments for governments to develop the ICT sector in such a way that the society at large is benefited. Increasingly, telecommunication monopolies are being dissolved and independent authorities responsible for establishing strategies and regulations for ICT sector are being established. In the Asian and Pacific region, by end 2008, 66 per cent of the countries had created separate regulatory authorities for their ICT and Telecommunication sectors. Although this figure is significant, the region lags behind Africa (93 per cent), the Americas (89 per cent), and Europe (80 per cent).[7]

[5] International Telecommunications Union, *Information Society Statistical Profiles 2009: Asia and the Pacific* (Geneva, 2009). (Page 1, and Chart 2.6)

[6] International Telecommunications Union, accessed from itu.int/ITU-D/ict/statistics/at_glance/KeyTelecom99.html on 24 December 2009.

[7] International Telecommunications Union, *Summary, Trends in Telecommunication Reform 2008: Six Degrees of Sharing* (Geneva, 2008). Accessed from itu.int/dms_pub/itu-d/opb/reg/D-REG-TTR.10-2008-SUM-PDF-E.pdf on 24 December 2009.

B. C2 – Information and communication infrastructure: an essential foundation for the information society

Developing countries in the region have registered exemplary growth in ICT infrastructure. The telecom sector reform heralded by economic liberalization, which resulted in massive private sector and foreign investment in network infrastructure, and steadily decreasing electronic equipment prices have brought about exponential growth in cellular mobile communication. To a certain extent, this has provided the missing link to bring rural communities into the national mainstreams; however, another kind of missing link is now apparent, namely broadband access.

Technological developments indicate that packet-based communication protocols, such as the Internet protocol (IP), will become the standard for all networked communication; such networks are called next generation networks (NGN). NGN are already being implemented in some countries, including Japan and the Republic of Korea. Some developing countries are also seeking to deploy NGN through wireless broadband technologies which could improve access to telecommunications in remote and rural areas.[8]

In many countries, the private sector leads mobile telecommunication subscriptions. The fierce competition among operators, the low call charges and the calling-party-pays regime (incoming calls free) have made the services affordable even for low-earning, self-employed, daily-wage and unskilled workers. Countries in the region that were struggling to achieve modest tele-density figures have surpassed the goals set earlier.

Several initiatives have been undertaken to establish regional and subregional information superhighway networks, for example, the Greater Mekong Subregional Information Superhighway Network (GMS ISN) connecting Cambodia, China, the Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam.

C. C3 – Access to information and knowledge

Governments and regulators in the region have generally followed a policy that allows entry to Internet service providers (ISPs) without licence fees for basic services (fixed and mobile). The market entry for ISPs is in most cases is through simple registration or authorization procedures. Public-private partnerships have helped establish countrywide networks for providing access to ICT.

D. C4 – Capacity-building

ICT has been introduced to middle and secondary schools' curricula in some countries in the region, and ICT based programmes have been instituted by public and private organizations and civil society to increase capacity on the use of ICT among various sectors of the population. Education and training by employing ICT as the mode of delivery has become common and institutions in the region are conducting such courses nationally as well as internationally, with significant student enrolments making them

[8] International Telecommunications Union, *ITU News No. 3 April (2009). News Article: Next-generation networks – Driven by convergence,* accessed from itu.int/itunews/manager/display.asp?lang=en&year=2009&issue=03&ipage=24&ext=html on 24 December 2009.

viable. Subregional and regional organizations have contributed by setting up training programmes and institutions such as the Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT) and ITU centres of excellence.

E. C5 – Building confidence and security in the use of ICT

Cyberlaws and associated administrative measures have been put in place by several countries in the region. Online commercial transactions have been increasing steadily and there is greater confidence today in the use of ICT. With globalization and the global nature of the Internet, it has become important for governments to have means to handle cybercrimes committed from inside and outside the national borders. For this reason, a number of countries have established national Computer Emergency Response Teams (CERTs), which can cooperate with each other regionally or bilaterally to address security threats. Some countries in the region are collaborating through initiatives such as the Asia Pacific CERT.[9]

F. C6 – Enabling environment

Countries in the region have established policy and regulatory regimes to encourage ICT development. At the international level, the Internet Governance Forum is the body established to look into all aspects of Internet governance.

Economic liberalization, the telecom sector reform, government policies backed by legislation, and the establishment of regulatory bodies have created an enabling environment for the extraordinary growth of the telecom sector. Together with the developments in telecommunication technology, particularly cellular mobile communication and private sector investment, telecommunication services are now within the reach of even low-income people as manifested by the growth of cellular mobile subscription in the developing countries. The constraints that State monopoly telecom operators faced with regard to financing the network infrastructure have disappeared with the entry of several competing, licensed private-sector operators. Since the 1990s, a large number of countries have initiated successful reforms in their ICT sector by establishing national regulatory bodies and introducing competition among telecommunication providers in order to create favourable conditions encouraging investment in the sector. However, some of the rural and remote areas in the region still remain unconnected and are without access to ICT services. Further shift in policy and regulatory frameworks is needed to enable countries to achieve the WSIS goals and targets by 2015.

G. C7 – ICT applications: benefits in all aspects of life

ICT applications have pervaded all activities of society, including administration, business, education, health, employment, environment, agriculture and science. Many countries in the region have established or plan to establish networks of community e-centres that provide one or more specific service or e-applications that serve disadvantaged, rural and remote communities. Monitoring systems to forecast and monitor natural and man-made hazards using ICTs have been established.

[9] Asia Pacific CERT, accessed from apcert.org on 24 December 2009.

The Information and Communications Technology and Disaster Risk Reduction Division of ESCAP promotes the application of information and communications technology, including space technology to enhance socio-economic development, and for improved management of disasters and associated socio-economic risks in Asia and the Pacific.

More information about activities promoted by ESCAP as well as other organizations in the region is provided in section entitled "WSIS follow-up activities by regional and international agencies" of this report.

H. C8 – Cultural diversity and identity, linguistic diversity and local content

As a result of policy measures adopted by governments and national stakeholders, there is ever increasing local content available. Subregional and regional organizations are helping in establishing cultural exchange programmes as well as in the sharing of experiences and content.

I. C9 – Media

The conventional indicators for measuring broadcast penetration are the *numbers of radio and television sets.* Radio and television are still very dependable and useful for many parts of the world where Internet-based ICT is not yet available or affordable. Few countries collect the number of devices and thus most data are estimates. ICT pervades print media television and radio broadcasts in all countries in the region. The majority of people in the region continue to rely on conventional radio and television as a daily source of information and entertainment.

J. C10 – Ethical dimensions of the information society

International and regional organizations as well as governments have established or are establishing conventions and laws to curb pornography and other practices deemed immoral or unethical in the region.

K. C11 – International and regional cooperation

All subregional, regional and international organizations have endeavoured to foster regional and subregional cooperation to promote universal access and public-private partnerships, assist in capacity-building and encourage the use of ICT in mainstreaming ICT in national development plans to achieve the WSIS goals. ESCAP, ITU, APT and other United Nations agencies and international organizations also coordinate their activities through the Regional Interagency Working Group on ICT.

The Information and Communications Technology and Disaster Risk Reduction of ESCAP promotes regional cooperation to achieve the WSIS goals and MDGs in Asia and the Pacific. More information about activities promoted by ESCAP as well as other organizations in the region is provided in section entitled "WSIS follow-up activities by regional and international agencies" of this report.

2. Progress in achieving the WSIS goals

Considering the different national circumstances, WSIS Geneva agreed on certain objectives and goals that could be taken into account in the establishment of the national targets to be achieved by 2015. Precise data to account for the progress made towards each of the goals is not readily available, however, based in the interaction of ESCAP with experts from its member States, it appears that progress has been made towards achieving these goals.[10] Table 1 presents an estimate of current progress.

