Academy of ICT Essentials for Government Leaders

Module 1

The Linkage between ICT Applications and Meaningful Development

Usha Rani Vyasulu Reddi

APCICT ASIAN AND PACIFIC TRAINING CENTRE FOR INFORMATION AND COMMUNICATION TECHNOLOGY FOR DEVELOPMENT

The Academy of ICT Essentials for Government Leaders Module Series

Module 1:
The Linkage between ICT Applications and Meaningful Development

United Nations Asian and Pacific Training Centre for Information
and Communication Technology for Development (UN-APCICT)
Bonbudong, 3rd Floor Songdo Techno Park
7-50 Songdo-dong, Yeonsu-gu, Incheon City
Republic of Korea

Telephone: +82 32 245 1700-02
Fax: +82 32 245 7712
E-mail: info@unapcict.org
http://www.unapcict.org

ISBN: 978-89-955886-0-4 [94560]

Design and Layout: Scandinavian Publishing Co., Ltd. and studio triangle
Printed in: Republic of Korea

FOREWORD

The 21st century is marked by the growing interdependence of people in a globalizing world. It is a world where opportunities are opening up for millions of people through new technologies, expanding access to essential information and knowledge which could significantly improve people's lives and help reduce poverty. But this is possible only if the growing interdependence is accompanied by shared values, commitment and solidarity for inclusive and sustainable development, where progress is for all people.

In recent years, Asia and the Pacific has been 'a region of superlatives' when it comes to information and communication technologies (ICTs). According to the International Telecommunication Union, the region is home to over two billion telephones and 1.4 billion mobile phone subscribers. China and India alone accounted for a quarter of all mobile phones in the world by mid-2008. The Asia Pacific region also represents 40 per cent of the world's Internet users and the largest broadband market in the world with a share of 39 per cent of the global total.

Against this background of rapid technological advancement, many have wondered if the digital divide will disappear. Unfortunately, the response to this question is 'not yet'. Even five years after the World Summit on the Information Society (WSIS) was held in Geneva in 2003, and despite all the impressive technological breakthroughs and commitments of key players in the region, access to basic communication is still beyond the vast majority of people, especially the poor.

More than 25 countries in the region, mainly small island developing countries and land-locked developing countries, have less than 10 Internet users per 100 persons, and these users are mostly concentrated in big cities, while on the other hand, some developed countries in the region have a ratio of more than 80 Internet users per 100. Broadband disparities between the advanced and developing countries are even more striking.

In order to bridge the digital divide and realize ICT potentials for inclusive socio-economic development in the region, policymakers in developing countries will need to set priorities, enact policies, formulate legal and regulatory frameworks, allocate funds, and facilitate partnerships that promote the ICT industry sector and develop ICT skills among their citizens.

As the Plan of Action of the WSIS states, "… each person should have the opportunity to acquire the necessary skills and knowledge in order to understand, participate in, and benefit from the Information Society and Knowledge Economy." To this end, the Plan of Action calls for international and regional cooperation in the field of capacity building with an emphasis on creating a critical mass of skilled ICT professionals and experts.

It is in response to this call that APCICT has developed this comprehensive ICT for development training curriculum – the *Academy of ICT Essentials for Government Leaders* – consisting presently of eight stand-alone but interlinked modules that aim to impart the essential knowledge and expertise that will help policymakers plan and implement ICT initiatives more effectively.

APCICT is one of five regional institutes of the United Nations Economic and Social Commission of Asia and the Pacific (ESCAP). ESCAP promotes sustainable and inclusive socio-economic development in Asia and the Pacific through analysis, normative work, capacity building, regional cooperation and knowledge sharing. In partnership with other UN agencies, international organizations, national partners and stakeholders, ESCAP, through APCICT, is committed to support the use, customization and translation of these *Academy* modules in different countries, and their regular delivery at a series of national and regional workshops for senior- and mid-level government officials, with the objective that the built capacity and acquired knowledge would be translated into increased awareness of ICT benefits and concrete action towards meeting development goals.

Noeleen Heyzer

Under-Secretary-General of the United Nations
and Executive Secretary of ESCAP

PREFACE

The journey in developing the *Academy of ICT Essentials for Government Leaders Module Series* has truly been an inspirational eye-opening experience. The *Academy* has not only served to fill a gap in ICT capacity building, but has also paved a new way for curriculum development – through people's participation and ownership of the process.

The *Academy* is the flagship programme of APCICT, which has been developed based on: results of a comprehensive needs assessment survey involving over 20 countries in the region and consultations with government officials, members of the international development community, and academics and educators; in-depth research and analysis of the strengths and weaknesses of existing training materials; feedback from participants in a series of APCICT-organized regional and sub-regional workshops on the usefulness and relevance of the module content and the appropriate training methodology; and a rigorous peer review process by leading experts in various ICT for development (ICTD) fields. The *Academy* workshops held across the region provided an invaluable opportunity for the exchange of experiences and knowledge among participants from different countries, a process that has made the *Academy Alumni* key players in shaping the modules.

The national roll-out of eight initial *Academy* modules marks the beginning of a vital process of strengthening existing partnerships and building new ones to develop capacity in ICTD policymaking across the region. APCICT is committed to providing technical support in rolling out the *National Academies* as its key approach towards ensuring that the *Academy* reaches all policymakers. APCICT has also been working closely with a number of regional and national training institutions that are already networked with central-, state- and local-level governments, to enhance their capacity in customizing, translating and delivering the *Academy* modules to take national needs and priorities into account. There are plans to further expand the depth and coverage of existing modules and develop new ones.

Furthermore, APCICT is employing a multi-channel approach to ensure that the *Academy* content reaches wider audiences in the region. Aside from the face-to-face delivery of the *Academy* via regional and national *Academies*, there is also the APCICT Virtual Academy (AVA), the *Academy's* online distance learning platform, which is designed to enable participants to study the materials at their own pace. AVA ensures that all the *Academy* modules and accompanying materials, such as presentation slides and case studies, are easily accessible online for download, re-use, customization and localization, and it encompasses various functions including virtual lectures, learning management tools, content development tools and certification.

The initial set of eight modules and their delivery through regional, sub-regional and national *Academy* workshops would not have been possible without the commitment, dedication and proactive participation of many individuals and organizations. I would like to take this opportunity to acknowledge the efforts and achievements of the *Academy Alumni* and our partners from government ministries, training institutions, and regional and national organizations who participated in the *Academy* workshops. They not only provided valuable input to the content of the modules, but more importantly, they have become advocates of the *Academy* in their country, resulting in formal agreements between APCICT and a number of national and regional partner institutions to customize and deliver regular *Academy* courses in-country.

I would also like to add a special acknowledgment to the dedicated efforts of many outstanding individuals who have made this extraordinary journey possible. They include Shahid Akhtar, Project Advisor of the *Academy*; Patricia Arinto, Editor; Christine Apikul, Publications Manager; all the *Academy* authors; and the APCICT team.

I sincerely hope that the *Academy* will help nations narrow ICT human resource gaps, remove barriers to ICT adoption, and promote the application of ICT in accelerating socio-economic development and achieving the Millennium Development Goals.

Hyeun-Suk Rhee

Director
UN-APCICT

ABOUT THE MODULE SERIES

In today's 'Information Age', easy access to information is changing the way we live, work and play. The 'digital economy', also known as the 'knowledge economy', 'networked economy' or 'new economy', is characterized by a shift from the production of goods to the creation of ideas. This underscores the growing, if not already central, role played by information and communication technologies (ICTs) in the economy and in society as a whole.

As a consequence, governments worldwide have increasingly focused on ICTs for development (ICTD). For these governments, ICTD is not only about developing the ICT industry or sector of the economy but also encompasses the use of ICTs to engender economic as well as social and political growth.

However, among the difficulties that governments face in formulating ICT policy is that policymakers are often unfamiliar with the technologies that they are harnessing for national development. Since one cannot regulate what one does not understand, many policymakers have shied away from ICT policymaking. But leaving ICT policy to technologists is also wrong because often technologists are unaware of the policy implications of the technologies they are developing and using.

The *Academy of ICT Essentials for Government Leaders* module series has been developed by the United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development (UN-APCICT) for:

1. Policymakers at the national and local government level who are responsible for ICT policymaking;

2. Government officials responsible for the development and implementation of ICT-based applications; and

3. Managers in the public sector seeking to employ ICT tools for project management.

The module series aims to develop familiarity with the substantive issues related to ICTD from both a policy and technology perspective. The intention is not to develop a technical ICT manual but rather to provide a good understanding of what the current digital technology is capable of or where technology is headed, and what this implies for policymaking. The topics covered by the modules have been identified through a training needs analysis and a survey of other training materials worldwide.

The modules are designed in such a way that they can be used for self-study by individual readers or as a resource in a training course or programme. The modules are standalone as well as linked together, and effort has been made in each module to link to themes and discussions in the other modules in the series. The long-term objective is to make the modules a coherent course that can be certified.

Each module begins with a statement of module objectives and target learning outcomes against which readers can assess their own progress. The module content is divided into sections that include case studies and exercises to help deepen understanding of key concepts. The exercises may be done by individual readers or by groups of training participants. Figures and tables are provided to illustrate specific aspects of the discussion. References and online resources are listed for readers to look up in order to gain additional perspectives.

The use of ICTD is so diverse that sometimes case studies and examples within and across modules may appear contradictory. This is to be expected. This is the excitement and the challenge of this newly emerging discipline and its promise as all countries begin to explore the potential of ICTs as tools for development.

Supporting the *Academy* module series in print format is an online distance learning platform — the APCICT Virtual Academy (AVA – http://www.unapcict.org/academy) — with virtual classrooms featuring the trainers' presentations in video format and PowerPoint presentations of the modules.

In addition, APCICT has developed an e-Collaborative Hub for ICTD (e-Co Hub – http://www.unapcict.org/ecohub), a dedicated online site for ICTD practitioners and policymakers to enhance their learning and training experience. The e-Co Hub gives access to knowledge resources on different aspects of ICTD and provides an interactive space for sharing knowledge and experiences, and collaborating on advancing ICTD.

MODULE 1

The linkage between Information and Communication Technologies (ICTs) and the achievement of the Millennium Development Goals (MDGs) appears at times clear and at other times fuzzy. But the linkage exists and it merits elaboration and explanation. This module invites readers to explore the various dimensions of the linkage through case studies of ICT applications in key sectors of development in Asia Pacific countries. The module also highlights key issues and decision points, from policy to implementation, in the use of ICTs to meet development needs. The aim is to foster a better understanding of how ICTs can be used for social and economic development, and to equip policymakers and programme managers with a development-oriented framework for ICT-based and ICT-supported interventions in a range of social sectors.

Module Objectives

The module aims to:

1. Argue the case for ICTs in development;

2. Describe the macro relationship between the MDGs and ICTs;

3. Foster a better understanding of how ICTs can be used to achieve social and economic development; and

4. Provide a development-oriented framework for ICT-based and ICT-supported projects and interventions in a range of social sectors.

Learning Outcomes

After working on this module, readers should be able to:

1. Provide a rationale for the use of ICTs to achieve development goals;

2. Cite and discuss examples of ICT applications in key sectors of development, in particular poverty alleviation, agriculture, education, health, gender, government and governance, and disaster and risk management;

3. Discuss challenges in the effective application of ICTs for development; and

4. Discuss key factors in the design and implementation of ICT for development projects and programmes.

TABLE OF CONTENTS

List of Case Studies

List of Boxes

List of Figures

List of Tables

Acronyms

ADPC	Asian Disaster Preparedness Centre
AIDS	Acquired Immunodeficiency Syndrome
APCICT	Asian and Pacific Training Centre for Information and Communication Technology for Development
APDIP	Asia-Pacific Development Information Programme
ASEAN	Association of Southeast Asian Nations
AusAID	Australian Agency for International Development
AVA	APCICT Virtual Academy
BPoA	Barbados Programme of Action
CENWOR	Centre for Women's Research, Sri Lanka
CD	Compact Disc
COL	Commonwealth of Learning
DANIDA	Danish International Development Agency
DVD	Digital Video Disc
ENRAP	Knowledge Networking for Rural Development in Asia/Pacific Region
ESCAP	Economic and Social Commission for Asia and the Pacific
FM	Frequency Modulation
FOSS	Free and Open Source Software
FTP	File Transfer Protocol
GeoCMS	Geospatial Content Management System
GIS	Geographic Information System
GooB	Governance Out of a Box
HINARI	Health InterNetwork Access to Research Initiative
HIV	Human Immunodeficiency Virus
ICT	Information and Communication Technology
ICTD	Information and Communication Technology for Development
IDRC	International Development Research Centre, Canada
IFAD	International Fund for Agricultural Development
ISRO	Indian Space Research Organization
IT	Information Technology
KADO	Karakoram Area Development Organization
LDC	Least Developed Country
MDG	Millennium Development Goal
MIGIS	Mobile Interactive Geographic Information System, China
NFE	Non-Formal Education
NGO	Non-Governmental Organization
NIOS	National Institute of Open Schooling, India
NREGA	National Rural Employment Guarantee Act, 2005 India
OCHA	Office for the Coordination of Humanitarian Affairs
OECD	Organisation for Economic Co-operation and Development
PFnet	People First Network, Solomon Islands
PIC	Public Internet Centre, Mongolia
PPP	Public Private Partnership
SARS	Severe Acute Respiratory Syndrome
SIDS	Small Island Developing States
SIDSNet	Small Island Developing States Network
SME	Small and Medium Enterprise
SMS	Short Message Service

SOPAC	Pacific Islands Applied Geoscience Commission
TEIN2	Trans-Eurasian Information Network 2
TEWS	Tsunami Early Warning System
TV	Television
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISDR	United Nations International Strategy for Disaster Reduction
USAID	United States Agency for International Development
VP	Village Phone
VSAT	Very Small Aperture Terminal
VUSSC	Virtual University for Small States of the Commonwealth
WHO	World Health Organization

List of Icons

Case Study

Goal


Questions To Think About


Something To Do

Test Yourself

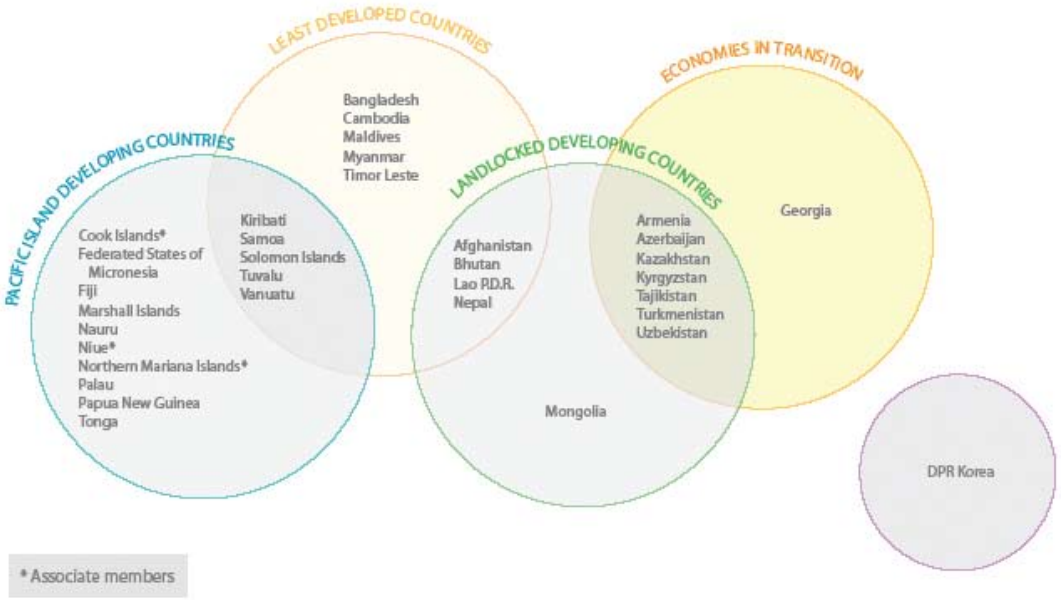
1. INTRODUCTION

The Asia Pacific region is home to about a quarter of the world's population. Compared to the rest of the world, it has the greatest diversity, with the oldest as well as the youngest civilizations, and the most populous states on continental Asia as well as the sparse and distant island countries of the Pacific. People of all races and religions live here, and amidst great wealth there is also intimidating poverty. In this region the world's fastest growing economies coexist with the least developed countries and with countries in transition.