Table 1: WSIS goals and progress made in Asia and the Pacific

Goal	Estimate of progress
a. To connect villages with ICT and establish community access points	Plans made. Implementation in progress
b. To connect universities, colleges, secondary schools and primary schools with ICT	Achieved to a large extent up to secondary schools
c. To connect scientific and research centres with ICT	Achieved to a large extent
d. To connect public libraries, cultural centres, museums, post offices and archives with ICT	Work in progress; goal likely to be achieved
e. To connect health centres and hospitals with ICT	Achieved to a large extent at the level of speciality/ referral/tertiary and secondary hospitals. Plans are afoot for connecting primary health centres
f. To connect all local and central government departments and establish websites and email addresses	Achieved to a large extent at the level of central Government departments. In progress for local governments
g. To adapt all primary and secondary school curricula to meet the challenges of the information society, taking into account national circumstances	In progress. Good prospects for achievement
h. To ensure that all of the world's population have access to television and radio services	Achieved to a large extent through terrestrial and satellite means
i. To encourage the development of content and to put in place technical conditions in order to facilitate the presence and use of all world languages on the Internet	In progress, achieved to a large extent.
j. To ensure that more than half the world's inhabitants have access to ICT within their reach	Expected to be achieved ahead of schedule.

Source: ESCAP

Note: Given the large size of Asia and the Pacific as well as the diversity among the countries in the region, this summary table is not a precise report of the WSIS progress in the region, but rather a generalization of the prevailing trends. ITU is currently undertaking a study to review and assess progress made towards achieving the 10 WSIS targets, and is collaborating closely with other international organizations. The results will be published in the next *World Telecommunication/ICT Indicators Report* during the first quarter of 2010.

[10] ESCAP, *Meeting report Expert Group Meeting on Regional Cooperation towards Building an Information Society in Asia and the Pacific. 20-22 July 2009.* (Bangkok, 2009), accessed from unescap.org/idd/events/2009_EGM-WSIS/EGM-WSIS-REPORT.doc on 24 December 2009.

3. WSIS follow-up activities by regional and international agencies

A. United Nations Economic and Social Commission for Asia and the Pacific

The Economic and Social Commission for Asia and the Pacific (ESCAP) is the regional arm of the United Nations representing all countries in Asia and the Pacific which annually discuss at the ministerial level the issues related to economic and social development, including those related to ICT, in the region and guides the secretariat. As noted above, ESCAP is a moderator/facilitator for WSIS action lines C1, C6 and C11.

All ESCAP divisions deal with ICT in their specific areas (e-health, e-commerce, e-transport, etc.). The Information and Communications Technology and Disaster Risk Reduction Division (IDD) services two out of a total of eight committees, namely the Committee on Information and Communications Technology and the Committee on Disaster Risk Reduction. IDD's multi-disciplinary pool of experts and professionals assists ESCAP members and associate members in the region to increase collaborative efforts and promote the use of ICT, including space technologies, to enhance socio-economic development in the ESCAP region and to better manage natural disasters and the associated socio-economic risks.

The strategy of ESCAP is to address issues that are regionally relevant by identifying and analysing economic and social trends and nurturing regional cooperative mechanisms that enable change and produce results that benefit ESCAP members and associate members. More specifically, its current ICT related efforts are focused on the following areas:

- Increase the sharing of knowledge among ESCAP member states on policy options, strategies and good practices for ICT connectivity and for integrating multi-hazard disaster risk reduction into national development
- Strengthen regional cooperative mechanisms in support of ICT connectivity and disaster risk management
- Improve the capabilities of ESCAP member States in the use of ICT for multi-hazard assessment, preparedness, early warning and response to disaster risks
- Improve institutional capacity of ESCAP member States to apply ICT for socio-economic development by supporting the work of APCICT, on technical materials, booklets, publications, training courses, seminars, workshops and field projects such as the APCICT Academy of ICT Essentials for Government Leaders

ICT policy formulation. IDD has promoted the development of comprehensive and articulated policy and regulatory frameworks at the national level in order to enhance national capacity in building national and regional information societies and to achieve the MDGs.

WSIS follow-up. A number of regional and subregional conferences were organized by IDD as a follow-up to the WSIS, initiating the implementation of the summit outcomes and the Regional Action Plan by promoting activities related to the development of ICT applications and an enabling policy environment for ICT for development.

The Regional Interagency Working Group on ICT. This group was established by ESCAP and its partners in August 2001, and co-chaired by ESCAP, ITU and APT, with a view to strengthening cooperation and coordination at the regional level and promoting mutually complementary and coherent strategies and programmes which would ensure synergy of efforts in achieving the MDGs. It was also aimed at facilitating the regional preparations for and follow-up to the World Summit on the Information Society. Its membership is voluntary and consists of international, regional and subregional organizations dealing with information, communication and space technology in Asia and the Pacific.

Rural connectivity. Over 60 per cent of the people in the Asian and Pacific region live in rural areas. The rural population tends to be poor, neglected and marginalized groups of society. In comparison to urban areas, the accessibility and availability of information and communications technology is significantly lower in rural areas. Governments and the private sector do not invest much in infrastructure development for ICT in rural areas, as it is not cost-effective. Even in cases where infrastructure is available, rural communities cannot afford to purchase needed communications equipment such as telephones, radios and computers or pay for connectivity to the Internet. Low affordability and connectivity and the lack of awareness regarding the use of these technologies have greatly contributed to the growing rural-urban digital divide.

- ESCAP in collaboration with the Asian Development Bank is currently implementing the project entitled "Empowering rural areas through community e-centres" under the South Asia Subregional Economic Cooperation programme, with funds provided by the Japan Fund for ICT. This project seeks to empower communities and improve the quality of life in rural areas in Bangladesh, Bhutan, India and Nepal through the increased accessibility of ICT applications by establishing community e-centres.

Pacific connectivity. In response to interest expressed in improved information and communication services by Pacific leaders at the Pacific Leaders United Nations ESCAP Special Session at the sixty-second session of the Commission in 2006, ESCAP in collaboration with its partners: the Pacific Islands Forum Secretariat (PIFS), the United Nations Development Programme (UNDP) and the Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, and the ITU Regional Office for Asia and Pacific, conducted a study entitled "Enhancing Pacific Connectivity".[11] The study provides a solid basis for further dialogue among interested parties on Pacific connectivity and creates opportunities to draw on Asian members' experience in technology, funding and application. The study looks at the situation in 20 Pacific States and territories. It concludes that improvements in this arena can well serve Pacific island States and that such improvements are technically, economically and institutionally timely. Raw connectivity, linked services, business and employment opportunities are areas where timely action could deliver substantial benefits to the Pacific.

Knowledge management. As the world moves into an increasingly globalized knowledge-based society, organizations and governments need to share knowledge and information through knowledge management. Knowledge management is a powerful

[11] ESCAP, *Enhancing Pacific Connectivity,* ST/ESCAP/2472 (Bangkok, 2008)

way to increase productivity and connectivity. A key driver/catalyst of knowledge management is ICT. Due to resource constraints, many developing countries have difficulty in investing in effective ICT tools for knowledge management. To address this problem, ESCAP has been implementing a United Nations Development Account project entitled "Knowledge networks through ICT access points for disadvantaged communities". Under this project, a number of activities have been organized since its inception in 2006.