Thus, the challenge of development that the Asia Pacific region poses to the global community of donors, development agencies and practitioners is massive. There is no one-size-fits-all, and a solution that works admirably in one country can fail miserably in another part of the same region.

For this reason perhaps, there is a critical need to segment the region's countries on the basis of some common parameters and subsequently look for innovative ways of addressing the challenges of development. Targets 13 and 14 of Millennium Development Goal (MDG) #8 charge the global community with the special responsibility of addressing the special needs of island, mountainous, landlocked and least developed countries. The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) also identifies as its high-target countries the Pacific Island Developing countries, the Least Developed Countries (LDCs), the Landlocked Countries and Economies in Transition.

Figure 1. ESCAP high-priority countries



Despite their diversity, the high-target countries face common problems. They are small in size and population, they have small markets, and they have limited human, technical and/or natural resources. Both island states and remote mountain communities are exposed to major environmental changes such as tsunamis and earthquakes. Politically, these countries are increasingly conscious of their vulnerability and fear that in the absence of a critical mass they could easily become marginalized and dependent upon the technologies, systems, goods, services and materials developed by the larger and more successful states. At the same time, they recognize that they cannot afford to be left out of the mainstream of international growth and development.

There is a need therefore to find innovative approaches and solutions to address the developmental needs of the high-target countries. In the era of the knowledge society, cutting-edge applications of information and communication technologies (ICTs) make possible such innovative approaches and out-of-the-box solutions.

This module views the problems of development in the high-target countries through the prism of ICT applications, particularly computer and Web-based digital technologies.[1] The module seeks to establish the link between the application of ICTs and the achievement of the MDGs, and to argue for the wise and meaningful application of ICT for development (ICTD). It is important to note at the outset, however, that there is no one way of using ICTs to address the MDGs and that each country must determine its own goals, objectives, strategies and pathways to implementation. The module simply introduces readers to the linkage between the goals (MDGs) and the strategies (ICTs), and suggests ways of applying these strategies more effectively.

The section that follows this introduction provides an overview of the MDGs and ICTs. The next section describes ICT applications in various sectors of development. While the development sectors are discussed separately, it is important to note that applications in one sector, say in education, will have spin-off benefits for other sectors. The final section of the module provides insights into the broad challenges that confront programme and project implementation. This section is particularly important for those engaged in the task of project implementation.

The module is meant to provide a general backdrop to the issues under discussion. Thus, while some may find the information new, others may find it rudimentary. There is also, for pedagogical purposes, some redundancy built into the module and in the series of which this module is a part. This is the nature of this complex field where the same issue can be explored from different perspectives and dimensions, making it all the more challenging and interesting.

1 Older technologies such as radio and television will be discussed only in so far as they are integrated with digital technologies.

2. THE MDGS AND ICTS: THE BIG PICTURE

This section aims to:
- **Review the region's progress toward achieving the MDGs;**
- **Describe the key features of ICTs; and**
- **Provide an overview of how the strategic use of ICTs can help address problems of development.**

2.1 The MDGs in Brief

The adoption of the Millennium Declaration in 2000 and the MDGs by all 189 member-states of the United Nations General Assembly was a watershed in global cooperation. While the importance of human development had been reiterated for decades and at various platforms and global conferences, it was the first time that all stakeholders — countries and governments, donor and development agencies, non-governmental and civil society organizations — acknowledged that unless they arrived at a common understanding and commitment, the goal of equitable development would never be reached.

The significance of the MDGs

The MDGs (Box 1) are the most broadly supported and the most specific poverty reduction strategies that the global community has articulated and championed. For the international system consisting of donor and technical aid agencies, the goals constitute a common agenda for development assistance. For nation-states, the MDGs mean a commitment to internationally agreed upon minimum standards of development against which their performance will be measured. If the goals are met, it will mean that more than one billion people living in poverty and deprivation will have a means to a life of dignity and freedom.

Each of the eight goals has specific targets, all equally important, that countries will seek to meet as part of the progress toward achieving the goals by the year 2015.

Box 1. Millennium development goals and targets

Goal 1: Eradicate Extreme Poverty and Hunger

Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than USD 1 a day

Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger

Goal 2: Achieve Universal Primary Education

Target 3: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling

Goal 3: Promote Gender Equality and Empower Women

Target 4: Eliminate gender disparity in primary and secondary education preferably by 2005 and in all levels of education no later than 2015

Goal 4: Reduce Child Mortality

Target 5: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate

Goal 5: Improve Maternal Health

Target 6: Reduce by three-quarters, between 1990 and 2015, the maternal mortality rate

Goal 6: Combat HIV/AIDS, Malaria, and Other Diseases

Target 7: Have halted by 2015, and begun to reverse, the spread of HIV/AIDS

Target 8: Have halted by 2015, and begin to reverse, the incidence of malaria and other major diseases

Goal 7: Ensure Environmental Sustainability

Target 9: Integrate the principles of sustainable development into country policies and programmes to reverse the loss of environmental resources

Target 10: Halve, by 2015,the proportion of people without sustainable access to safe drinking water

Target 11: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers

Goal 8: Develop a Global Partnership for Development

Target 12: Develop further an open rule-based, predictable, non-discriminatory trading and financial system

Target 13: Address the special needs of the LDCs

Target 14: Address the special needs of land-locked countries and Small Island Developing States (through the Programme of Action for the Sustainable Development of Small Island Developing States and the outcome of the 22nd Special Session of the General Assembly)

Target 15: Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term

Target 16: In cooperation with the developing countries, develop and implement strategies for decent and productive work for youth

Target 17: In cooperation with pharmaceutical companies, provide access to affordable, essential drugs in developing countries

Target 18: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications

Source: UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia: Realising the Millennium Development Goals* (New Delhi: UNDP, Elsevier, 2005), http://www.apdip.net/elibrary#rhdr.

Also part of the global commitment is a strategy and plan of action that requires programmes at global and national levels supported by activities at the regional level. At the global level is the United Nations system that will work toward the achievement of the goals through core elements such as monitoring, analysis, campaign and mobilization, and operational activities. At the national level, it is essential that there be enabling policy frameworks, partnerships, country studies and activities pursued through the policy dialogue and country-driven strategy-setting process envisaged in the Poverty Reduction Strategy Papers or other similar national plans and strategies.

Progress on the MDGs

Since 2004 there have been several mid-term reviews of global and regional progress in meeting the targets in different parts of the world. By 2007, halfway through the defined period of 15 years, alarm bells were ringing. *The Millennium Development Goals Report 2007*[2] reveals that global progress is uneven and that despite some visible and widespread gains even in regions where the challenges are greatest, large parts of the world will miss the targets set for 2015.

The inter-agency report *The Millennium Development Goals: Progress in Asia and the Pacific 2007*[3] shows that while on the one hand the region is making much better progress towards the MDGs than sub-Saharan Africa, the region has five of the most populous countries in the world (Bangladesh, China, India, Indonesia and Pakistan) accounting for over two-thirds of all people living in rural areas without access to basic sanitation, with underweight children, and in conditions of abject poverty and deprivation. The Asia Pacific region as a whole is on course to achieve the large majority of the MDG targets by 2015, as shown in Table 1. Progress on halving poverty and hunger, achieving universal primary education, and eliminating gender disparity at all levels of education is moving apace and the region could well meet these goals. However, infant mortality is still high and HIV/AIDS prevalence continues to rise. Environmental degradation is also cause for concern.

The report argues that to look at progress towards the MDGs alone is not enough because even those countries that are on track to achieve their targets can still have high rates of poverty and child mortality, while other off-track countries may be close to the target. For this reason, it is necessary to have a more holistic view of the overall progress of each country.

Although there are similarities across the entire Asia Pacific region, in the ESCAP high-target countries contrasts need to be identified and described (see Table 1). The LDCs still have the region's highest rates of child and maternal mortality and tuberculosis. Central Asian countries are regressing on health-related targets and their progress in reducing child mortality is slow. Progress is also slow in the provisioning of clean water and basic sanitation. Data gaps are making it difficult to assess progress in the Pacific subregion but the main areas of concern are similar to those in Central Asia. China and India are showing impressive progress towards achieving the goals but have huge intra-country disparities, with large numbers of impoverished people for whom the indicators under Goals 1 to 4 and 6 have not been reached.

2 United Nations, *The Millennium Development Goals Report 2007* (New York: United Nations, 2007), http:// www.un.org/millenniumgoals/pdf/mdg2007.pdf.

3 ADB, ESCAP and UNDP, *The Millennium Development Goals: Progress in Asia and the Pacific 2007* (Bangkok: ADB, ESCAP and UNDP, 2007), http://www.unescap.org/stat/mdg/MDG-Progress-Report2007.pdf.

Table 1. Classification of countries by progress on MDG targets

Country	Goal 1		Goal 2			Goal 3			Goal 4 & 5		Goal 6			Goal 7							
● Early Achiever ▲ On Track ■ Slow ▼ No Progress/ Regressing	$1/Day Poverty	Underweight Children	Primary Enrolment	Reaching Grade 5	Primary Completion Rate	Gender Primary	Gender Secondary	Gender Tertiary	Under-5 Mortality	Maternal Mortality	HIV Prevalence	TB Prevalence Rate	TB Death Rate	Forest Cover	Protected Area	CO2 Emissions	ODP CFC Consumption	Water Urban	Water Rural	Sanitation Urban	Sanitation Rural
Afghanistan		▲				■	▼	▼	■	■	▲	●	●	▼	▲	●	●	●	▲	●	▲
American Samoa												●	●	▼		●					
Armenia	●		●	●	●	●	●	●	●	●	▲	▼	▼	▼	●	●	●	●		●	
Azerbaijan	●		▼		●	●	●	▲	■	■	▲	●	▼	▲	●	●	●	●	●		
Bangladesh	▼	■	▲	▼	▼	●	●	▼	▲	▲	▲	●	●	▼	●	▼	▼	▼	■	▼	▲
Bhutan				▲					▲	■	▲	●	●	●	●	▼	●				
Brunei Darussalam				▲	●	●	●	●	●	●	▲	▼	▼	▼	●	●	●				
Cambodia		▼	●	▼	▲	▲	▲	▲	▼	▼	●	●	●	▼	●	●	●				
China	●	●				●	●	▲	●	●	▲	●	●	●	●	▼	●	▼	■	■	▲
Cook Islands			▼			●	●		●	●		●	●	●		▼	●				
DPR Korea		▼							▼	▼		●	●	▼	▲	●	●	●	●		
Fiji			●	●	●	●	●	●	●	●	▲	●	●	●	●	▼	●			▼	▼
French Polynesia												▼	●	▲		●		●	●	●	●
Georgia	▼		▼		▼	●	●	●	●	■	▼	●	●	▲	●	●	●	●	▼	●	▼
Guam												●	▼	▲		▼		●	●	●	●
Hong Kong, China			▼	●	●	▼	●	●			▲	●	●			▼					
India	▲	■	▲	▲	▲	▲	▲	■	■	■	▲	●	●	●	●	▼	▼	●	●	▲	▲
Indonesia	●	▼	■	▼	●	●	●	▼	●	●	▲	●	●	▼	●	▼	●	▼	■	■	■
Iran	●		▲	▼	■	●	●	●	●	●	▼	●	●	▲	●	▼	●	●	▼		
Kazakhstan	●		▲		●	●	●	●	▼	▼	▲	▼	▼	▲	●	●	●	●	▼	▼	▼
Kiribati				▲	●	●	●		■	■		●	●	▲	●	▼	●	■	▲	▲	■
Kyrgyzstan	●		■		▼	●	●	●	■	■	▲	●	●	●	●	●	●	●	▼	▼	▼
Lao PDR	▼	■	▲	▲	■	▲	■	▲	▲	▲	▲	●	●	▼	●	▼	●				
Macao, China			▲	●	●	▼	●	▼				▼	▼			▼					
Malaysia	●	●	▼	●	▼	●	●	●	●	●	▼	●	●	▼	●	▼	●	●	●	▼	
Maldives		▲	▼		●	●	●	●	●	●		●	●	▲		▼	●	●	▼	●	
Marshall Islands			▲		●	▼	●	●	▲	■		●	●		●		●	▼	●	▲	■
Micronesia									●	●		●	●	▲	●		▼	●	●	■	▼
Mongolia	▼	▼	▼		●	●	●	●	▲	▲	▲	●	●	▼	●	●	●	▼	▼		
Myanmar		■	▲	▲	▲	●	●	●	■	■	●	●	●	▼	●	▼	▼	▼	●	●	●

Source: ADB, ESCAP and UNDP, The Millennium Development Goals: Progress in Asia and the Pacific 2007, (Bangkok: ADB, ESCAP and UNDP, 2007), 33, http://www.unescap.org/stat/mdg/MDG-Progress-Report2007.pdf.

● Early Achiever
▲ On Track
■ Slow
▼ No Progress/ Regressing

Country	Goal 1		Goal 2			Goal 3			Goal 4 & 5		Goal 6			Goal 7							
	$1/Day Poverty	Underweight Children	Primary Enrolment	Reaching Grade 5	Primary Completion Rate	Gender Primary	Gender Secondary	Gender Tertiary	Under-5 Mortality	Maternal Mortality	HIV Prevalence	TB Prevalence Rate	TB Death Rate	Forest Cover	Protected Area	CO2 Emissions	ODP CFC Consumption	Water Urban	Water Rural	Sanitation Urban	Sanitation Rural
Nauru					▼	●	●		●	●		●	▼			●	●				
Nepal	▲		▲	■	▲	▲	▲	■	▲	■	▲	●	●	▼	●	▼	●	●	●	▲	▲
New Caledonia												▼	●	▲		●					
Niue					▼	●	▼					●	●	▼		▼	●	●	●	●	●
N. Mariana Islands												●	▼	▼				●	●	●	●
Pakistan	●	■	▲			■	▲	▼	■	■	▲	●	●	▼	●	▼	▼	●	●	●	▲
Palau			●		●	▼	●	●	●	●		●	●	●	●	●	●	■	▼	●	▼
Papua New Guinea				▲	▼	▼	▲		■	■	▼	●	●	▼	●	●	●	▼	▼	▼	▼
Philippines	▲	▼	▲	▼	●	●	●	●	●	●	▲	●	●	▼	●	▼	●	▼	■	▲	■
Republic of Korea			●	●	●	●	●	●	●	●	▲	●	●	▼	●	▼	●	●			
Russian Federation	●		▲			●	●	●	●	●	▼	●	●	▲	●	●	●	●	■	▼	▼
Samoa			▲	▲	●	●	●	▼	●	●		●	●	●	●	▼	●	▼	▼	●	●
Singapore									●	●	▲	●	●	▲	●	●	●	●		●	
Solomon Islands			●			●	▲		■	●		●	●	▼	●	●	●			●	
Sri Lanka	▲		●			●	●		●	●	▲	●	●	▼	●	▼	●	●	▲	●	●
Tajikistan	●		●		▼	●	▼	▼	■	■	▲	▼	▼	▲	●	●	●				
Thailand	●					●	●	●	●	●	▲	●	●	▼	●	▼	●	●	●	●	●
Timor-Leste		▼							▲	▲		●	●	▼	▲	●					
Tonga			●		●	▼	●	●	●	●		●	▼	▲	●	▼	●	●	●	●	●
Turkey	●	●	▼	▼	▼	▲	▼	▲	●	●		●	●	●	●	▼	●	●	●	●	●
Turkmenistan	●								▼	▼		●	●	▲	●	▼	●				
Tuvalu				▼	●	●			■	▲		●	●	▲	▲		●	▲	▲	●	▲
Uzbekistan	●				●	●	●	▼	■	■	▼	▼	▼	●	●	●	●	▼	▼	●	▲
Vanuatu			▲		▲	●	▼	▼	●	●		●	●	▲	■	▼	▲	▼	▼		
Viet Nam	●	●	▼	▲	●	▼	●	■	●	●	▼	●	●	●	●	▼	●	●	●	●	▼
Asia Pacific	▲	▲	▲	▲	▲	▲	▲	▲	▲	■	▼	●	●	●	●	●	●	▼	▲	■	▲
LDCs	■	■	▼	■	▲	▲	▲	■	■	■	●	●	●	▼	●	▼	●	▲	▲	▲	▲
South Asia (excl India)	▲	■	▲	▼	▼	▲	▲	▼	■	■	▲	●	●	▼	●	▼	●	▲	▲	▲	▲
CIS in Asia	●		▲		●	●	●	▲	■	■	▼	▼	▼	●	●	●	●	●	▼	■	■
Pacific Islands			▲	▲	■	▼	▲	●	■	■	▼	●	●	▼	●	●	●	▼	■	▼	▼

Questions To Think About

1. What are the key MDG goals that your country has achieved?
2. Which MDG targets is your country close to meeting?
3. Which targets is your country not likely to meet? Why?

The reasons for the wide divergence in the performance of different countries in Asia Pacific with respect to achieving the MDG goals by 2015 are as varied as the countries themselves. In general, there is need for greater public investment in education and health. For example, public expenditure on education is still very low in South Asia and until recently, public sector investment in health was virtually non-existent in Afghanistan. Many countries receive very little international aid especially because donors are increasingly taking account of aid effectiveness in allocating their assistance.

On the other hand, it is difficult to correlate social outcomes with public expenditures because the relationship is often influenced by many other social factors. Some countries rank very high on education levels but low on poverty. Others have high growth rates but have large intra-country disparities. Hence the need to be careful when considering common indicators of human development such as life expectancy at birth, adult literacy rates and gross enrolment ratio to analyse levels of development and progress on the MDGs.

What is clear from regional progress reports is that much remains to be done if governments in the region are serious about delivering on the MDGs. What is also clear is that in addition to the need to increase investments in social sectors, there is a parallel need to invest in good governance practices and to deploy various strategies to accelerate progress toward these goals.

The final report of the United Nations Millennium Project[4] identifies four overarching reasons why the MDGs may not be met: poor governance, corruption, poor policy choices and the denial of human rights. Sometimes being poor is itself a problem: some local and national governments are too poor to make the necessary investments. Nevertheless, world leaders have committed themselves and their countries "to spare no effort to free our fellow men, women and children from the abject and dehumanizing conditions of extreme poverty."[5] All national constitutions also declare their commitment to providing all citizens a life of dignity free of poverty. Although the process of evolutionary change is slow, governments are committed to telescoping the change of centuries into a small, intensive period of 15 years (from 2000 to 2015).

This is where the role of ICTs becomes important — as tools that governments can deploy in their poverty reduction programmes to accelerate growth. Indeed, within the last 10 years, the ability to effectively use computers and the Internet has become a key driver of the rapid development of several Asian countries. ICTs can be used to provide improved and equitable delivery of services, to facilitate complex planning processes and coordination across sectors, and to enable increased information sharing, outreach and monitoring of key efforts. Implementation problems have dogged efforts in key social sectors in developing countries. But when ICTs are used to facilitate integrated approaches and cost-effective scalable solutions, the total implementation and operational costs are likely to be lower.

4 UN Millennium Project, *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals* (New York: UNDP, 2005), http://www.unmillenniumproject.org/reports/fullreport.htm.

5 United Nations, *Report of the Secretary-General on the work of the Organization* (New York: United Nations, 2006), 4, http://mdgs.un.org/unsd/mdg/Resources/Static/Products/SGReports/61_1/a_61_1_e.pdf.

Recognizing this, countries in the region have indicated their desire to harness ICTs for development. Some promising areas for ICT integration are the delivery of lifesaving drugs, scaling up of access to education and improving teacher training, supplementing rural extension by providing a direct link to farming communities, and creating early warning and disaster mitigation systems for geographically sensitive locations. In light of these, it is not an exaggeration to say that the achievement of the MDG targets is inextricably linked to the use of ICTs and, for this reason, an understanding of these technologies is imperative.

To sum up

- Progress on the achievement of the MDG targets is uneven. While there are some visible and widespread gains and Asia Pacific is doing better than Sub Saharan Africa, the LDCs still have the region's highest rates of child and maternal mortality, the incidence of tuberculosis and HIV/AIDS continues to rise, and the region is regressing in environmental sustainability. There are huge data gaps in the Pacific region and great intra-country disparities for example in China and India.
- There is a need for greater public investment in education and health.
- Poor governance, poor policy choices, corruption and denial of human rights are factors impeding rapid progress.
- ICTs can be used to facilitate integrated approaches and cost-effective scalable solutions in key sectors of development, such as poverty reduction, education, health care, natural resource management and disaster management.

What is now required is to move from the 'know how' of ICTs to the 'do how' — in other words, to move toward a greater understanding of the nature of the ICTs and the conditions and contexts that will help in the optimum utilization of these strategic tools.

2.2 ICTs: What they are and what they can do

Definitions of ICTs vary widely depending on contexts and conditions of use. For this discussion, we adopt the definition provided by the United Nations Development Programme (UNDP):

> ICTs are basically information handling tools — a varied set of goods, applications, and services that are used to produce, store, process, distribute and exchange information. They include the "old" ICTs of radio, television and telephone, and the "new" ICTs of computers, satellites and wireless technology and the Internet. These different tools are now able to work together, and combine to form our "networked world", a massive infrastructure of interconnected telephone services, standardized computer hardware, the Internet, radio and television, which reaches into every corner of the globe.[6]

ICTs can be broadly classified into analog and digital, synchronous and asynchronous. Analog data is received in a continuous stream while digital information reads analog data using only ones and zeros. The older broadcast television and radio, as well as videocassette recorders,

6 UNDP Evaluation Office,*Information Communications Technology for Development, UNDP Essentials: Synthesis of Lessons Learned* (New York: UNDP, 2001), 2.

were analog devices. But these media are fast becoming digital and so can easily be used with other digital devices such as DVD players. Computers can only handle digital data, which is why most information today is stored digitally. Table 2 indicates the different ICTs currently in use in the world.

Table 2. Classification of ICTs in current use

Synchronous ICTs (requires providers and users to be together at the 'same time' while allowing for 'different places')	**Asynchronous ICTs** (allows for providers and users to be at 'different times' and 'different places')
Audio-graphics Computer conferencing (synchronous) Electronic blackboard Radio Satellites Tele-classrooms Tele-conferencing Television Broadcast - radio - cable Telephony	Computer-based learning Computer conferencing (asynchronous) Computer file transfer Correspondence materials Electronic bulletin boards E-mail Facsimile Multimedia products such as CD-ROMS Web-based technologies (e.g. websites) Tele-CAI Video-cassette, disc

Strengths and weaknesses

Both the old and new digital technologies promote individualization of use and can serve multiple needs, functions and user groups. But there are major differences in their capabilities. A wise choice depends on an understanding of their strengths and limitations as illustrated in Table 3.

Table 3. Strengths and weaknesses of different ICTs

ICT	Strengths	Weaknesses
Print technologies	• Familiarity • Reusable • Can provide depth • Allow economies of scale • Allow uniform content and standards	• Limited by literacy • Static in time • Updating is difficult • Passive, one-way technology with little or no interactivity
Broadcast Analog Technologies (Radio and TV)	• Familiarity • Speed of delivery • Provides vicarious experience • Allow economies of scale • Uniform content and standards possible • Ease of use	• Limited access • Static in time, synchronous • Updating is difficult • Not problem- or location-specific • Passive, little or no interactivity • One-size-fits-all content for all groups of people • High start-up, production, and distribution costs
Digital (Computer and Internet-based) Technologies	• Interactive • Low per unit cost • Allow economies of scale • Uniform content and standards possible • Can be updated easily • Problem- and location-specific • User-friendly	• Limited access still • High development costs • Dependent on capacity of providers • Computer literacy essential for use • Lack of local content

In earlier decades, the use of the older technologies (i.e. analog radio and television) in support of development efforts was extensive. Potential reach and ease of access were the main drivers for using radio and television, and donor and technical assistance agencies supported the exploitation of these technologies. Examples abound. One of the oldest successful applications in Asia Pacific is the use of satellite-based radio and television for education at the University of the South Pacific. Other oft-quoted examples include the Radio Rural Forum in the 1950s, the SITE experiment in India in 1975-76, China's Radio and Television University and Mexico's Telesecundaria.

Although the specific goals and strategies adopted were determined by local needs and conditions, these ICT-supported projects followed a familiar pattern. The countries used the latest technology of the day to transcend barriers of distance, poor infrastructure, lack of schools and colleges, and illiteracy. Each country made major investments in the creation of national and international technology grids, enabling the delivery of content. Each made investments in content development, with content specialists, teachers, producers and researchers coming together in interdisciplinary teams to develop educational materials that would be relevant to national priorities and sociocultural contexts.

While enjoying a measure of success, these programmes have faced a number of issues and challenges. These include the challenge of how to reduce the rigidity imposed by a synchronous model (in particular, the built-in inflexibility of television scheduling) and how to create a pedagogically sound balance between the visual power of televized images,

demanding and intellectually stimulating learning activities that require reading and research, and motivating learners to undertake hands-on activities. In addition, these programmes have had to address the issues of centralized planning and deployment versus ensuring local relevance and meeting regional needs and demands. All of them have had to face daunting the challenges of access, equity and interactivity. Moreover, they have been overtaken to some extent by technological developments emerging out of the digital revolution. Even with decreasing costs of technology, upgrading and replacement of obsolete equipment has been a constant headache.

Today, all large-scale ICT-supported education efforts use digital technologies to enhance access while promoting interactivity between learners and between learners and teachers, at lower costs. As shown by the comparison of strengths and weaknesses of older analogue and newer digital ICTs (Table 3), the latter have a definite comparative edge as information tools. For this reason, their use in efforts to meet the MDGs should be explored.

Various studies conducted on the use of ICTs in development have documented both successes and failures. The studies reveal the tremendous diversity of experience in policy, planning, design, technology deployment and use in different national contexts. But it is equally obvious from these studies that compared to the older ICTs, the digital ICTs are transformationally different. With the older technologies such as print, radio and television, the shaping, production and regulation of content and the delivery methodologies remained centralized and one-way. The new digital ICTs are potentially more open and can be owned and operated by an individual or social group — i.e. ownership has shifted to the hands of the person handling the remote control or the mouse or the mobile phone. The use of technology is in terms of one's own needs and wants and in terms of one's own private space. This leads to diversity in both form and content, and the possibility of localization in terms of language, culture, design, content and use.

A major driver propelling the use of digital technologies is convergence. Convergence means the coming together in a seamless way of telecommunications technology with all media, text, audio, graphics, animation and video such that all are delivered on a common platform while also allowing the user to choose any combination of media to interact with. It also means the connectivity and networking of all of these different technologies in such a way that it is sometimes difficult to distinguish one from the other: the same telecommunication tool — i.e. the mobile phone — can be the delivery channel for text, audio, video, e-mail, SMS and Internet browsing, from point to point (sender to receiver), from one point of origin to many points of reception, and from multiple points to any number of receivers.

Convergence has enabled content providers to create and supply knowledge products in such a way that there are 'multiple outputs from a single process' — information and knowledge can be produced and provided electronically as data, graphics, audio, video both separately and together. This convergence of technologies simplifies production and diversifies distribution, thereby addressing one of the major weaknesses of old analog technologies.

To sum up

- Both old and new ICTs are important tools in development work.
- However, there is increasing use of digital technologies.
- Use of the new digital technologies has the advantage of diffused and dispersed democratic production and ownership enabled by technology convergence.

Something To Do

Form small groups of three or four members each and discuss in your group which combination of ICTs (you can include old and new ICTs) will be most useful for delivering services to, and fostering greater social participation among, the following population groups (choose one group only):

a. Farmers
b. Rural women
c. Children in remote villages
d. Out-of-school youth

Briefly identify the service or services that you think should be delivered (e.g. health care, education, access to knowledge resources), and explain the reasons for your choice of ICTs to deliver this/these service/s to your chosen population group.

2.3 Bridging the Digital Divide

Before proceeding further, it is essential to take a close look at existing regional and national statistics on teledensity and ICT penetration in the Asia Pacific region.