With regard to the implementation of the outcomes of the WSIS, ESCAP has conducted a number of activities including the Expert Group Meeting on Regional Cooperation towards Building an Information Society in Asia and the Pacific, held in Bangkok from 20 to 22 July 2009. This meeting reviewed the progress in the implementation of the outcomes of WSIS in the region; discussed a number of emerging issues including the necessity of streamlining the implementation of the Regional Action Plan towards the Information Society and prepared recommendations for actions at the national, subregional and regional levels towards attaining the major objectives of the Regional Action Plan, goals and targets of WSIS by 2015 in Asia and the Pacific.[12]

APCICT was established as a subsidiary body of ESCAP on 16 June 2006. The Centre's membership is identical to that of ESCAP. It is located in Incheon, the Republic of Korea. Its objective is to build the capacity of members and associate members of ESCAP in the use of ICT for socio-economic development. Promoting the implementation of the WSIS outcomes in the region, in particular with regards to WSIS action line C4 on capacity-building, APCTT and APCICT, together have undertaken a series of activities supporting capacity-building. Major activities are listed below:

- In 2006 and 2007, a series of five national seminars and workshops were held, one each in Cambodia, Mongolia, the Lao People's Democratic Republic, Nepal and Thailand, on capacity-building in public policy on Internet use for business development
- In 2007: (a) a National Seminar on Capacity Building for ICT Policymaking in Azerbaijan, co-organized with ECE; (b) Capacity Building Workshop on Information Society Statistics, in Bangkok, co-organized with ITU and APT, as part of the ongoing Partnership on Measuring ICT for Development initiative (as mentioned above); and (c) the Regional Seminar on Capacity Building for ICT Policymaking in Central Asia, held in Kyrgyzstan, co-organized with ECE, UNDP and the Soros Foundation
- APCICT has developed a structured and comprehensive ICT training curriculum entitled "Academy of ICT Essentials for Government Leaders", with eight initial modules, in order to provide value-added contribution to the member countries and enhance ICT capacity-building. Three subregional workshops were conducted during April and May 2008 for South-East Asia, South Asia, and Western and Central Asia, in order to solicit feedback on the modules, and a regional training of trainers was held in June 2008. Subsequently, APCICT has provided the Academy modules through

[12] Details of ESCAP activities in the area of ICT including WSIS follow-ups are available at http://www.unescap.org/idd/events/

partnerships with national Government and training institutions, as well as through subregional organizations to Afghanistan, Armenia, Bhutan, Cambodia, India, Indonesia, Kyrgyzstan, the Lao People's Democratic Republic, Mongolia, Pakistan, the Philippines, Sri Lanka and Uzbekistan, as well as to Pacific island countries. In the Pacific islands, the subregional Academy workshop was held from 2 to 5 September 2008 in the Cook Islands. The workshop was attended by 27 participants from five countries (Cook Islands, Kiribati, Papua New Guinea, Samoa and Tonga). In order to reach an even wider audience, the Centre has embarked on translations of the modules. Academy partners are translating the modules into six languages, namely, Bahasa Indonesia, Russian, Mongolian, Dari, Pashtun and French. APCICT is also working with ECA on the development of an African version of the Academy.

APCICT organized a global forum and a range of other training activities to meet the needs of its members and associate members. They covered the areas of e-government, ICT accessibility for people with disabilities, information security and measuring ICT for development (ICT4D). The activities included: (a) The Global Forum on Building an Inclusive Internet Economy: Developing Countries Perspectives; (b) Training Course on the Production of Statistics on the Information Economy; (c) Asia-Pacific Information Security Training Workshop; (d) Regional Workshop for Enhancement of ICT Accessibility for Persons with Disabilities; and (e) Pacific Islands Forum Officials' e-Government Training Programme. In 2008 the Centre organized a total of 10 training courses, a global forum in conjunction with the OECD Ministerial Meeting, and an expert group meeting on the development of the Academy.

APCICT launched an e-Collaborative Hub (e-Co Hub) on 16 June 2008 to enhance the learning and training experience by providing easy access to relevant resources and by making available an interactive space for sharing knowledge and experiences on ICT4D.

ESCAP also provides regional cooperation and knowledge sharing through mechanisms such as expert meetings, websites, publications and databases.

In 2008, Consultative Meetings for the Establishment of Regional Knowledge Network of Telecentres were held in Azerbaijan and in Bangkok, culminating in the establishment of the Central Asia Network of Telecentres and the Asia-Pacific Network of Telecentres. As part of the technical cooperation project entitled "Empowering the rural area through community e-centres", national stakeholder consultation workshops were organized, as well as regional planning and knowledge sharing meetings in 2008 and 2009, resulting in the establishment of 21 pilot CeCs operating in rural areas and the training of national government officials, CeC operators, and rural community end users.

Through the Regional Space Applications Programme for Sustainable Development (RESAP), ESCAP has been promoting regional cooperative mechanisms on the use of space-based ICT for disaster management and sustainable development. The Intergovernmental Consultative Committee, at its thirteenth session held in July 2009, recommended four pillar areas for actions: disaster management, natural resources management and climate change adaptation, community e-Centres and satellite-based connectivity.

In the area of disaster management using space technology, ESCAP is promoting the establishment of a regional platform for the sharing of space information for disaster management. A technical cooperation project on space technology applications for development and disaster reduction was undertaken in collaboration with the Japan Aerospace Exploration Agency in Bangkok in March 2008. This meeting was instrumental in raising awareness among the disaster management authorities on the effectiveness of space technology for disaster management. A regional cooperative mechanism on drought disaster monitoring and early warning, based on an integrated analysis of space- and ground-based information, is under development.

Databases have been established for sharing publications and good practices and these continue to be updated and can be accessed from the following websites:

- Information and Communications Technology and Disaster Risk Reduction Division (www.unescap.org/idd/)
- APCICT (www.unapcict.org)
- APCTT(www.apctt.org)
- APCICT e-Co Hub (www.unapcict.org/ecohub)

APCICT has released five important knowledge products on ICT human resources capacity.[13] APCTT continued to improve upon its programmes in the Asia and Pacific region to deploy ICT for facilitating SME technology transfer initiatives. The comprehensive web-based tool called Technology4sme (www.technology4sme.net), which has a database of technology offers and requests and serves as an online technology market, was expanded.

APCTT was established on 16 July 1977 pursuant to ESCAP resolutions 159 (XXXI) of 6 March 1975 and 164 (XXXII) of 31 March 1976. It has the status of a subsidiary body of ESCAP and has identical membership to that of the ESCAP. It is located in New Delhi. The objectives of the Centre are to assist the members and associate members of ESCAP through strengthening their capabilities to develop and manage national innovation systems; develop, transfer, adapt and apply technology; improve the terms of transfer of technology; and identify and promote the development and transfer of technologies relevant to the region. APCTT has designed and introduced a search engine called Asia-Pacific Technology Information Tracking and Unified Data Extraction (APTITUDE) to enable buyers and sellers of technology to reach not only the APCTT technology4sme database but also related databases in the public domain in selected member countries.

APCTT has also developed the Asia-Pacific On-line National Innovation System Resource Centre (www.nis.apctt.org) which has information on national innovation system practices of participating countries and related reference material on policy frameworks and support mechanisms.

Future actions by ESCAP

During the first session of the Committee on Information and Communications Technology, held in November 2008, representatives from the ESCAP member States discussed the progress made in the implementation of the WSIS outcomes in the region

[13] To access APCICT knowledge products, please visit www.unapcict.org/aboutus.

and identified priorities for future work in the region. The priority areas that were identified included (a) providing or enhancing access to ICT in rural areas, (b) enhancing ICT access in the Pacific, (c) monitoring the implementation of the WSIS outcomes and (d) using ICT for disaster risk reduction.[14] Accordingly, ESCAP will undertake research and analysis on ICT access in rural areas and for the Pacific island countries for policy options and recommendations, while facilitating the implementation of the WSIS outcomes at the regional level. In order to provide value-added and high impact ICT capacity-building programmes to the member states, Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT) will expand its human resource capacity development and national rollout of the Academy of ICT Essentials for Government Leaders, among other activities.