Table 4. Teledensity in selected least developed countries of the Asia Pacific region

	Country	HDI[a] rank 2007	Telephone lines (per 1,000 people) 2005	Mobile subscribers (per 1,000 people) 2005	Internet users (per 1,000 people) 2005
Land-locked LDCs	Afghanistan	N.A.	N.A.	N.A.	N.A.
	Bhutan	133	51	59	39
	Lao PDR	130	13	108	4
	Nepal	142	17	9	4
LDCs that are not land-locked	Bangladesh	140	8	63	3
	Cambodia	131	3#	75	3*
	Maldives	100	98	466	59*
	Myanmar	132	9	4	2
	Solomon Islands	129	16	13	8
	Timor-Leste	145	11*	4	23
Land-locked countries that are not LDCs	Armenia	83	192*	106	53
	Azerbaijan	98	130	267	81
	Tajikistan	122	39#	41	1*
	Kazakhstan	73	167*	327	27*
	Kyrgyzstan	116	85	105	54
	Mongolia	114	61	218	105
	Turkmenistan	109	80#	11*	8*
	Uzbekistan	113	67#	28	34*
Other regions	Developing countries		132	229	86
	Least developed countries		9	48	12
	OECD		441	785	445
	World		180	341	136

* Data from 2004 # Data from 2003
Source: UNDP, *Human Development Report 2007/2008 - Fighting climate change: Human solidarity in a divided world* (New York: UNDP, 2007), 273-276, http://hdr.undp.org/en/media/HDR_20072008_EN_Complete.pdf

The Asia Pacific region represents a broad spectrum of telecommunications infrastructure development, with teledensity rates (the number of phone lines per 100 people) ranging from a high of 53 per cent in Hong Kong to rates of less than 1 per cent in several South-East Asian nations (e.g. Bangladesh and Cambodia).

According to ESCAP:

> In the landlocked LDCs (Afghanistan is excluded for lack of data), the number of fixed telephone lines per 100 inhabitants increased by 15.03 per cent from 1998 to 2003. Bhutan has significantly more fixed lines than Nepal and three times more than the fixed lines of the Lao PDR. These three landlocked LDCs have had a higher increase in fixed lines than the LDCs on average. Bangladesh and Cambodia have teledensity rates lower than one per cent, which is very low compared with the rest of the region.
>
> In the Solomon Islands, the situation worsened from 1998 to 2003 with a decrease of seven per cent. The average increase here is 4.6 per cent, with an average teledensity of 3.27 per cent. This is higher than the three landlocked LDCs with an average of 2.08 mainly because of very low penetration in Nepal and the Lao PDR. Maldives stands out positively with a penetration rate of 10.2 and an increase of 7.2 per cent from 1998 to 2003.
>
> The teledensity of landlocked countries which are not LDCs is significantly higher than that of the LDCs, with an average of 8.79 in 2003. Armenia, Azerbaijan and Kazakhstan have a relatively high teledensity of around 13.0 per cent while Tajikistan has the lowest rate — 3.7 per cent, which is lower than the rates of Maldives and Samoa, both LDCs. Both Kyrgyzstan and Turkmenistan saw a decrease, resulting in a low average increase for the entire group of 1.8 per cent from 1998 to 2003. This is also low compared with the world average, which increased 5.2 per cent in the same period.[7]

Figures on the penetration of mobile phones are more promising.[8] The region can boast of the fastest growing mobile market in China and India, high penetration rates in most of Central Asia, and pioneering initiatives in Bangladesh. Afghanistan, which has very low teledensity figures otherwise, has a mobile penetration rate of 15 per cent (as of May 2007).

With respect to Internet usage (see Table 5), Asia, which has more than two thirds of the world's population, accounts for one third of global usage. Most of this usage is concentrated in the developed countries of Asia, such as Japan, Malaysia, Republic of Korea and Singapore. Oceania's Internet usage is even poorer, at two per cent of global usage, of which Australia and New Zealand account for 96 per cent. None of the ESCAP high-priority countries has an Internet penetration in double-digit figures. The implication of these statistics is that there is a critical need to first create infrastructure and provide connectivity at affordable rates if ICT initiatives are to be scaled up and country-wide provision is to be planned and executed.

7 ESCAP, "Information, Communication and Space Technology for Meeting Development Challenges," United Nations Economic and Social Council, Seventh Session, Bangkok, Thailand, 10-11 May 2005, 7, http://www.unescap.org/LDCCU/SB7_Item%205.doc.

8 Wikipedia, "List of mobile network operators of the Asia Pacific region," Wikimedia Foundation, Inc., http://en.wikipedia.org/wiki/List_of_mobile_network_operators_of_the_Asia_Pacific_region.

Table 5. Internet penetration and usage in the Asia Pacific region

Country	Population (2007 Est)	Internet Users (Year 2000)	Internet Users, Latest Data	Pene-tration	% of users in Asia	User Growth (00-07)
South Asia						
Bangladesh	137,493,990	100,000	450,000	0.3%	0.1%	350.0%
Bhutan	812,814	500	30,000	3.7%	0.0%	5,900.0%
India	1,129,667,528	5,000,000	60,000,000	5.3%	13.1%	1,100.0%
Maldives	303,732	6,000	20,100	6.6%	0.0%	235.0%
Myanmar	54,821,470	1,000	300,000	0.5%	0.1%	29,000.0%
Nepal	25,874,519	50,000	249,400	1.0%	0.1%	398.0%
Pakistan	167,806,831	133,900	12,000,000	7.2%	2.6%	8861.9%
Sri Lanka	19,796,874	121,500	428,000	2.2%	0.1%	
South-East Asia						
Brunei	403,500	30,000	165,600	41.0%	0.0%	452.0%
Cambodia	15,507,538	6,000	44,000	0.3%	0.0%	633.3%
Indonesia	224,481,720	2,000,000	20,000,000	8.9%	4.4%	900%
Lao PDR	5,826,271	6,000	25,000	0.4%	0.0%	316.7%
Malaysia	28,294,120	3,700,000	14,904,000	52.7%	3.2%	302.8%
Philippines	87,236,532	2,000,000	14,000,000	16.0%	3.0%	600.0%
Singapore	3,654,103	1,200,000	2,421,800	12.6%	1.8%	268.1%
Timor-Leste	958,662	-	1,000	0.1%	0.0%	0.0%
Viet Nam	85,031,436	200,000	17,220,812	20.3%	3.7%	8,510.4%
Central Asia						
Afghanistan	27,089,593	1,000	535,000	2.0%	0.1%	53,400.0%
Armenia	2,950,260	1,000	535,000	2.0%	0.0%	476.0%
Azerbaijan	8,448,260	12,000	829,100	9.8%	0.2%	6,809.2%
Georgia	4,389,004	20,000	332,000	7.6%	0.1%	1,560.0%
Kazakhstan	14,653,998	70,000	1,247,000	8.5%	0.3%	1,689.4%
Kyrgyzstan	5,436,608	51,600	298,100	5.5%	0.1%	477.7%
Mongolia	2,601,641	30,000	268,300	10.3%	0.1%	794.3%
Tajikistan	6,886,825	2,000	19,500	0.3%	0.0%	875.0%
Turkmenistan	6,886,825	2,000	64,800	0.9%	0.0%	3,140.%
Uzbekistan	26,607,252	7,500	1,745,000	6.6%	0.4%	23,166.7%
East Asia						
China	1,317,431,495	22,500,000	162,000,000	12.3%	35.3%	620.0%
Hong Kong*	7,150,254	2,283,000	4,878,713	68.2%	1.1%	113.7%
Japan	128,646,345	47,080,000	87,540,000	68%	19.1%	85.9%
Korea, DPR of	23,510,379	--	--	--	--	0.0%
Korea, Republic of	51,300,000	19,040,000	34,120,000	66.5%	3.2%	131.6%
Macao*	500,631	60,000	201,000	40.1%	0.0%	235.0%
Taiwan	23,001,442	6,260,000	14,500,000	63.0%	3.2%	131.6%

(continues..)

Table 5. Internet penetration and usage in the Asia Pacific region (continued)

Country	Population (2007 Est)	Internet Users (Year 2000)	Internet Users, Latest Data	Pene-tration	% of users in Asia	User Growth (00-07)
Pacific Region						
American Samoa	57,663	1.6 %	--	--	--	0.0 %
Antarctica	1,446	0.0 %	--	--	--	0.0 %
Australia	20,434,176	60.9 %	15,504,532	75.9 %	80.9 %	134.9 %
Australia, Ext. Ter.	3,750	5.6 %	--	--	--	0.0 %
Christmas Island	1,493	0.0 %	464	31.1 %	0.0 %	0.0 %
Cocos (Keeling) Is.	618	0.0 %	--	--	--	0.0 %
Cook Islands	21,750	0.1 %	3,600	16.6 %	0.0 %	0.0 %
Fiji	0918,675	02.7 %	80,000	8.7 %	0.4 %	966.7 %
French Polynesia	278,963	0.8 %	65,000	23.3 %	0.3 %	712.5 %
Guam	169,879	0.5 %	79,000	46.5 %	0.4 %	1,480.0 %
Kiribati	93,565	0.3 %	2,000	2.1 %	0.0 %	100.0 %
Marshall Islands	55,449	0.2 %	2,200	4.0 %	0.0 %	340.0 %
Micronesia	110,064	0.3 %	16,000	14.5 %	0.1 %	700.0 %
Nauru	11,424	0.0 %	300	2.6 %	0.0 %	0.0 %
New Caledonia	243,233	0.7 %	80,000	32.9 %	0.4 %	233.3 %
New Zealand	4,274,588	12.4 %	3,200,000	74.9 %	16.8 %	285.5 %
Niue	1,722	0.0 %	450	26.1 %	0.0 %	0.0 %
Norfolk Island	1,673	0.0 %	700	41.8 %	0.0 %	0.0 %
Northern Marianas	84,228	0.2 %	10,000	11.9 %	0.1 %	0.0 %
Palau	21,897	0.1 %	--	--	--	0.0 %
Papau New Guinea	6,157,888	17.9 %	170,000	2.8 %	0.9 %	25.9 %
Pitcairn Islands	46	0.0 %	-	-	-	0.0 %
Samoa	184,633	0.5 %	8,000	4.3 %	0.0 %	1,500.0%
Smaller Territories (4)	4,397	0.0 %	-	-	-	0.0 %

*Not included in China
Source: Repurposed from Internet World Stats, "Asia Marketing Research, Internet Usage, Population Statistics and Information," Miniwatts Marketing Group, http://www.internetworldstats.com/asia.htm.

The disparities and gaps caused by the uneven growth of telecommunications and ICTs have led to what is currently known as the digital divide.

> The so-called digital divide is actually several gaps in one. There is a technological divide — great gaps in infrastructure. There is a content divide. A lot of web-based information is simply not relevant to the real needs of people. And nearly 70 per cent of the world's websites are in English, at times crowding out local voices and views. There is a gender divide, with women and girls enjoying less access to information technology than men and boys. This can be true of rich and poor countries alike.
>
> *UN Secretary-General Kofi Annan*
> *Statement to the World Summit on the Information Society,*
> *10 December 2003, Geneva, Switzerland.*
> *http://www.itu.int/wsis/geneva/coverage/statements/opening/annan.html*

The term 'digital divide' is used to describe the gap between individuals and societies that have the resources to participate in the knowledge economy and those that do not. Essentially it is a symptom of more profound inequalities in gender, income, development and literacy. As *The Economist* has pointed out, "Fewer people in poor countries than in rich ones own computers and have access to the Internet simply because they are too poor, are illiterate, or have other more pressing concerns, such as food, health care and security."[9] At the same time, the digital divide impacts on the persistence of social inequality. According to Chen and Wellman, "Individuals, social groups and nations on the wrong side of the digital divide can be excluded from the knowledge economy. In other words, if pre-existing inequalities deter people from using computers and the Internet, these inequalities may increase as the Internet becomes more consequential for getting jobs, seeking information and engaging in civic or entrepreneurial activities."[10] Thus, addressing the digital divide is more than simply making information technology available. It is trying to use ICTs to address and narrow gaps in many sectors towards the achievement of the MDGs.

The digital divide will not resolve itself; it cannot be left to technological evolution alone. There has to be an overarching development policy concentrating on strategies for poverty reduction with a clear and enabling national ICTD policy as a precondition to the setting up of infrastructure, institutions and tools that will narrow the digital divide and promote universal access. The strategy of investing solely in ICT infrastructure and neglecting other critical developmental priorities may be counterproductive. Many countries need to address more fundamental constraints to economic development, such as improving the basic infrastructure, opening up markets, breaking telecommunication monopolies, putting in place an effective legal and regulatory system, and providing education for all. Countries that ignore these problems in favour of computerization and Internet access may end up wasting scarce resources as capacity to take advantage of ICT remains undeveloped. In other words, efforts to bridge the digital divide need to be directed toward promoting universal access while creating opportunities for ICT use at the community level.

Something To Do

Identify at least five factors that, in your opinion, are responsible for the digital divide in your country. For each factor, list a strategy through which the divide can be addressed.

Promoting universal access

Given the rapid pace at which ICTs are evolving, governments in poor countries could focus more on channelling their scarce financial and political resources to developing social and human capital, building the basic infrastructure, and creating a level playing field for the private sector. Engaging the private sector can not only speed up infrastructure development but also reduce the heavy burden on the government exchequer, which would help the government concentrate on areas that need public investment the most. In other words, the role of government is to put in place the prerequisites for the ICT sector to flourish.

9 "Technology and development," *The Economist* (10 March 2005), http://www.economist.com/displaystory.cfm?story_id=3742817.

10 Wenhong Chen and Barry Wellman, *Charting and Bridging Digital Divides: Comparing Socio-economic, Gender, Life Stage, and Rural-Urban Internet Access and Use in Eight Countries* (The AMD Global Consumer Advisory Board, 2003), 25, http://www.amd.com/us-en/assets/content_type/DownloadableAssets/FINAL_REPORT_CHARTING_DIGI_DIVIDES.pdf.

Investment in both formal and non-formal education is another priority. International evidence suggests that education is necessary for the achievement of all MDG targets and not just those directly related to education. Access to secondary and higher education enables the development of human resources, which in turn spurs innovation and large-scale growth. In terms of bridging the digital divide, education is important because it provides the skills required for creating, adapting and utilizing ICTs. Indeed, education becomes increasingly important for going beyond basic ICT applications.

A third priority is the creation of physical infrastructure in telecommunication links. Government investment is necessary because connecting the poorest of the poor is not necessarily attractive to the private sector for whom market demand is a key motivator and the high cost of building rural infrastructure is a disincentive. Even assuming that the private sector is not shy of investing in rural infrastructure, the government has to play the role of regulator, establishing standards, creating a level playing field, and promoting more even growth through deregulation.

At the community level, governments can look at opportunities for creating common service facilities and services that can extend reach and provide local access. There are two parallel paths that need to be pursued. At the provider's end, there is need to create portals as dynamic repositories where specific development knowledge is stored and updated. At the user end, creating community telecentres or kiosks can enable easy access to knowledge stored in such portals.