At its first session held in March 2009 in Bangkok, the Committee on Disaster Risk Reduction, another ESCAP subsidiary body serviced by IDD, recommended the establishment of an Asia-Pacific gateway on information sharing and analysis for disaster risk reduction and development, and recommended the development of regional cooperative mechanisms and a knowledge-sharing arrangement on the use of information, communications and space technology for disaster risk reduction and management.[15]

Public-private partnerships will continue to be pursued, recognizing that the private sector is a major driver of ICT adoption and diffusion, as also the cooperation with international organizations in areas such as ICT for food security and sustainable agriculture and disaster risk reduction which are areas of major concern for the region.

B. ITU technical assistance activities in the Asia-Pacific region[16]

At the World Telecommunication Development Conference (2006) in Doha, ITU adopted the development programme and regional initiatives for the next four years (2007-2010), under which its Asia-Pacific Regional and Area offices in Bangkok and Jakarta respectively have developed various projects with its member States and various stakeholders.

In addition to the regular technical assistance under the development programmes supported by its own operational funds, ITU has been able to raise external funds. For instance, $5.2 million has been mobilized (as of December 2008) and all these projects are currently either under implementation or already completed. In 2009, a further $1.6 million has been raised to support the regional initiatives (as of June 2009).

Several other projects are either under call for partners or under negotiation for funding. It has been observed in the Asia-Pacific region that the provision of external funds from member States, regulators and even private industries through close partnership has effectively enabled project implementation under each regional initiative. Table 2 provides information related to ongoing regional initiatives and their related projects.

[14] ESCAP, *Report of the Committee on Information and Communications Technology on its first session, (E/ESCAP/CICT/6), 19-21 November 2008.*

[15] ESCAP, "*Report of the Committee on Disaster Risk Reduction on its first session"(E/ESCAP/CDR/9), 25-27 March 2009.*

[16] Information provided to ESCAP by the International Telecommunication Union Regional Office, Bangkok.

Table 2: ITU – Ongoing regional initiatives

Projects – short title	Total Budget
Telecom/ICT Governance in the Asia-Pacific Region	430 206
Harmonized Policies for the ICT Market	3 000 000
Spectrum Management	15 950
Training Programme: Spectrum Management & Related Issues	61 600
Training on Bridging the Standardization Gap	132 548
Policy and Regulatory Assistance in Asia and the Pacific	590 000
ASP ICT Policies and addressing unique ICT needs of the Pacific Island Countries	475 000
Executive Training Programme on Enabling Frameworks for Telecommunication/ICT Development (2008-2009)	252 640
Subregional Telecom. Meeting for CLMV	24 540
Rural/Outer Island Communications in the Pacific	222 100
PC Donation Kiribati	10 200
TOTAL	**5 214 777**

Source: International Telecommunication Union.

Note: All amounts cited are in United States dollars, and are approximate.

Among the contributors to the ITU Asia-Pacific regional initiatives, the Australian Department of Broadband, Communications and the Digital Economy (DBCDE) has been providing support since WTDC-2006 in Doha, providing about $500,000 each year, bringing its total contribution to about $2.3 million (including 2009). Andorra (187,000), Japan ($145,000), Singapore ($310,000 in kind contribution including 2009), Thailand ($580,000), and the Asian Development Bank (ADB) ($160,000) have also contributed to the regional initiatives, among others that have provided cash, in-kind contributions or both. Table 3 lists project under negotiation.

Table 3: ITU – Projects currently under negotiation (2009)

Projects – short title	Total Budget
Universal Service Obligation in Thailand	444 853
NGN Planning Workshop	54 475
NGN Access Network Planning: A Case Study of TOT's Network	
NTC Training Programme	63 415
Rural ICT Policy Lessons and Practices for Universal Service	526 320
ACMA/ITU International Training Program 2009	17 540
ASP ICT Development	505 467
TOTAL	**1 632 840**

Source: International Telecommunication Union

Note: All amounts cited are in United States dollars, and are approximate.

In addition to the above, other actions for the implementation of relevant regional initiatives have been undertaken, such as the Workshop on New Technology and Applications in the Islamic Republic of Iran. Others, such as the Regional Development Forum on NGN and Broadband in Indonesia, are planned.

To avoid any duplication and to optimize the resources, a number of partnerships and collaborations have been developed and executed in the ITU Asia-Pacific Region for its various initiatives and activities. A list of some of those partners can be seen below:

- **ITU member States:** Department of Broadband, Communications and the Digital Economy (Australia), Ministry of Internal Affairs and Communications (Japan), Ministry of Industry and Information Technology (China), Ministry of Information and Communication Technology (Thailand), Ministry of Information and Communication Technology (Islamic Republic of Iran)
- **Regulators:** Australian Communications and Media Authority (ACMA), InfoComm Development Authority (IDA) of Singapore, National Telecommunications Commission (NTC) of Thailand and Pakistan Telecommunications Authority (PTA)
- **Regional organizations:** ESCAP, European Commission, Asia-Pacific Telecommunity (APT), Pacific Islands Telecommunications Association, PIFS, Asia-Pacific Broadcasting Union, Asia-Pacific Institute for Broadcasting Development, and ASEAN
- **Industry:** TOT Public Company Limited (TOT) of Thailand, Servei de Telecommunicacions d'Andorra (STA), Nokia Siemens Networks, NTT Communications and KDDI Corporation
- **Other entities:** World Bank, University of the South Pacific, One Laptop Per Child, ITU Association of Japan, Korea Information Security Agency (of the Republic of Korea), Busan National University, and Universiti Utara Malaysia.

During 2007-2009 (Q1), five ITU Centres of Excellence nodes were established in the Asia-Pacific region, targeting specific telecommunications/ICT themes including policy and regulation (PTA, Pakistan); spectrum management (MICT, Islamic Republic of Iran); rural ICT development (Universiti Utara Malaysia, Malaysia); technology awareness (Busan National University, Republic of Korea); and business management (MICT/TOT Academy, Thailand). A total of 13 face-to-face and 8 e-learning courses were held in that period for over 650 participants. The Centre of Excellence Project for the Asia and Pacific Region (CoE-ASP) has helped to build regulatory capacity, using both traditional and electronic means on issues pertaining to the economics of NGN, mobile number portability, new approaches to spectrum management and spectrum usage rights, and universal service obligations and universal access policies and funding mechanisms. In addition, regional workshops on human resource management issues for the Pacific region were held in partnership with the Pacific Islands Telecommunications Association, which in February 2009 became a partner in the CoE-ASP network. Human capacity-building emerged as a major theme (particularly with regard to policy and regulatory issues) at the ICT Pacific Ministerial conference held in February 2009.

C. UNESCO – Asia-Pacific Regional Bureau for Education[17]

Regional ICT in education activities

The ICT in Education Programme of the UNESCO Asia-Pacific Regional Bureau for Education has four main objectives:

(a) To identify and promote ways in which ICT can enhance the reach and quality of education in the Asia-Pacific region;

(b) To draw attention to possible pitfalls involved in acquiring and utilizing ICT and to the pre-conditions for their successful use;

(c) To empower teachers, educators, principals, administrators and policymakers to make informed, judicious choices regarding the use of ICT in education;

(d) To promote greater access to ICT tools by educators and learners.

Table 4 provides an overview of the focus areas and on-going and new projects, including a summary of key activities and achievements since 2002.