Use of telecentres

Like its predecessors, the community radio set and the community television, the telecentre can be a common village resource — i.e. a facility that will benefit everyone in the village. Telecentres are strategically located facilities providing public access to ICT-based services and applications. Depending on their size and the extent of the services provided, these centres are usually operated by a manager and a small number of staff who may be part-timers or volunteers.

There are many types of telecentres. In some places, telecentres may provide simple basic services such as phone calls and fax services, photocopying and printing, typing services, and maybe some bookkeeping for very small businesses. These simple telecentres have a lot of potential for successful commercial operations and for evolving into multi-purpose telecentres where a variety of services can be provided.

Some telecentres are cybercafés where a person can go and access the Internet. These also have a very good potential for developing into multi-purpose telecentres providing valuable community service while also being commercially successful.

In other places telecentres may be 'info-shops' where a person can go and access information for a price (e.g. agri-clinics for agriculture information). e-Choupal in India is one such effort funded by a private company. Some of these centres are small institutes providing training in computer and word processing while also providing access to the Internet.

Other telecentres provide government services, including access to government information such as property records and payment facilities for taxes and bills. These e-government facilities in villages can save a lot of time, money and energy for villagers while also being commercially viable for the telecentre operator.[11] An example of this type of telecentre is the Internet Information Centre in Mongolia. There are four such centres covering four provinces.

11 Usha Vyasulu Reddi, *Training Commons Modules Introductory Booklet* (Ottawa: IDRC, 2008). See also http://www.telecentre.org for a wealth of resources on telecentres around the world.

Internet Information Centres, Mongolia

The project covers four provinces — Erdenet, Khovd, Dornod, and Umnugovi in the north, west, east and south of Mongolia, respectively. The telecentres, which are known as Public Internet Centres (PICs), provide the following facilities and services to members and customers: six PCs, modems and related equipment; dial-up access with six ports; Internet access; e-mail; fax service; Web hosting and design; and local telephone service. The telecentres in Erdenet and Dornod provinces are connected to the Internet via a very small aperture terminal (VSAT) satellite system at a speed of up to 64Kbps.

As required by the project sponsors, the PICs provide free Internet connection to secondary schools, local government offices and non-governmental organizations (NGOs). Secondary schools and local government offices are connected through radio modems. Business users are charged for Internet access.

The local library is one of the members of the PIC's Board of Management. The PICs also work closely with local government offices which provide the PIC premises.

Electricity, connectivity, language and PC penetration have posed problems. Nevertheless, reliable and well-managed telecentre operations have been established. This in turn has alerted the concerned communities to the potential of the Internet for development. Although the predominant use to date is for literacy training and communication, there is also some evidence that the PICs are being used to achieve community-based developmental outcomes.

Source: Adapted from Harris, Roger, "Telecentres in Rural Asia: Towards a Success Model" (Paper presented at the International Conference on Information Technology, Communications and Development, 29-30 November 2001, in Kathmandu, Nepal), http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan006304.pdf.

Questions To Think About

Would a telecentre such as the Mongolian PICs be relevant for your own country? Why or why not?

A word of caution about telecentres: They seem simple but like all things simple, it is only when many aspects come together that they are successful. There are many examples of both success and failure in telecentres. Many of the failed models are in the developing countries. Failure is often due to lack of 'know-how' and 'do-how' about:

- Financing and sustainability – There is often lack of knowledge and skill in raising resources, marketing and business planning, and pricing.
- Ownership and operating models – There is lack of knowledge and skill in how to set up and operate a telecentre as a useful community resource.
- Human resources – Many telecentre managers and staff are not properly paid for their work. The centres typically rely on volunteers. Both factors lead to difficulties in motivating and retaining staff.

- Training and capacity building – Managers and staff are often untrained in advanced operations. They struggle with the different aspects of managing a telecentre while at the same time learning about entrepreneurship and marketing, community mobilization, and information and communication.[12]

The successful cases, on the other hand, prove that when the conditions that spell the difference between success and failure are taken into account, telecentres and local efforts to build websites and portals may be a viable option for bridging the digital divide. Small community-based telecentres have been successful in both large and small, isolated countries. Australia and Canada, for example, have linked their remote communities to government services through 'telecottages' and similar kiosks. For small island, landlocked and mountainous countries with dispersed and remote populations, telecentres could prove to be a suitable strategy for ICT-supported development.

Something To Do

Identify a location in your country for a pilot project to set up a telecentre. Decide what kind of telecentre to set up, what facilities and services the telecentre will provide, and what model should be adopted to make it financially sustainable and relevant for the community.

Achieving connectivity for small island, land-locked and mountainous countries

Small island, landlocked and mountainous countries have some key characteristics in common. The first is that they have small populations and, consequently, small economies, small markets and limited human and technical resources. In some cases, they also have limited natural resources. Second, they all have problems of great distances: the small island states have oceans of water separating islands while the mountainous countries have impassable mountains. All have remote populations, mostly underserved. And all have transport and communications problems, with poor telecommunications systems. Third, all of these countries are vulnerable to the forces of nature on the one hand, and the winds of globalization, liberalization and privatization sweeping the world on the other. Some of these countries are surrounded by economically and politically powerful neighbours and few are free from ethnic conflicts that threaten to destroy whatever small gains have been made over many decades of development.

The island states have a greater vulnerability to environmental disasters such as the rising seas; livelihood depletion from resource loss due to rising salinity, water contamination, oil spills and nuclear contamination; imported health hazards such as malaria and the flu; and technological hazards such as satellite and cable failure. Landlocked and mountainous countries also have special problems, among these subsistence agriculture, isolation, earthquakes, landslips and other such disasters.

12 Raul Roman & Royal D. Colle, *Themes and Issues in Telecentre Sustainability*, Development Informatics, Paper no. 10 (Manchester: Institute for Development Policy and Management, University of Manchester, 2002), http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/di_wp10.htm.

There is no one solution to the challenges posed by geographic location, and conventional methods may not apply. Out-of-the-box solutions are needed, as are regional partnerships. The Small Island Developing States Network (SIDSNet), which applies the principles of cooperation and convergence of opportunities, interests and technologies, demonstrates this.

Small Island Developing States Network

SIDSNet was established in 1997 as a direct follow-up to the 1994 Barbados Programme of Action (BPoA). Its primary goal is to support the sustainable development of SIDS through enhanced ICT.

SIDSNet responds to several critical challenges faced by small islands, namely, (1) remoteness, isolation and geographic dispersion; (2) poor connectivity and data management; (3) limited human and technological capacity; and (4) the need for greater international recognition and assistance in reducing the economic and environmental vulnerability of SIDS. It does so by using ICTs to link remote and isolated SIDS to facilitate the sharing of technical expertise, education and knowledge for improving welfare and reducing poverty through innovation, expanded national capacity, and better use of scarce resources.

Through the SIDSNet website, affiliated countries can maintain contact with each other to share information on best practices in priority areas such as health, conservation, education, freshwater and sanitation, tourism, and human resource development. The network also seeks to facilitate the virtual exchange of expertise through the SIDS Technical Assistance Programme, which is an online roster of experts. SIDSNET has also been proposed for use as the portal to and home for the University Consortium of the Small Island States, which was endorsed at the 2005 Mauritius International Meeting.

SIDSnet is a strong advocate for improving Internet awareness and infrastructure. In the area of capacity building, it serves as a medium for South-South and SIDS-SIDS collaboration and technology transfer. In the area of cooperation and knowledge sharing, SIDSNet boosts connectivity and communication by registering users in an in-house e-mail system and chat rooms where information can be exchanged and experts contacted. SIDSNet also provides a calendar of upcoming activities and events, allowing governments to strategically deploy limited personnel. SIDSNet strengthens research and data management by serving as a database for island publications, academic research, UN resolutions and decisions, development indicators, and national and regional statistics. Finally, SIDSNet builds awareness of the central challenges encumbering island development, thereby raising the profile of SIDS in the international policy circles that influence the flow of financial resources and technical assistance.

Source: Adapted from SIDSNet, “About SIDSNet,” Division for Sustainable Development of the United Nations, http://www.sidsnet.org/5.html.

Questions To Think About

Could an initiative like SIDSNet work for the landlocked countries of Central Asia? What would be the key elements of such a partnership?

While some ICT-supported initiatives require extensive government policy intervention, it is possible to achieve dramatic results through community action alone. The Nangi Village Project in Nepal is a case in point.

Wood and Cyber: The Nangi Village Project in Nepal

Nangi is a mountain village of 800 inhabitants at 7,300 feet elevation in western Nepal, near the Annapurna and Dhaulagiri ranges of the Himalayas. The hike into Nangi takes six to nine hours from the nearest large town, Beni, and includes an ascent through several mountain villages and forests. Nangi has no factories. Its inhabitants are farmers whose tools are wooden plows, iron spades, axes, sickles, chisels and hammers. No machinery or automated tools are available.

About 10 years ago, under the leadership of Mahabir Pun, a village school teacher, Nangi embarked on an effort to take advantage of the Internet. Initially computers were built in wooden boxes, a small hydro-powered generator was developed, and connectivity was established through a robust Wi-Fi network connecting four other villages and the Internet hub in Pokhara, a large city about 22 miles away from the nearest relay station. A dozen access points were connected to the dial-up ISP in Pokhara using donations and equipment supplied at cost price by manufacturers.

Over the past 11 years, Pun and the villagers have constructed a secondary school (with a library), a plant nursery, a health clinic with a telemedicine video link to Pokhara, a carpentry facility, paper-making and sewing machine workshops, a camping ground for trekkers (which includes e-mail capability), a fish farm and a yak farm. The computer lab consists of donated equipment from many sources.

The availability of links to the outside world has made it possible for Nangi to have a rudimentary telemedicine system, interact with villagers in other locations, improve agriculture and teach the children the use of computers.

The usual assumption is that connectivity and access problems in developing countries require large investments in infrastructure usually by government or a donor agency. The Nangi Village School Project demonstrates that local low-cost initiatives can make a major difference. Micro projects like Nangi succeed because they address local problems and realities with local solutions brought together by a local catalyst or change agent.

Source: Adapted from Ruth, Stephen and Jiwan Giri, "Defying the Odds: A Success Story from the Mountains of Nepal," *Information Technology in Developing Countries*, Vol. 17, No. 3, November 2007: 7-10, http://www.iimahd.ernet.in/egov/ifip/nov2007/nov2007.htm.

Questions To Think About

Can an initiative like the Nangi Village Project be scaled up and/or replicated? What is needed for a successful scale up? What factors must be taken into account when considering replication of the project?

To sum up

- The digital divide is the gap between individuals and societies with access to the resources of the Information Age and those without.
- The digital divide is a reflection of economic and social inequalities, including those around income, gender and literacy.
- Addressing the digital divide requires a broad perspective that goes beyond information technology.
- It is necessary to promote universal access by creating physical infrastructure as well as common service facilities, or telecentres, at the community level.
- It is also necessary to create portals as dynamic repositories of information and to build national and regional partnerships to share resources.

This section of the module sought to provide a broad perspective of the linkages between ICTs and MDGs, and to establish that ICTs are critical tools in the strategy to achieve the MDGs. The next section focuses on specific applications of ICTs in different sectors relating to the MDGs.

Test Yourself

Do the following in consecutive order.

1. Collect MDG macro statistics on your country from available sources.
2. Collect ICT penetration statistics on your country from available sources.
3. What do the statistics tell you about strengths, weaknesses, opportunities and threats in the application of ICTs as tools in accelerating development? Can ICTs be used to accelerate development? Analyse critically what can be done in terms of national policy.
4. Identify who/which agency or inter-agency group will make the policy for ICT-supported development in your country/region.
5. What will it take to put the policy in place? Set down a set of tasks and time frames.

3. APPLICATIONS OF ICTS IN DEVELOPMENT

This section aims to:
- **Describe ICT applications in different sectors particularly those directly concerned with the MDGs; and**
- **Identify principles of good practice from select case studies of ICT application in priority development sectors.**

ICTs, by their very nature, are cross-cutting and their application may be multisectoral and multi-pronged. For instance, while ICT deployment for poverty reduction may focus on providing income-generating opportunities, it can also help bring women into the mainstream of economic activity, thus addressing a parallel development goal. However, for purposes of discussion, this section describes the various applications of ICT with special reference to their role in helping achieve a specific development goal or target. The goals are segmented into sectors of development.

It merits mention here that there are two approaches to the deployment of ICTs. One is **direct** and targets the ultimate beneficiaries and uses ICTs to directly link them with the service providers. The second is **indirect** and supportive — i.e. it targets the development of policies, infrastructure, support systems and content, which in turn is expected to benefit the ultimate beneficiaries. Both approaches are critical to the achievement of development goals, but each has a different design at the policy and implementation levels. An effort will be made to look at both types of interventions but within the context of the individual MDG sectors.

3.1 ICTs and Poverty Reduction

Goal #1 - Eradicate Extreme Poverty and Hunger

Target 1: Halve, between 1990 and 2005, the proportion of people whose income is less than one dollar a day.

Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger.

ICTs have an important role in spurring economic growth, which in turn impacts on poverty reduction. Countries that have high levels of economic development also have high ICT penetration rates. There is evidence that business and industry have benefited the most from the information revolution. ICT infrastructure and human resources development have given

rise to high growth rates in countries like India and China, transforming them into powerful economies in the information society.

The transforming impact of ICTs has been most visible in the small and medium enterprise (SME) sector. Using ICTs, small businesses have been able to improve the efficiency of internal business operations by reducing costs associated with internal communications (across internal departments) and external communication with clients; explore new markets, develop a global client base and increase volumes of demand; and improve inventory management, reducing wastage and consequently increasing profits.

Although government investment in communications infrastructure is essential to this kind of economic growth, the best incentives that governments can give SMEs using ICTs to boost productivity are to remove constraints and create an enabling environment through simpler registration and legal requirements, provide business skills education and financing, link SMEs to larger companies and grant tax benefits.

Industry and private sector-led growth supported by ICT has in some cases contributed to poverty reduction. However, the poor have benefited less from this type of development than the non-poor.[13] Governments need to address poverty directly and not just through interventions in the economy to spur growth that it anticipates will eventually benefit the poor.

The faces of poverty are many. These include lack of basic income; lack of access to land, credit and services; a regular experience of hunger; no access to basic education and/or health care, especially for children and mothers; high mortality and low life expectancy; exposure to HIV/AIDS, malaria and tuberculosis; lack of sustainable livelihoods and access to jobs for young people; and increased vulnerability to natural disasters and conflict. For all these, both direct and indirect ICT intervention — i.e. using ICT to deliver services to the poor, and more supportive interventions such as natural resource mapping — are important poverty alleviation strategies.

Thread Net Hunza is an externally funded local initiative in a remote corner of Pakistan to improve access to the global marketplace for local weavers and traders, thereby improving their productivity, income and quality of life. It represents the direct approach where ICTs are used to link the poor to markets.