Table 4: Key UNESCO ICT in Education activities since 2002

Focus area	On-going and new projects	Activities and achievements
Education Policy	ICT in Education Policy	Building national capacities to develop appropriate policies and plans for the integration of ICT into education • Developed an online toolkit, www.ICTinEDtoolkit.org, that provides policymakers, planners and practitioners with a systematic process to formulate, plan and evaluate education programmes enhanced by ICT • Trained more than 500 policymakers and educational planners from 29 countries in the Asia-Pacific region
Teacher Education	Next Generation of Teachers	Building institutional capacities of teacher education institutions by: (a) enhancing leadership in teacher education institutions through the Deans Forum; (b) updating the skills of teacher educators in ICT-pedagogy integration; and (c) catalysing curriculum reform in pre-service teacher education • Conducted survey on ICT training for teachers in the Asia-Pacific region • Co-organized with Microsoft three Innovative Teachers Conferences • Conducted four Deans Forums

[17] Information provided to ESCAP by the United Nations Educational, Scientific and Cultural Organization Asia-Pacific Regional Bureau for Education, Bangkok.

Table 4: *(continued)*

Focus area	On-going and new projects	Activities and achievements
	Training and Professional Development of Teachers and Other Facilitators for Effective Use of ICT in Teaching and Learning	Building the capacity of teachers to utilize ICT to improve teaching and learning • Over 200 teacher educators trained in using ICT in the classroom • Teacher guidelines developed for integrating ICT into teaching • Published case studies from the Asia-Pacific Region on ICT in Teacher Education • Developed various resources for educators such as the Free and Open Source Software CD-ROM; the Multimedia CD-ROM; and the Web Tools for Educators CD-ROM
Teaching and Learning	UNESCO SchoolNet: Strengthening the Use of ICT in Schools and SchoolNets in the ASEAN Context	Supporting the development of local and national SchoolNets in the ASEAN region and facilitating the creation of the regional ASEAN SchoolNet • Trained in-service teachers in integrating ICT into education • Compiled and distributed teaching-learning materials • Initiated tele-collaboration activities • Published *Initiating and Managing SchoolNets Lessons Learned*
Non-Formal Education	ICT for Community Empowerment through Non-Formal Education	Supporting the use of ICT for bringing quality education to out-of-school youth and adults • Developed and implemented country-level action plans • Built the capacity of non-formal education practitioners • Supported and enhanced community learning centres • Established community tele-centres • Empowered rural communities through the provision of ICT skills • Convened workshops to share experiences in the use of ICTs in community learning centres and community multi-media centres • Developed a regional ICT pack for non-formal education including videos
Monitoring and Measuring Change	Performance Indicators on ICT Use in Education	Developing performance indicators to monitor and measure the impact of using ICT in education • Developed a set of indicators grouped into five areas: (a) ICT-based policy and strategy (b) ICT infrastructure and access (c) Curriculum and textbooks (d) Teaching process and outcomes (e) Learning process and outcomes

Table 4: *(continued)*

Focus area	On-going and new projects	Activities and achievements
Research and Knowledge Sharing	Regional Clearinghouse in Support of the ICT in Education Programme	Collecting, creating and disseminating information about the use of ICT in education • Continues to maintain the most comprehensive ICT in Education website in the Asia-Pacific region • Regularly sends ICT in Education e-newsletters to more than 4,000 subscribers worldwide • Disseminates important publications ensuring continuous awareness of ICT in Education partners on issues and lessons learned from various ICT in Education projects and initiatives
	ICT in Education Capacity-Building	Providing policymakers, educational planners, administrators, education managers, specialists and leaders a common framework for discussing issues relating to the use of ICT in Education • Produced an e-learning CD-ROM containing two modules: Module 1: ICT in Education Essentials – provides learners with essential information about ICT in education and is aimed at promoting common understanding about the topic in the education sector Module 2: ICT in Education Decision Making – helps learners to consider the different factors involved in choosing the appropriate technology to use in a particular education setting
	Innovative Practices in the Use of ICT in Education	Identifying outstanding examples of the innovative use of ICT in education and disseminating information about these innovative practices to enable others to benefit from them • Organized the Innovative Practices Awards in 2008, providing prizes and recognition to winners of three categories: (a) Teachers and teacher educators in formal education (b) Educational planners and administrators (c) Non-formal educators • Produces a series of case studies documenting exemplary innovations in ICT in education
	ICT in Education Knowledge Communities	Maintaining an online community and interactive forum where educators, teachers, administrators and policymakers can share their opinions and discuss topics relating to the integration of ICT into teaching and learning • Online forum/community at www.unescobkk.org/education/ict/forum

Source: UNESCO Regional Office, Bangkok.

Note: For the latest updates on UNESCO Bangkok's ICT in Education Programme, visit www.unescobkk.org/education/ict.

D. Asia-Pacific Telecommunity (APT) – Regional and subregional cooperation activities[18]

APT is an intergovernmental organization created in 1979 by ITU and ESCAP to foster regional cooperation specifically in the field of ICT. Its membership comprises the designated Government organizations and certain island countries and territories (Special Autonomous Regions) are associate members.[19] The corporate sector is also part of APT, under the category of affiliate members.[20] APT engages in all aspects of ICT ranging from standardization and spectrum management to development. It has four study groups. One of its major activities is to hold preparatory regional meetings for major ITU events, such as WTDC, the World Radio Conference (WRC), etc.

APT, together with ESCAP and ITU, formed and currently co-chairs the Regional Interagency Working Group on ICT. All concerned agencies and organizations working to promote ICT at regional and subregional levels are invited to become members of the Regional Interagency Working Group on ICT. The Working Group ensures well coordinated programmes for providing technical assistance in ICT through projects, seminars, conferences, meetings and workshops.

One of the major ICT events organized by APT was the Ministerial Conference on Broadband and ICT Development, which was held in Bangkok on 1 and 2 July 2004 to coincide with the Silver Jubilee of the establishment of the Asia-Pacific Telecommunity. The objective of the Conference was to adopt the Bangkok Agenda for Broadband and ICT Development in the APT region, taking into consideration the outcome of the Asia-Pacific Summit on Information Society, Tokyo, 2000 and the Declaration and Action Plan of WSIS 2003.

The conference was hosted by the Government of Thailand and was attended by 224 delegates, including 1 Prime Minister, 12 Ministers and 9 Deputy/Vice Ministers, associate members, affiliate members and regional and international organizations.

APT has established three forums: the Asia Pacific Wireless Forum (AWF), the Asia Pacific Development Forum (ADF) and the Policy and Regulatory Forum (PRF). AWF meetings are held twice annually and ADF and PRF meetings are held annually; common regional issues are discussed. APT runs 30 training courses for the APT members and provides over 75 fellowships on average each year. Through its ICT development programme for supporting pilot projects in rural areas, it implemented seven new projects (budget: $296,500) in Indonesia, Lao People's Democratic Republic, Malaysia, Pakistan, Philippines, Thailand and Viet Nam. APT also implemented it implemented four new projects (budget: $556,939) in Indonesia, the Federated States of Micronesia, Nepal and Samoa.

APT undertakes the administrative work in conducting the meetings of SATRC, an autonomous voluntary self-funded association constituted by the regulators of South Asian countries (Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Maldives, Nepal, Pakistan and Sri Lanka) and its working groups, the latter as part of the SATRC Action Plan.

[18] Information provided to ESCAP by the Asia-Pacific Telecommunity Secretariat, Bangkok.

[19] Asia-Pacific Telecommunity, accessed from http://www.apt.int/Member/Members.html#member on 24 December 2009.

[20] Asia-Pacific Telecommunity, www.apt.int/Member/affiliate.html#affiliate on 24 December 2009.

The APT calendar of events of regional and subregional activities in 2009 consists of:

1. 15th APT Standardization Program (ASTAP) Forum, Thailand;
2. 29th APT Study Groups Meeting, Thailand;
3. APT Wireless Forum (AWF-6), Viet Nam;
4. Telecommunication ICT Policy and Regulation Meeting for Pacific, Fiji;
5. 1st APT Preparatory Meeting for ITU Plenipotentiary Conference and WTDC (PP-10 and WTDC), Malaysia;
6. APT Policy and Regulatory Forum, Hong Kong, China;
7. 2nd APT Conference Preparatory Group Meeting for WRC-11 (APG2011-2), China;
8. Workshop on Telecommunications Trade Rules, Australia;
9. Industry Workshop/16th APT Standardization Program (ASTAP) Forum, Macao, China;
10. 30th APT Study Groups Meeting, Macao, China;
11. APT Wireless Forum (AWF-7), Thailand;
12. Asia-Pacific Telecommunication and ICT Development Forum (ADF), Indonesia;
13. APT Ministerial Meeting, Indonesia;
14. 11th South Asian Telecommunication Regulators' Council Meeting (SATRC), Sri Lanka;
15. 2nd APT Preparatory Meeting for ITU Plenipotentiary Conference (PP-10) and WTDC-10, Thailand;
16. 33rd Session of the APT Management Committee, Islamic Republic of Iran;
17. SATRC Workshop on IP Based Network Services and Network Security;
18. Regional Meeting on e-Government;
19. Workshop on Disaster Management.

E. South Asian Association for Regional Cooperation (SAARC): subregional cooperation activities[21]

SAARC was established when its charter was formally adopted on December 8, 1985 by the Heads of State or Government of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. SAARC provides a platform for the peoples of South Asia to work together in a spirit of friendship, trust and understanding. It aims to accelerate the process of economic and social development in the member States.

With regard to the ICT sector, the Second Conference of SAARC Communications Ministers in 2004 adopted the Revised Plan of Action on Telecommunications[22] with goals and objectives including the promotion of cooperation in the enhancement of

[21] South Asian Association for the Regional Cooperation "SAARC", website accessed from www.saarc-sec.org on 24 December 2009.

[22] SAARC Documentation centre website, accessed from sdc.gov.in/AboutSAARC/comm.htm on 24 December 2009.

telecommunication links and utilization of information technologies within the region; the reduction of disparities within and among member States in the telecommunications field; the harnessing of telecommunication technology for the socio-economic development of the region through infrastructure development, sharing of resources, cooperation in technology transfer, standardization and human resource development.

A common position on issues of concern to the region in the telecommunications sector was presented at WSIS in Tunis in November 2005. The Second Conference of SAARC Communications Ministers also recognized the need to develop a framework of knowledge sharing on ICT development across the region. The Working Group on ICT was formed in the SAARC Council of Ministers' Meeting in Pakistan in January 2004. It was given the responsibility of developing ICT performance indicators. SAARC also identified the need to partner with two institutions—the SAARC Human Resource Development Centre, Islamabad and the APT—to implement the proposed plan of action.

SAARC works through the Government line ministries, such as the ministries of information technology or ministries of telecommunications. The SAARC secretariat and specialized organs within the SAARC secretariat have been created to develop expertise, and conduct research in various areas of development. SAARC has established centres of excellence in areas of development cooperation such as agriculture, meteorology, tuberculosis, human resource development, coastal zone management, energy, and information sharing.[23]

Successive meetings by the information and communication ministers of SAARC member countries led to the development of a common position for the development and exchange of media and content throughout the region, as reflected in the Dhaka communiqué: A SAARC Plan of Action on Media and Information. [24]

This plan articulates a strategy for cooperation in the field of media and information with the goals and objectives including actively encouraging the flow of information in the SAARC region on issues of common concern to member countries, the promotion of the optimal utilization of available resources and facilities in the SAARC region to strengthen cooperation in the field of media and information and upgrading the professionalism of media persons through human resource development programmes and regional exchanges. This plan also seeks to initiate regional actions to enable member countries to benefit from the use of new technologies, and to promote a positive image of SAARC internationally.

In order to achieve these objectives, the information ministers agreed to implement various actions in the region including ensuring the free flow of information, newspapers, and other publications; reducing postal and telecommunication rates for media transmission; increasing cooperation among news agencies; facilitating travel for media persons; examining the financial and technical feasibility of establishing a SAARC satellite, among others.

[23] International Development Research Centre website accesses from idrc.ca/panasia/ev-127185-201-1-DO_TOPIC.html on 24 December 2009.

[24] South Asian Association for the Regional Cooperation "SAARC", *The Dhaka communiqué: A SAARC Plan of Action on Media and Information,* (Kathmandu, SAARC Council of Ministers at its Twenty-second Session, 2001), accessed from www.saarc-sec.org/data/agenda/ict/actionplan.htm on 24 December 2009.

F. Economic Cooperation Organization (ECO) activities for subregional cooperation[25]

ECO is a regional intergovernmental organization established in 1985 by the Islamic Republic of Iran, Pakistan and Turkey for the purpose of promoting economic, technical and cultural cooperation among the member States. It was expanded to include seven other members, namely: Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan in November 1992.

ECO faces challenges with respect to realization of its objectives and goals. Most importantly, the region is lacking in appropriate infrastructure and institutions which the Organization is seeking to develop, to make full use of the available resources in the region. ECO has initiated various projects in sectors such as energy, trade, transportation, agriculture, and drug control.

The ICT-related cooperation activities consist of meetings of the directors of the national telecommunication companies and the heads of telecommunication authorities of the ECO member States, as well as of the Expert Working Group on Trans-Asia-Europe Fiber Optical Cable System (TAEFOS).[26]

G. Association of Southeast Asian Nations (ASEAN): activities for subregional cooperation[27]

ASEAN Heads of Government adopted the e-ASEAN Framework Agreement in 2000[28] with the objective of realizing an e-society in a connected, vibrant and secure ASEAN Community. Additionally, ASEAN established various institutional and cooperation mechanism comprises to promote ICT, which include the ASEAN Telecommunication and IT Ministers' Meeting (TELMIN), four technical working groups of ICT senior officials, and ICT centre, and the ASEAN Telecom Regulators' Council. Such mechanisms are active in various ways, for instance, the ASEAN TELMIN has made the following major declarations:

- 2001: Ministerial Understanding on ASEAN Cooperation in Telecommunications and IT
- 2004: Vientiane Action Plan on Telecommunications and IT Sector
- 2005: Beijing Declaration on ASEAN-China ICT Cooperative Partnership for Common Development
- 2005: Ha Noi Agenda on Promoting Online Services and Applications to Realize E-ASEAN

[25] Economic Cooperation Organization, website accessed from ecosecretariat.org on 24 December 2009.

[26] Economic Cooperation Organization, *The 5th Ministerial Meeting on Transport & Communications,* (Kyrgyz Republic, 2004), accessed from ecosecretariat.org/ftproot/High_Level_Meetings/Ministerial/Trans_Comm/5mm_rep.htm on 24 December 2009.htm and *Calendar of Events for the years 2008-2009 at the18th regional planning council meeting of the Economic Cooperation Organisation*, (Islamabad, 2008), accessed from e ecosecretariat.org/Events/18rpc_caland.htm on 24 December 2009.

[27] Nguyen Ky Anh, *ASEAN ICT Cooperation in Relevance with the WSIS Plan of Action,* presentation made at the Expert Group Meeting on Regional Cooperation towards Building an Information Society in Asia and the Pacific, Bangkok, 20-22 July 2009. Available at: http://www.unescap.org/idd/events/2009_EGM-WSIS/

[28] Association of Southeast Asian Nations (ASEAN), *e-ASEAN Framework Agreement,* accessed from the website aseansec.org/6267.htm on 24 December 2009.