13 OECD, *Good Practice Paper on ICTs for Economic Growth and Poverty Reduction* (Paris: OECD, 2005), http://www.oecd.org/dataoecd/2/46/35284979.pdf.

Thread Net Hunza, Pakistan

The Karakoram Area Development Organization (KADO) is a not-for-profit local development organization working to improve the socio-economic base and living conditions of the physically and economically isolated rural population of the Hunza valley in Pakistan. KADO has a special focus on women, artisans, small producers, and other disadvantaged groups such as people with special needs. Its work includes:

- Promotion and revival of traditional crafts involving women and other disadvantaged groups;
- Use of information technology for poverty reduction and development in rural areas;
- Revival and promotion of festivals, arts and culture;
- Rehabilitation of people with special needs;
- Building the capacity of local institutions; and
- Addressing environmental issues in Hunza.

KADO has recently supported two village literacy centres that provide training in software applications to rural women. These centres are being run on a cost-recovery basis in partnership with local communities. KADO has also embarked on a handicraft e-commerce initiative in collaboration with the International Development Research Centre (IDRC) Pan Asia Networking to promote local products made by women and disabled artisans. Under its Project on Information and Communication Technology for Development, which is funded by IDRC, KADO also provides Internet services. KADO believes in promoting sustainable livelihoods and eradicating extreme poverty in the remote areas through action research in the application and integration of ICT.

Sources: Adpated from Karakoram Area Development Organization, http://www.kadohunza.org/index.html; and Thread Net Hunza, http://www.threadnethunza.com.pk/index.html.

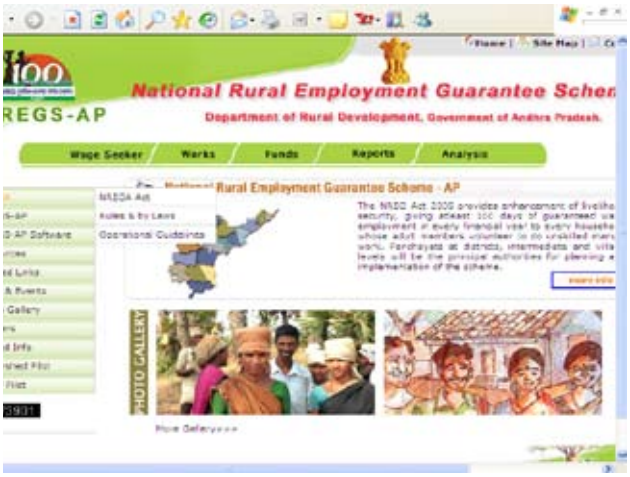
Questions To Think About

Thread Net provides an innovative solution to a local problem. However, it faces many of the problems of small-scale digital interventions, such as sustainability and scalability. How do you think can this project be scaled up and made sustainable?

Equally important for addressing the multidimensional aspects of poverty are the creation of effective ICT-based systems for supporting large public programmes addressing poverty issues. An example is Malaysia's SINAR system, a database on the urban poor that has proven useful to governments and donor agencies in their efforts to provide services for this sector. Another example is the use of ICT applications by the government of the state of Andhra Pradesh, India in support of a commitment to provide the rural poor with employment for at least 100 days annually under India's National Rural Employment Guarantee Act (NREGA).

ICTs and India's National Rural Employment Guarantee Scheme

In the Indian state of Andhra Pradesh, ICTs are being used effectively in the implementation of the National Rural Employment Guarantee Act (NREGA) 2005, which mandates the provision of 100 days of paid employment per year to the rural poor.



NREGA ensures employment for the rural poor through rural infrastructure projects. The programme covers 13,000 villages in 13 districts. Problems in programme implementation include delays in preparation of estimates by the engineers, a tendency to overstate figures, lack of transparency in the preparation of estimates, non-availability of estimates for public scrutiny, and non-availability of estimates in the local language. To address these and other impediments, the government of Andhra Pradesh placed computers in 659 intermediate villages and used specially developed software to generate job cards, reports of estimates, work commencement orders, measurement sheets, pay orders and wage slips. The Web portal created for the programme enables anyone to view details of any aspect of the programme.

Results so far show that more than four million poor people have been issued job cards by which they can seek employment, and more than 500,000 poor people have been provided the mandated employment under the NREGA. Savings accounts for those employed have been opened and direct payments are made into these accounts, eliminating corruption.

Built up against considerable resistance, the system now provides up-to-date information not only to policymakers and project personnel on the ground but also to the poor and the village communities under India's Right to Information Act. With a little help, any poor person can access programme-related information and seek redress for grievances, thereby ensuring social accountability for the government.

Several factors account for the success of the NREGA initiative, among these an enabling policy environment with the appropriate legislation, political will on the part of the state government to implement poverty reduction measures, a partnership between the state government and the IT industry, and ground support systems for effective programme management and monitoring.

Source: Adapted from National Rural Employment Guarantee Scheme - Andhra Pradesh, Department of Rural Development, Government of Andhra Pradesh, http://nrega.ap.gov.in/Nregs/Home_eng.jsp.

Questions To Think About

What do you think are the limitations of the NREGA programme? How do you think can these limitations be addressed?

There are a variety of initiatives throughout Asia[14] that illustrate the use of ICTs to provide vital linkages between rural communities and global markets, and to provide the information necessary to manage poverty alleviation programmes (e.g. poverty mapping using appropriate software). Evidence from these experiments has shown that effective use of ICTs could help small farmers increase their revenues and improve their farming practices by making it possible for them to access information on agricultural know-how and market developments. For example, in Viet Nam, villages such as Bat Trang and Hoi An have created their own websites to market village goods.[15] In India, e-Choupal[16] and the Village Knowledge Centres[17] have succeeded in linking the village poor to external markets. Both initiatives have specifically targeted the needs of the poorest people.

14 See UNDP, "ICT and Poverty and Hunger: Asian Experiences," World Summit on the Information Society, 11 December 2003 in Geneva, Switzerland, http://www.apdip.net/projects/rhdr/news/08012004/poverty.pdf.

15 See UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia: Realising the Millennium Development Goals* (New Delhi: UNDP, Elsevier, 2005), 112, http://www.apdip.net/elibrary#rhdr.

16 See e-Choupal, http://www.itcportal.com/sets/echoupal_frameset.html.

17 See MS Swaminathan Research Foundation, http://www.mssrf.org.

e-Choupal, India

e-Choupal was launched by ITC, a multinational company, to address the challenges posed by the unique features of Indian agriculture, such as fragmented farms, weak infrastructure, and the involvement of numerous intermediaries. The project features a judicious blend of 'click' and mortar capabilities, with village Internet kiosks managed by the farmers (called *sanchalaks*) themselves giving the agricultural community access to local language information on the weather, market prices, scientific farm practices and risk management. The kiosks also help farmers purchase farm inputs and sell farm produce from the farmers' own doorstep, which significantly reduces transaction costs. World-class quality in the delivery of goods and services is ensured through several product- and service-specific partnerships with leaders in the relevant fields, aside from ITC itself.

While the farmers benefit through enhanced farm productivity and higher farm gate prices, ITC benefits from the lower net cost of procurement (despite offering better prices to the farmers) due to the elimination of costs in the supply chain that do not add value.

Launched in June 2000, e-Choupal is now the largest among all Internet-based interventions in rural India. e-Choupal services today reach more than 3.5 million farmers growing a range of crops (soya bean, coffee, wheat, rice, pulses, shrimp) in over 38,500 villages, through nearly 6,500 kiosks across nine states (Madhya Pradesh, Haryana, Uttarakhand, Karnataka, Andhra Pradesh, Uttar Pradesh, Maharashtra, Rajasthan and Kerala).

The problems encountered in setting up and managing these e-Choupals relate primarily to infrastructural inadequacies, including power supply, telecom connectivity and bandwidth. Also a challenge is how to impart skills to first-time Internet users in remote and inaccessible areas of rural India.

Sources: Adapted from OneChoupal, "About e-Choupal," ITC Limited, http://www.echoupal.com; and "e-Choupal: Empowering Indian farmers," ITC Limited, http://www.itcportal.com/rural-development/echoupal.htm.

Questions To Think About

What do you think are the elements of e-Choupal's success? Could a similar project succeed in your country? Why or why not?

As important as providing direct support to farming communities is the building up of agricultural systems, capacity building in research and extension, and skill and knowledge enhancement for government and agricultural officials working toward the MDGs. The globally available Knowledge Networking for Rural Development in Asia/Pacific Region (ENRAP) is one such single window portal that assists both government and agro-based institutions to build up individual and institutional capacities in agricultural research and extension.

Knowledge Networking for Rural Development in the Asia Pacific Region

ENRAP is a collaboration between the International Fund for Agricultural Development (IFAD) and IDRC that is designed to bring the benefits of accessing and sharing global information resources to IFAD-supported rural development projects in the Asia Pacific region. Now on its third phase and running until 2010, ENRAP develops skills in accessing, managing and sharing knowledge relevant to IFAD project objectives and implementation. Potential users of the knowledge sharing system include project staff and their partners who work directly with rural communities and help make the knowledge available at the grass-roots level. The project seeks to foster a culture for knowledge sharing and learning among all of the stakeholders of IFAD projects.

ENRAP investigates strategies, processes, methods and technologies to support rural communication and knowledge networking, and develops recommendations for future activities. It initiates research and development in the area of knowledge networking and Internet applications at the local, national and international levels. Methods and practical solutions fostering participation at the grass-roots level are a special focus. Local electronic newsletters, agricultural market information dissemination and shared electronic libraries are examples of ENRAP-supported activities.

ENRAP includes selected groups of projects in the Asia Pacific region. Other countries not receiving direct assistance from ENRAP can benefit from free training materials, documents and databases available on the ENRAP website (http://www.enrap.org), technical advice and allocation of working space on the ENRAP website. It is expected that in the future all IFAD projects in Asia Pacific will participate in ENRAP activities and contribute to the knowledge sharing system.

Source: Adapted from IDRC, IFAD, "Knowledge Networking for Rural Development in Asia/Pacific Region," http://www.enrap.org/index.php? module=htmlpages&func=display&pid=5.

Questions to Think About

What other global resources and international organizations exist to help develop national agricultural systems? Are you aware of any such organization serving the interests of your country/region?

To sum up

- There is enough evidence to show that there is a direct connection between investment in ICTs and economic productivity.
- The use of ICTs by SMEs has been shown to result in improvements in business practices that reduce communication and transaction costs, assist in inventory management, and provide access to global markets, thereby increasing productivity and profits.
- Although economic growth is not a guarantee of poverty reduction, it is essential for sustaining poverty reduction over the longer term.
- Direct ICT interventions that address poverty reduction link the poor to markets and market information.
- Such interventions can be in the form of government programmes, NGO interventions and corporate social responsibility projects of the private sector.

Something To Do

Look for development projects in your country that specifically target (i) SMEs; and (ii) poor communities (e.g. urban poor communities). Identify the role of ICTs, if any, in these projects.

3.2 ICTs in Education

Goal #2 - Achieve Universal Primary Education

Target 3: Ensure that by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.

The right to education is well recognized as a fundamental right, not least because education is a vital input in eliminating poverty and other forms of inequality in society. However, social and economic inequities have created a situation where a majority of the world's children are denied this fundamental right. For developing countries, the challenge is how to provide quality education for all in the face of overwhelming scarcity of resources, which in the education sector is manifested in severe shortages of classrooms, textbooks and teachers, among others.

ICTs have an important role to play in meeting this challenge. More specifically, ICTs can provide access to schools and educational resources, enhance the quality of teaching and learning, and improve administrative and instructional efficiency (see Table 6).

Table 6. Opportunities and benefits of using ICTs in education

Opportunities	Benefits
Access to high quality learning materials irrespective of location	Learning material developed anywhere accessible anywhere
Connectivity between learners	Collaborative learning
Interactivity	Networked ICTs allow interactivity between learners, teachers and learners
Remove spatial constraints	Distance, isolation is no longer a determinant of quality or cost of learning
Management of learning	Admissions, assessment, and certification can be organized lowering costs of educational management

ICTs can be and have been used to provide access to education for those who, for reasons of poverty, physical disability, geographic location, gender, conflict, occupational commitments or cultural restrictions, are unable to go to school. For example, television and radio have been used in countries like China and Mexico to deliver classroom instruction to children and youth in remote communities. In male-dominated societies, technology has proven to be a cost-effective alternative to all-female schools for educating women and girls. In Bangladesh, India, Pakistan and Sri Lanka, open schools have been experimenting with different ICTs, from the conventional print materials to audio visuals and e-learning, to provide underserved sectors access to primary and secondary education.

National Institute of Open Schooling, India

India's National Institute of Open Schooling (NIOS) delivers basic education, bridge courses and secondary education to more than 1.5 million young people. Special attention is paid to meeting the requirements of first generation learners (i.e. the first generation in a family to benefit from formal schooling); physically, mentally and visually challenged learners; and candidates from disadvantaged sectors of society.

Courses are available in print, audio-visual and online modes. NIOS currently operates through a network of Departments, Regional Centres and Accredited Institutions (Study Centres) in India and abroad. With oversight over a system of state-level open schools, it is the largest open schooling system in the world. The system is poised to help India meet the target of 'universalization of education'.

Source: Adapted from National Institute of Open Schooling, http://www.nios.ac.in.

Something To Do

Search the Web for initiatives, in your country or elsewhere, that are similar to the open schools in South Asia. What do these initiatives have in common? What are their differences? How do they address issues of educational quality?

SchoolNets represent an ICT-supported approach that specifically aims to improve the quality of educational provision in schools. SchoolNets are groups of schools that use ICTs to work together or collaborate to enhance teaching and learning. SchoolNets have been set up in Africa, where collaboration between schools has been both necessary and effective, and in South-East Asia, where the system is actively being supported by international agencies. The emergence of SchoolNets in the Pacific region highlights both the potential and the possible pitfalls that such efforts can have.

A SchoolNet and Community Access Model for the South Pacific

The Samoa SchoolNet and Community Access Project is an initiative of the Government of Samoa, with funding support from the Asian Development Bank, to pilot an appropriate model for introducing ICT in schools and their respective communities.

The project involves establishing in the school a Learning Centre equipped with computers, photocopier, camera, DVD, printer, Internet connection, fax and multimedia projector, among others. Students and teachers use the Learning Centre during school hours. The same facility functions after hours as a business venture catering to community members. This scheme provides financial support to the Learning Centre. Collaboration between the school staff and respective school committees has also been strengthened through this project.

Vaitele Uta Primary School was the first school in Samoa and in the entire South Pacific to be connected as a SchoolNet school. Then Vaimauga College and Lepa/Lotofaga College joined the network. The team has since connected Amoa College and Mataaevave College on Savaii.

The connectivity model is a hybrid design using wireless broadband and dial-up connecting through a data centre. The timely introduction of the new ICT legislation by the Government of Samoa to regulate the communications sector and the issuance of new 3G licenses will only improve ICT services and connectivity. The expansion of the wireless connectivity is particularly significant, as it is relatively inexpensive to install, easily expanded to other parts of the country, and very well suited to the geography of Samoa.