- 2006: Brunei Action Plan – "Enhancing ICT Competitiveness: Capacity Building"
- 2007: Siam Reap Declaration on Enhancing Universal Access of ICT Services in ASEAN
- 2008: Bali Declaration in Forging Partnership to Advance High Speed Connection to Bridge Digital Divide in ASEAN
- 2009: Vientiane Declaration on Promoting the Realization of Broadband across ASEAN

With regard to implementation of the WSIS outcomes, ASEAN has undertaken several policy initiatives and joint cooperation programmes, with the goals listed below:

ICT infrastructure

- Facilitate high-speed connection among all national information infrastructure by 2010 and implement ICT measures as identified in the Vientiane Action Plan (2004)
- Deepen regional policy and regulatory framework to deal with the opportunities and challenges in the area of NGN, including the interoperability of products/services, information systems and networks in the convergence environment.

Access to information and knowledge

- Encourage the participation of all stakeholders (people, communities, enterprises and public administrations) in the utilization and development of ICT applications and services on the regional information infrastructure

Capacity-building

- Promote regional on e-learning
- Implement capacity-building programmes to increase ICT literacy in ASEAN, including women, children, the elderly and people with disabilities
- Promote positive use of ICT, in particular the Internet
- Encourage the introduction of ICT at all levels of education
- Initiate the early use of ICT in primary school
- Enhance the use of ICT to promote e-learning
- Develop a workforce and manpower with high levels of ICT proficiency and expertise
- Establish computer emergency response teams (CERTs) in ASEAN member States
- Intensify capacity-building and training programmes for national CERTs and strengthen the capacity, cooperation and coverage of the region's cybersecurity network, including expanding the participation of dialogue partners in ASEAN CERT Incident Drills (ACID)

ICT applications

- Support sectoral ICT applications (initially in key sectors such as customs, logistics, transport, content industry) to improve their effectiveness and productivity
- Support programmes for e-government
- Support the establishment of an ASEAN single window for processing goods through customs
- Promote ICT for disaster reduction and management
- Promote the establishment of a harmonized e-commerce legal infrastructure and the enactment of domestic legislation to provide legal recognition of electronic transactions
- Facilitate the mutual recognition of digital signatures in ASEAN

Cultural diversity and identity, linguistic diversity and local content

- Promote the development, use and sharing of digital content among ASEAN member States
- Promote research and development on multi-language translation technology
- Promote the creation of original ASEAN contents (including an initiative on contents for sustainable telecentres)
- Promote the development of ASEAN video games (ASEAN Foundation)

Media

- Develop appropriate actions and preventive measures against pornography and Internet use that exploits women, children, and other vulnerable groups

H. Pacific Islands Forum[29]

The Pacific islands forum comprises 14 countries, diverse in terms of geography, topography, demography, economy, and culture. Together, they represent about 1,000 languages, most of which are not supported by commercial software. Combined with low levels of literacy in some Pacific countries, the capacity to use ICT is limited. However, cooperation among those countries could bring about synergy in terms of optical fibre cable and satellite linkages to connect internationally. Several regional projects implemented in the region have resulted in:

- Sector reform accelerating ICT development and bringing about competition
- Dramatic improvement in access
- Wireless and satellite technologies overcoming the distance factor and improving affordability
- Reduction in the cost of personal computers and cell phones

[29] Pacific Islands Forum Secretariat (PIFS), *Presentation by John Budden of Pacific Islands Forum Secretariat,* (Bangkok, Expert Group Meeting, ESCAP on 20 July 2009). Available at: http://www.unescap.org/idd/events/2009_EGM-WSIS/

E-services, such as e-commerce, e-government and other applications of ICT have not yet grown significantly.

Undersea cables now serve Fiji, Papua New Guinea, Samoa and the territories of New Caledonia and American Samoa. Other island connectivity is under way.

The Pacific islands have agreed to develop a concept known as the Pacific Plan, in which a broad concept of digital strategy has been included for facilitating and exploiting ICT in socio-economic development in a sustainable and secure environment.

Chapter II

Challenges and Way Forward

Despite progress in different WSIS action lines and the accomplishment of the WSIS goals in the region through transformation of existing digital divide into digital opportunities in the region, there is still large digital divide between rural and urban areas, rich and poor, and developed and developing countries, especially, least developed countries, landlocked developing countries and small island developing States. A list of challenges and options for policymakers to address them is presented below.

1. Economic issues

The most immediate impact of the recent economic crisis was a lack of available credit and higher commercial interest rates, which was and continues to be required to invest in ICT infrastructure development. Some NGN projects have been postponed, however others have continued as the implementation of NGN is perceived by operators as the future of the industry. The private sector has called on Governments for support financing projects, and for example in Europe, the Governments of Greece and Italy announced plans to do so. In terms of consumer demand, studies suggest that telecommunication services may behave as luxury services in developing countries, but not in developed countries. Reduced demand for broadband service in some developed economies was seen in 2009; however in other countries the demand for broadband services appeared relatively robust.[30]

The ICT sector is important not only by itself but also because it boosts economic growth and increases economic productivity and efficiency. Technologies such as mobile telephony and Internet access continue to offer huge growth potential. The financial crisis has disturbed markets and created openings for disruptive technologies and players offering better products and services prices.

In order to address these challenges, policymakers may explore options such as developing innovative and affordable packages in partnership with internet service providers and telecommunication operators to continue to offer affordable services to all segments of the population. To support ICT industries and promote the adoption of policies that attract investment and encourage other sectors to prioritize ICT usage in their activities, and promote local IT industry including the establishment of IT parks, Governments may consider providing more fiscal incentives, such as, concessional interest rates in lending, tax waiver for broadband Internet access in rural areas, waiver of spectrum charge for deployment in unserved and underserved areas. Governments may also consider for exemption of personal income tax for household use, expenditure on purchase of computers so as to create incentive to enable general ICT usage, particularly, to make it easy for citizens who for traditional and social or other reasons remain homebound.

[30] International Telecommunications Union, *Confronting the Crisis – Its Impact on the ICT Industry,* (Geneva, 2009).

Broadband Internet service providers are suggested to develop local content and application services whose benefits may be easily appreciated by the target groups of customers with the resulting demand making their operations commercially viable and sustainable in the long run, for example creating content that brings value. Awareness campaigns on the benefits of broadband to be undertaken, particularly in rural areas through private and government funding, promotion of the use of the universal service fund for implementing broadband including common infrastructure such as telecommunication towers are other important aspects.

Governments may consider collaborating regional/international organizations including ESCAP, ITU, APT and others who could facilitate the sharing of know-how on national broadband policies, standards for implementing broadband networks, and types of innovative and value-added content, and ICT capacity-building.

2. Technological issues

The current version of the Internet Protocol (IPv4) was designed to accommodate some 4 billion users (IP addresses, which are numerical identifications assigned to devices participating in the Internet). A large number of these are already allocated or reserved, which means that shortly the Internet will run out of capacity. Fortunately new standards for establishing telecommunication networks exist such as the Internet Protocol Version 6 (IPv6), which would be sufficient to handle the forecasted growth for a number of years. The migration from IPv4 to IPv6 requires planning and investment for Governments and private sector stakeholders.

Technological developments are enabling a convergence between telecommunications, computing and broadcasting. Packet-based communication protocols such as the Internet protocol (IP) has become the standard for networked communication, the so called next generation networks (NGN) can unify in a single telecommunication network fixed and mobile telephony, computing, and television. This consolidation opens opportunities for telecommunication operators. Countries in the region are at different stages of planning and migration towards NGN infrastructure and services. Some countries are evaluating whether to migrate or not to NGN, given that the investment on existing network infrastructure has still not been recovered.

Several network technologies for providing rural connectivity are available from within and outside the region, including GSM EDGE, UMTS, CDMA2000, WIMAX (IEEE 802.16), iBurst (HC-SDMA), LTE (3GPP Long Term Evolution), and satellite technology among others, and each country may choose as appropriate for its needs.

In this regard, Governments may undertake suitable measures to foster regional cooperation for the adoption of new technologies, particularly for rural connectivity, as well as to evolve strategies for migration to NGN and IPv6. Additionally, increasing investment in research and development of low power and affordable computing technologies would be beneficial.

In order to expand the network infrastructure Governments may promote investment by both private and public sector and collaboration among experts in order to develop policies and technology which is relevant to the region, for example in the domain of tools for language translation and the use of open source software.

The development of the Information Society can also be encouraged through establishing one-stop e-government portals, payment gateways and identity management systems, as well as through the establishment of common national infrastructure, data standards, data centres, and unique service delivery points.

3. Social and cultural issues in implementing ICT

The potential challenges that could be faced in implementing ICT uniformly across all sections of society are many; however policymakers have some options to address them.

Consistency of implementation and availability of services. Depending on the demand within a given market segment, the services available could vary greatly. It is perceived that the services will be provided as per classic demand-supply curves. For example, in a rural market, there could be operators who provide only basic services while in a metropolitan area several providers compete to give consumers a wider set of products. Regulatory incentives and safeguards can be introduced by Governments in order to ensure that the service gaps between rural and urban areas are not large, and that future implementations of newer generation technologies will reach all parts of a country.

Demographic variation in adoption of ICT. Depending on the technical knowledge of each consumer, there is a vast variance in the adoption of ICT. For example, a 50-year-old homemaker may have access to the Internet but is not using it due to lack of confidence in the use of technology. For a better spread of ICT, the technologies used must be simple and user friendly, in the same way that telephones and televisions are simple to use while being technically complex in the background. Additionally, tailored training could be made available to the various demographics, based on age, language, background, and potential usage patterns. This has the potential for spawning an additional training industry.

Potential erosion of local culture and language. As more people adopt the Internet and have access to the same information, there is a potential to erode and lose the local culture and values and adopt homogenized view points. This could lead to irrevocable loss of language and local texts. Potentially this can lead to jingoistic backlashes on the part of anti-technology groups. Given the abundance of languages and cultures in the region, it is crucial to have internationalized[31] products that provide localized representation of information. Currently, available sites are predominantly in English, which can present a huge barrier to ICT uptake in areas of little English literacy. To address this, Governments could consider taking actions to balance technology development with social and cultural standards and which encourage the development of local content originating at the community level. One example of such projects is the Pan Asia Networking project.[32]

[31] Internationalization is the design and development of a product, application or document content that enables easy localization for target audiences that vary in culture, region, or language. Localization refers to the adaptation of a product, application or document content to meet the language, cultural and other requirements of a specific target market/locale. Definitions from The World Wide Web Consortium (W3C) accessed from w3.org/International/questions/qa-i18n on 24 December 2009.

[32] International Development Research Centre, *Pan Asia Networking project,* website accessed from idrc.ca/panasia/ on 24 December 2009.

Misuse of digitization. Potentially, corporations could buy and control access to vast collections of knowledge and provide access to it on a paid basis which could move these collections out of reach of the majority of the public. Should this happen, the computer revolution would benefit only a handful of people as opposed to the general public. Care must also be taken to ensure that as information is digitized, knowledge and information are not lost or destroyed. This requires that adequate backups and copies exist. Equally important is to ensure that information is not manipulated. A governance model has to be provided to ensure that important information and knowledge are not distorted and that the right information is presented and protected. This is certainly a task of tall order to undertake, since the Internet often presents conflicting and contradictory information.

4. Environmental issues

ICT helps conserve the environment by reducing the need to travel, thus reducing atmospheric pollution by the burning of fossil fuels. However, ICT creates waste (e.g. discarded equipment and packaging) and carbon emissions from generating electricity to power them.

Electronic waste management is an issue which may be addressed through policies relating through general waste management, or through specific policies applicable to the ICT industry, but regardless of the approach, the issue should not be neglected. As mentioned, the increase in ICT adoption globally is increasing rapidly, and the territories lacking policies to manage electronic waste may face increased pollution and health problems.

As ICT penetration increases, the requirement for electricity also does. With current electricity generating technologies which burn fossil fuels, increasing electricity generation results in increased carbon emission to the atmosphere. Governments, can address this on the one hand by encouraging the use of alternate energy sources such as (wind, solar, micro-hydro, etc.). On the other hand, this issue may also be addressed by encouraging the development and use of low power consuming equipment.

5. Cybercrime

Whereas ICT have empowered the people, men and women alike, they also are being increasingly used by criminals who endanger society. Identity theft, spam, and hacking continue to grow. The malaise of cybercrimes is a very serious issue of international proportions and needs to be resolved technologically, socially, politically and administratively.

Dealing with cybercrimes committed from outside the national borders, is currently a major challenge. With the support of ESCAP, Governments may consider drafting and undertaking preparatory actions for adoption of a cybercrime treaty covering countries in the region on regional or subregional basis in order to provide safeguards against economic and other crimes that may take place from outside the national borders of each country. Additionally, Governments may consider enhancing the role of the national Computer Emergency Response Teams (CERT) and expand the Asian and Pacific CERT to fight cybercrime.

6. Policy issues

Regulatory policy should promote innovation, infusion of new technologies and encourage ICT investment. In this respect, Governments should consider strengthening the regulatory capacity of ICT regulators and mainstreaming of ICT in development plans to attain the Millennium Development Goals (MDGs).

7. Regional and subregional cooperation

To strengthen regional and subregional cooperation, ESCAP as the regional arm of the United Nations for inclusive and sustainable socio-economic development, may provide a platform together with other regional and subregional organizations to jointly organize activities to share good practices and successful projects, exchange information, and measure the progress with regard to the implementation of the WSIS outcomes. Such activities may include promoting virtual collaboration of the experts which could be engaged on a continuous basis.

Governments may also request ESCAP to develop a strategy for mobilizing its own resources as well as for coordinating other regional and subregional organizations to assist countries to mainstream ICT in their development plans.

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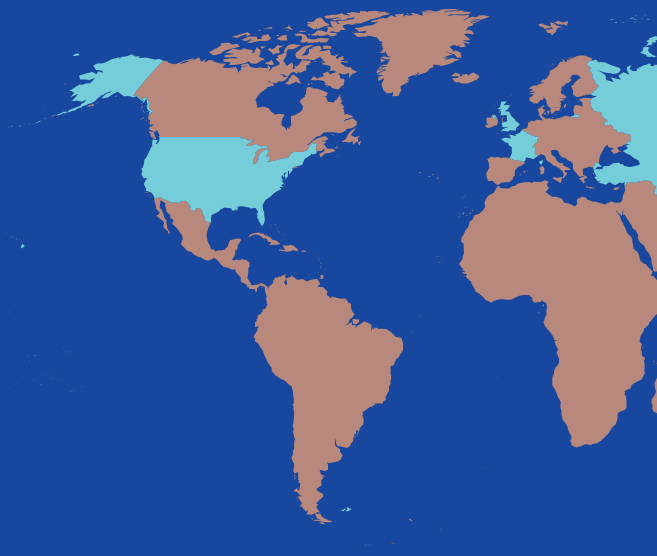

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