Source: Adapted from Asian Development Bank, “Samoa SchoolNet,” http://www.adb.org/Projects/project.asp?id=36513.

Questions To Think About

What do you think are the benefits of connecting schools to each other, and of connecting schools to the community? How can this strategy help improve access to education, as well as the quality of education provision, in your country?

Because the use of ICTs implies a minimum level of computer literacy, it was initially promoted in the educational sector as a tool to support tertiary education. Distance education in particular has increased accessibility to tertiary education especially in countries with large populations. Today distance education programmes are delivered online, in a mode called e-learning. However, the digital divide limits the reach of these programmes to those who have the finances, infrastructure and expertise for them. To address precisely such a concern, the small states of the Commonwealth, especially those from the Pacific region, have formed an alliance with landlocked states to make a plea for a virtual university that would specifically address their needs while making the best use of technology options. The result is the Virtual University for Small States of the Commonwealth (VUSSC).

A Virtual University for Small States of the Commonwealth

The VUSCC was established in 2005 on the recommendation of the Commonwealth Education Ministers. Thirty countries are part of the VUSSC initiative, with the Commonwealth of Learning (COL), an international agency based in Vancouver, Canada, coordinating activities.

The VUSCC focuses on creating post-secondary, skills-related courses in areas such as tourism, entrepreneurship, professional development, disaster management and a range of technical and vocational subjects. Non-proprietary, electronically held course materials that can be readily adapted to the specific context of each country are used in the offering of credit-bearing qualifications in the post-secondary institutions of the VUSCC countries. This has strengthened their educational capacity and outreach.

A major project is the creation of Open Educational Resources using existing course content to be made available via the Internet.

The extent of VUSSC's success has yet to be measured. However, even at this early stage, it may be said that the VUSSC is helping to bridge the digital divide and showing that small states can become active contributors to global development and leaders in educational reform through the innovative use of ICTs.

Sources: Adapted from Commonwealth of Learning, "A Virtual University for Small States of the Commonwealth (VUSSC)," http://www.col.org/colweb/site/cache/offonce/pid/100; and Commonwealth of Learning, "COL in the Caribbean," http://www.col.org/colweb/site/cache/offonce/pid/3512.

Questions To Think About

The VUSSC is a long-term initiative that involves extensive cooperation and collaboration among its partners. Such collaborations have the potential to succeed while also facing various risks that can lead to failure. What do you think are the factors for success? And what do you think are the risks that could lead to failure if not properly addressed?

Another area of educational provision where ICTs may be leveraged is non-formal education (NFE). Today NFE is an integral part of the concept of lifelong learning through which young people and adults are expected to acquire and maintain skills and abilities needed to adapt to a continuously changing environment. In developing countries, basic literacy programmes are a major component of NFE and most of these continue to be delivered face-to-face. But there is evidence that this is changing.[18]

People First Network, Solomon Islands

The People First Network (PFnet), a project in the Solomon Islands, is demonstrating the application of ICT in delivering non-formal and continuing education to remote communities. PFnet is an existing communications network. In this project, the University of the South Pacific established a PFnet gateway base station in the rural community of Sasamungga, Choiseul along with a solar-powered computer centre at the community school. Members of the community are being taught pre-tertiary English and English for All Purposes at the computer centre.

Participants consider the project a success. Staff and administrators at Sasamunga Community High and Primary School now have access to computers. More important, organizational and attitude changes have been observed as village leaders have come to realize the importance of using ICTs in their communities.

Source: Adapted from Rural Development Volunteers Association, "Pipol Fastaem," UNDP and UNOPS, http://www.peoplefirst.net.sb.

A key application of ICTs in education in developing countries is in teacher professional development. ICTs are an important means of training the large numbers of teachers that are needed to meet the challenge of providing education for all. And because they are the key to the effective use of ICTs in the classroom, teachers need to develop both the technical and pedagogical skills necessary for ICT-supported teaching and learning. This is particularly important in the new knowledge economy where the goal of education has shifted from developing mastery of a fixed body of knowledge and skills to developing '21st century skills' — critical thinking, information literacy, problem solving, collaborative learning, the ability to learn new knowledge and apply that knowledge to new situation.[19]

18 See, for example, Tata Group, "Tata Computer-based Functional Literacy Programme" (Tata Sons Ltd.), http://www.tataliteracy.com; and Glen Farrell, *ICT and Literacy: Who benefits? Experience from Zambia and India* (Vancouver: Commonwealth of Learning, 2004), http://www.col.org/colweb/site/pid/3104.

19 Wadi D. Haddad and Alexandra Draxler, eds., *Technologies for Education: Potentials, Parameters, and Prospects* (Paris: UNESCO and Washington, D.C.: AED, 2002), 7, http://unesdoc.unesco.org/images/0011/001191/119129e.pdf.

The success of Singapore's ICT in education effort was largely based on the successful training of teachers to work in an ICT-enhanced environment even before computers were placed in schools. Bhutan entered into a partnership with the Singapore International Foundation to systematically introduce teachers to ICTs through several training programmes in their colleges of education. The effort was synchronized with the deployment of hardware in schools for the teachers to use in ICT-supported lessons. After the first round of teacher training, the second phase saw the integration of ICTs into the curriculum as a requirement in the Bachelor of Education programme.[20] In Nepal and Bangladesh teachers are likewise being trained in a range of technologies, from computers to digital cameras.[21] Similar initiatives are underway in countries as different as Mongolia[22] and Samoa.[23] Despite the differences, there is a common recognition that without effective teacher training in ICT and curriculum integration, a major component of educational reform would be left out.

The impact of ICTs on education has been second only to their impact on business practices around the world. Even a broad survey of national efforts shows that the use of ICTs in education is as extensive as it is diverse. Education policymakers and planners who used to be very sceptical now want to know how ICTs can increase access to educational opportunities, what the costs are, and what the impact will be on the quality of educational provision.

It is important to understand that ICTs are not the cure-all for all of the problems plaguing education systems. Furthermore, the potential benefits of ICTs are more likely to be realized when ICTs are introduced in the context of systemwide reform in educational policies and practices. Real learning gains and the improvement of an education system will take place only when all of the elements of educational change, from policies and practices, to teachers, learners and other stakeholders, come together.

To sum up

- ICTs can be used to provide access to schooling and to continuing education, and to improve the quality of education in the classroom.
- ICTs can enable networking and collaboration among students and teachers in different schools, which makes learning engaging and challenging.
- Teacher education is one of the key applications of ICTs in education.
- There is extensive use of ICTs for NFE especially for literacy and general knowledge about health, nutrition and the environment, leading to a better quality of life.

Something To Do

From existing case studies, it seems clear that ICTs can be used to expand access to education and enable collaborative networks such as SchoolNets to improve the quality of education. However, can ICTs be used in the absence of minimum literacy levels among the poor? Try to locate and discuss any experiment or project where this has been attempted, either in your own country or elsewhere in the world.

20 Philip Wong, "Bhutan 'Support for Teacher Education' Project," in *ICT in Teacher Education: Case Studies from the Asia-Pacific Region*, ed. Ellie Meleisea (Bangkok: UNESCO, 2007), 3-9, http://www.unescobkk.org/index.php?id=7035.
21 Sarah Lucas Pouezevara and Binita Parajuli, "Using Video Technology for Primary School Teacher Training in Rural Nepal," in *ICT in Teacher Education: Case Studies from the Asia-Pacific Region*, ed. Ellie Meleisea (Bangkok: UNESCO, 2007), 62-73, http://www.unescobkk.org/index.php?id=7035.
22 Ibid.
23 Ibid.

3.3 ICTs and Gender Equality

Goal #3 - Promote Gender Equality and Empower Women

Target 4: Eliminate gender disparity in primary and secondary education preferably by 2005 and in all levels of education no later than 2015.

Gender inequalities are not the problem of women and girls alone. Where at least half of the population is denied equal rights and opportunities and therefore rendered incapable of making a full contribution to society, socio-economic development will be uneven at best.

There is global and official recognition of this fact, as evidenced by the inclusion of gender equality in the MDGs. However, there is lack of clarity at all levels of decision-making and implementation. Many development policies and programmes remain gender-blind, none more so than those involving ICT integration. According to a study of the Swedish International Development Agency,[24] although there are a number of areas where ICTs have helped to alleviate poverty, most ICT projects have focused on the 'poor' as a general category without necessarily paying attention to women's issues.[25] As a consequence, the projects have not benefited women. This is a problem because ICTs are increasingly becoming a major tool of social participation and economic productivity and failure to equip women with ICT skills will marginalize them further.

ICTs can benefit women directly when women exploit ICTs to improve their own status, and indirectly when ICTs are used to improve delivery of information and services to women. ICTs offer possibilities for women to directly engage in e-commerce and access education and e-government, bypassing the socio-cultural barriers that have hindered access to economic advancement. Among women's groups, the use of ICTs has enabled women to organize advocacy campaigns for women's rights and participation by providing a new communication forum for the expression of their views and for raising awareness of women's issues.

Data on the gender divide in the use of ICTs does not exist for most of the Asia Pacific region. But what is known is that most of the barriers women face in accessing ICTs are the same ones they face when accessing education or economic opportunity of any kind — illiteracy and lack of awareness, poverty, lack of time, low confidence and self esteem, and socio-cultural norms that restrict mobility. Other barriers to women's access to ICTs can be summed up in three major categories: relevance, availability and usage. Women's use of ICTs is hampered when the content is not directly relevant to their livelihood and other concerns, and when it does not value their knowledge, wisdom and experience. Studies show that unless the content delivered by ICT has a direct impact on women's lives, women will not perceive the need and benefits of ICTs.[26]

The best known example of a direct ICT intervention that has helped women obtain and sustain a livelihood is the Grameen Phone project in Bangladesh.

24 Alan Greenberg, *ICTs for Poverty Alleviation: Basic Tool and Enabling Sector* (Stockholm: Swedish International Development Agency, 2005), http://www.sida.se/sida/jsp/sida.jsp?d=118&a=3607&language=en.

25 Anita Dighe and Usha Vyasulu Reddi, *Women's Literacy and Information and Communication Technologies: Lessons that Experience has Taught Us* (New Delhi: Commonwealth Educational Media Centre for Asia and Commonwealth of Learning, 2006), 33, http://www.cemca.org/CEMCA_Womens_Literacy.pdf.

26 Sophia Huyer and Swasti Mitter, *ICTs, Globalisation and Poverty Reduction: Gender Dimensions of the Knowledge Society - Part I. Poverty Reduction, Gender Equality and the Knowledge Society: Digital Exclusion or Digital Opportunity?* (New York: Gender Advisory Board, 2005), 19, http://gab.wigsat.org/partI.pdf.

The Story of Grameen Phone, Bangladesh

Village Phone (VP) is a unique idea that provides modern telecommunication services to poor people in Bangladesh. Grameen Bank, world famous for providing collateral-free loans to the poor in rural Bangladesh, plays a vital role in Grameen Telecom's VP programme, specifically by providing organizational support Grameen Telecom in the selection of members, collection of bills, handling of day-to-day problems, and the like.

The programme aims to:

- Provide easy access to telephone services all over rural Bangladesh;
- Initiate a new income-generating option for the villagers;
- Gradually bring the benefits of the Information Revolution to the doorsteps of villagers (i.e. bring IT to the poor); and
- Use telephones as a weapon against poverty since connecting rural areas to the rest of the world brings new opportunities to rural populations.

A Grameen Bank member who has a good record of loan repayment and who is literate or who has children or a relative who can read and write, is entitled to have a VP. The operator's income is derived from the difference between the air time charges paid by the customer/s and the billed amount that the VP operator must pay, along with a flat service charge that the customer pays.

The programme has worked because Bangladesh is flat, poor and densely populated, and mobile phone signals reach far and, in comparison to landlines, require much less infrastructure. For VP operators and the various organizations involved, the economics are persuasive: The telecom generates a profit, the microfinance institution makes money on its repaid loans, the VP operators generate an income, and villagers can now make calls at discounted rates when they could not do so before. Moreover, evaluation findings show that this modern technology has increased the social standing of the Village Phone Lady, and it has substantially empowered women from rural households who can now access services provided by the government and non-government organizations through a simple telephone call from their village.

Sources: Adapted from Grameen Telecom, "The Concept of Village Phones," http://www.grameentelecom.net.bd/vp.html; and Grameen Foundation, "Village Phone: Connecting Technology and Innovation," http://www.grameenfoundation.org/what_we_do/technology_programs/village_phone.

Questions To Think About

The Grameen Phone programme has been emulated in other parts of the developing world. But in light of the rapidly decreasing costs of mobile technology, which means that even poor people might one day be able to acquire their own mobile phones, do you think that the Village Phone will continue to have relevance? What are the prospects for the programme's sustainability? What is required for the programme's survival and expansion?

That ICTs have created new economic opportunities for women is evidenced by the large number of women, especially in countries like India and the Philippines, who have entered the workforce in IT-enabled services such as call centres and helplines. Telework and e-commerce enable women to work from home. These ICT-enabled economic opportunities are much more successful when designed, operated and managed by women, as in the case of eHomemakers, Malaysia.

Salaam Wanita, Malaysia

Salaam Wanita is an initiative of the pioneering The eHomemakers network of Malaysia, an online community of women "that promotes working from home, teleworking and the running of SOHO (Small Office Home Office) businesses through the use of information and communications technology."

Initially, eHomemakers addressed the needs of Malaysian women from middle- to low-income groups wanting or needing to stay at home to look after children while also being economically self-sufficient. Much of the project planning, design and execution was done by women volunteers who had similar needs. In just a few years, eHomemakers enjoyed financial success and social recognition.

With a government grant, eHomemakers launched Salaam Wanita to address the needs of special women, among them the abused, disabled and chronically ill, as well as single mothers and widows. In 2002, about 200 Salaam Wanita members received basic training on the use of computers and the Internet. Secondhand computers were then procured for some of them so that they could use their new skills to generate an income and become self-reliant. Salaam Wanita also conducts workshops where women learn to weave eco-baskets. The women get business management training that includes costing their products and handling finances.

Besides economic empowerment, eHomemakers provides information and support on key issues affecting women like social prejudice and self-defeating mindsets. Indeed, networking through eHomemakers has turned around the lives of members who were on the brink of despair and even verging on suicide.

Challenging the traditional view that only the young and educated can use IT, eHomemakers has made their portal a democratic space through which members have been introduced to concepts like choice, costs of working, technology use and better control of their lives. At last count, eHomemakers had close to 10,000 members and their website had over 10,500 unique visitors, 28,000 hits and 100,000 page views.

Sources: Adapted from eHomemakers, "About Us: Empowering Homemakers to Become Homepreneurs: eHomemakers Malaysia," Corpcom Services Sdn. Bhd., http://www.ehomemakers.net/en/aboutus.php?id=48. eHomemakers; and "Just Marketing: Salaam Wanita Project," Corpcom Services Sdn. Bhd., http://www.justmarketing.info.

Questions To Think About

What factors do you think account for the success of programmes like eHomemakers and Salaam Wanita? Can such programmes be replicated in your country? In the ESCAP high-priority countries?

ICTs can also facilitate women's participation in government and political affairs by providing a communications platform to exchange opinions, to articulate and aggregate interests, and to engage political leaders in women's issues. Women's advocacy groups can effectively use ICTs to network and connect with each other, and to mobilize public opinion. For example, the Centre for Women's Research (CENWOR),[27] which monitors the use of ICTs by women's groups in Sri Lanka, has reported that enhanced networking has been one of the most useful and practical results of increased access to ICTs. Increasingly, women's groups in Sri Lanka have become better connected with similar international women's groups and activists around the world. Similarly, Shirkat Gah, one of Pakistan's most respected women's rights groups, has used the Internet to support their networking, information and communication needs and in the process, strategically link local women's concerns with the global women's movement.[28]

But there are challenges. Social and cultural attitudes are deep-rooted, and with the majority of women in rural areas deprived of education and livelihood skills, it is difficult to imagine how they can harness the full potential of ICTs. Lack of content and software in local languages remains a barrier, assuming that lack of access to expensive ICT hardware is addressed. Unless key players in national ICT policymaking and implementation integrate gender into every aspect of their plans and target women as a specific group, women's participation in ICT-enabled development will not be realized.

To sum up

- The barriers that women face when accessing education and ICTs are similar — poverty, illiteracy, lack of time and lack of relevant content.
- However, when technology is placed in their hands, women are able to improve their economic and social status in the community.
- Women use technology not just to learn and to generate an income, but also to create women-friendly spaces on the Internet for building up networks to voice and share their concerns and to lobby for gender equality.

27 See CENWOR, http://www.cenwor.lk.
28 W. Harcourt, "World Wide Women and the Web," in *Web Studies: Rewiring Media Studies for the Digital Age*, ed. David Gauntlett (Rome: Society for International Development, 2000).

Something To Do

Design an ICT-supported project to develop self-confidence and economic self-sufficiency among the marginalized women in your country. Start by identifying a specific group of women (e.g. elderly women, women in urban poor communities, adolescent girls in rural communities, or even a group of women in *a particular community*). Describe their situation and social and economic needs. Then articulate the project objectives, target outcomes and project strategy/ies. You might also specify a timeline for achieving the target outcomes.

3.4 ICTs and Health

Goal #4 - Reduce Child Mortality

Target 5: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate.

Goal #5 - Improve Maternal Health

Target 6: Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio.

Goal #6 - Combat HIV/AIDS, Malaria, and Other Diseases

Target 7: Have halted by 2015, and begun to reverse, the spread of HIV/AIDS.

ICTs have facilitated two-way exchanges in health care between rural and isolated communities and urban areas, enabled effective health monitoring systems, provided access to the latest findings from medical research, and provided for a system of continuing professional education for health professionals. From these it may be deduced that there are two main categories of key stakeholders in the health sector who can benefit from ICT support. The first category consists of ordinary people who need health care, especially those among them whose access to health services and/or health-related information is limited, including vulnerable groups such as victims of disasters and conflict and persons with disabilities. In short, the first category of ICT-supported health care beneficiaries includes those for whom health services are intended. The second category of stakeholders includes health care providers; medical professionals such as doctors, nurses and caregivers at the primary health care level; researchers and health managers; and even policymakers in the area of health care. For the first group, ICT interventions can be direct, linking patients to expert medical services. For the second group of stakeholders, ICT interventions can be indirect and supportive through the creation of health monitoring systems or continuing professional education. Both types of ICT interventions are discussed below.

The most commonly reported ICT application in health is telemedicine. Also known as e-Health, it is essentially the use of technology, either satellite or broadband, to connect patients in rural and remote communities to medical specialists in the city. One form of telemedicine is interactive video conferencing where geographically separated doctors and patients can have a consultation. A camera in an examining room enables a doctor to present the patient to the specialist based elsewhere, thereby significantly reducing the costs of bringing the patient to the specialist or the cost of travel by the specialist to remote locations. This also broadens access to health care even when there is an acute shortage of medical practitioners.

India is one of several countries that have been using telemedicine extensively. Currently more than 78 hospitals in eight states have linked up to the Indian Space Research Organization's (ISRO) network, thus extending specialized and advanced consultation to the remote Northeast and the Andaman and Nicobar islands.[29] Pakistan has been running, since 1998,[30] a 'Store and Forward Telemedicine' system where a patient's medical information is collected locally (stored) and then sent to a qualified doctor (forward) in any part of the world who is then expected to respond with a diagnosis and treatment recommendation within 24 to 48 hours. Thailand[31] and Malaysia (Medical Online)[32] have also developed telemedicine systems. The Trans-Eurasian Information Network 2 (TEIN2) links hospitals across a region that spans Australia, China, Indonesia, Japan, Malaysia, the Philippines, Republic of Korea, Singapore, Thailand and Viet Nam, and supports a global community of over 30 million users.[33] In Afghanistan, an innovative public-private partnership (PPP) is delivering telemedicine services to remote locations. An extensive description of telemedicine projects in several Asian countries[34] reports programmes such as HealthNet in Nepal[35] and a mobile ICT-Based Mobile Telemedicine System with Multi-Communication Links for Urban and Rural Areas in Indonesia.

A case study from Pakistan illustrates the power and the capacity of Web-based telemedicine initiatives to address rural health needs.

29 See ISRO, "International Telemedicine Conference India 2005," http://www.isro.org/pressrelease/Mar15_2005.htm; and R.L.N. Murthy and L. S. Satyamurthy, "Indian Telemedicine Program: Marching Toward Transforming National Healthcare Delivery System," ISRO, http://www2.telemed.no/ttec2007/presentations/session08_tuesday/s08_tue_1315_Abdul_OK.ppt.

30 See TelmedPak, "Telemedicine in Pakistan," http://www.telmedpak.com.

31 See PubMed, "The Ministry of Public Health Telemedicine Network of Thailand," National Center for Biotechnology Information, http://www.ncbi.nlm.nih.gov/pubmed/11311665.

32 See Association of Private Hospitals of Malaysia, "About Medical Online," http://www.hospitals-malaysia.org/index.cfm?menuid=35.

33 See DANTE Ltd., "TEIN2," http://www.tein2.net.

34 See Michael Dougherty, *Exploring New Modalities: Experiences with Information and Communications Technology Interventions in the Asia-Pacific Region - A Review and Analysis of the Pan-Asia ICT R&D Grants Programme* (Bangkok: UNDP-APDIP, 2006), 121-140, http://www.unapcict.org/ecohub/resources/exploring-new-modalities.

35 See Institute of Medicine, Kathmandu, Nepal, "HealthNet Nepal," http://www.healthnet.org.np/?p=profile.

Telemedicine in Pakistan

In Pakistan where medical services for the poor are insufficient, the TelmedPak initiative seeks to use ICTs to bridge the gap between doctors and patients through two distinct ways. The first method is called Store and Forward Telemedicine (described above). The other technique is known as Real Time Telemedicine: the patient's data becomes available to the specialist as soon as the local doctor receives the information. This method uses video conferencing technology and live data transmission.

Through its initiatives in Taxilla, Gilghit and Upper Punjab, the system provides a telecommunications link between doctors and patients for a variety of health related issues. The system also provides vital health services during disasters especially in the upper reaches of the Himalayas where villages are otherwise inaccessible.

Source: Adapted from TelmedPak, "Telemedicine in Pakistan," http://www.telmedpak.com/ and http://www.telmedpak.com/Telemedicine/.

Questions To Think About

The Pakistan project demonstrates both direct ICT intervention to provide health services to the poor and to remote populations and an indirect ICT-supported intervention in the form of capacity building for health professionals. What accounts for its relative success so far? What do you think will ensure the project's sustainability? Is it a project that can be replicated in other countries, including your own?

Go to the project website for more information to support your answers.

Using ICTs to link doctors to poor patients in rural areas has a direct and significant impact on the quality and reach of a country's health services. But using ICTs to improve the quality of health care education and administration is equally important as health care education and administration impact upon the provision of health services. In many developing countries there is a lack of a critical mass of health care professionals, including doctor educators for teaching hospitals. Access to important medical literature is limited for both medical students and health workers who must keep abreast of the latest developments through continuing medical education and training. ICTs have a key role to play in meeting these needs. For example, an initiative started by a young doctor in India is providing medical content in multimedia format both online and offline to a large clientèle of medical students, aspiring doctors and practising health professionals.[36] Global networks are providing access to medical journals and to vast online libraries either for free or at a substantially reduced subscription fee. The World Health Organization (WHO)-supported Web portal called HINARI is a global effort to provide support to health professionals and policymakers worldwide.

The Health InterNetwork Access to Research Initiative

The Health InterNetwork Access to Research Initiative (HINARI) was set up by WHO in collaboration with major publishers to give developing countries access to one of the world's largest collections of biomedical and health literature. Over 3,750 journal titles are now available to health institutions in 113 countries, benefiting many thousands of health workers and researchers and in turn contributing to improved world health.

Launched by the United Nations Secretary General in 2000, the network has brought together public and private partners to provide equitable access to health information, and it is being effectively used by health professionals, researchers and policymakers alike.

Source: Adapted from WHO, "HINARI Access to Research Initiative," http://www.who.int/hinari.

36 See MEdRC EduTech Ltd., "SmarTeach," http://www.smarteach.com.

Questions To Think About

Look up the HINARI website and other news reports to see how this kind of support system has been useful in tracking and tackling recent epidemics such as Severe Acute Respiratory Syndrome (SARS) and the avian flu. Do your country's health officials use this system? Why or why not?

Efforts to modernize hospital and health administration have led to the development of a large number of health administration software. These management information systems enable the recording and reporting of patient data of individual departments that are then linked in an intranet system for effective administration. Given the resource requirements of these kinds of projects, it is not surprising that private corporate hospitals are taking the lead in this area.

Another critical application of ICT in health is the deployment of ICT-based surveillance systems for the prevention, reporting and monitoring of diseases such as HIV/AIDS, malaria, tuberculosis and leprosy.[37] The availability of such systems has enabled both international agencies and national governments to monitor outbreaks of diseases across international borders. For instance, addressing protection against and treatment of quickly spreading diseases such as SARS and the avian flu has been possible only because of ICT-based health surveillance systems.

However, in Asia a number of countries still lack the basic infrastructure to support the use of ICTs. As a consequence, the diffusion and use of ICTs in health is still at a nascent or primary stage. Until and unless investments in ICT infrastructure and access are made to underpin the health support system, maximizing the potential of ICTs in health care may remain a distant dream.

To sum up

- Major stakeholders in the health sector include people needing health services, especially those with limited access to health care such as rural and marginalized people, as well as health care professionals.
- Telemedicine is the most common application of ICTs in health. Telemedicine has been used extensively in many countries of Asia Pacific.
- There are several global efforts such as HINARI to support the knowledge needs of health professionals.
- Global surveillance systems have enabled countries to contain the threat of cross-border diseases such as SARS and the avian flu.

37 UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia: Realising the Millennium Development Goals* (New Delhi: UNDP, Elsevier, 2005), 147-160, http://www.apdip.net/elibrary#rhdr.

Something To Do

Identify one major health need among the poor and one health service in your country that is capable of meeting such a need. Discuss what kind of ICT application might be useful to effectively connect the need and the service.

3.5 ICTs and the Management of Natural Resources

Goal #7 - Ensure Environmental Sustainability

Target 9: Integrate the principles of sustainable development into country policies and programmes to reverse the loss of environmental resources.

Target 10: Halve, by 2015, the proportion of people without sustainable access to drinking water.

Target 11: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers.

Inequitable distribution of resources and unbridled exploitation of natural resources have created a global crisis of monumental proportions. Global climate changes, including global warming, drought and floods, are increasingly being felt in various parts of the world. Island states are particularly vulnerable to the effects of global warming and rising sea levels while landlocked and mountainous states are vulnerable to the melting of glaciers, soil erosion and avalanches. The most vulnerable victims of climate change are the poor, wherever they are located, since the scale of global degradation results in the loss of their livelihoods. The large-scale suicides of farmers in India are evidence of this.

ICTs have a major role to play in addressing environmental issues, whether through the use of geographic information systems (GIS) for the mapping of natural resources or as a means of drawing sharp attention to the consequences of deforestation. For island and other remote areas, integrated planning and management systems using ICTs could be very useful. The Tikiwiki example described below is one such initiative.

Tikiwiki GeoCMS, Pacific Island Countries

The Tikiwiki GeoCMS project of the Pacific Islands Applied Geoscience Commission (SOPAC) aims to reduce the vulnerability of the Pacific Island Countries to the adverse effects of climate change through the development of an integrated planning and management system.

ICT development and related capacity building are very important to the project a key component of which is the Geospatial Content Management System (GeoCMS) that facilitates the collection and sharing of geographical data among project stakeholders. As there was no suitable software available for a GeoCMS when the project started, a new GeoCMS application was developed from two existing Free and Open Source Software (FOSS) applications, MapServer and Tikiwiki. The GeoCMS system has made it possible for the Pacific Island Countries to publish their geographical data for access and sharing over the Internet. Data contributions from other parts of the world are accepted. All this helps in reducing the vulnerability of these nations as governments can access important information that can now be made available in a 'just in time' manner.

Sources: Adapted from Nah Soo Hoe, *Breaking Barriers: The Potential of Free and Open Source Software for Sustainable Human Development - A Compilation of Case Studies from Across the World* (Bangkok: UNDP), http://www.unapcict.org/ecohub/resources/breaking-barriers/ and http://www.iosn.net/pacific-islands/case-studies/tikiwikigeocms/; and Tikiwiki Map Server, "Tikiwiki GeoCMS," http://maps.tikiwiki.org/tiki-index.php.

FOSS applications enable countries and regions to develop dynamic platforms that can be rapidly used by people with minimal training in their use. *Refer to Module 4 of the Academy of ICT Essentials for Government Leaders for more information about FOSS.*

Questions To Think About

What remote sensing and GIS data are available in your region for use by policymakers? How are they being used?

Similar ICT-based knowledge resources exist at national levels. In China the Mobile Interactive Geographic Information System (MIGIS) is used in conjunction with Participatory Rural Appraisal "to bring the best of indigenous knowledge and scientific information together to optimize planning" and use of natural resources at a community level. MIGIS converts to digital format graphic information gathered through participatory learning and action exercises.[38]

38 Barbara Fillip, *Information and Communication Technologies for Development Self-Paced Learning Materials – Module 6: ICTs and Agriculture (Notes)*, http://www.knowledgefordevelopment.com/ICT4D03SP/File/Notes6.pdf.

The rehabilitation of the Loess Plateau in China[39] is a sustained effort of several stakeholders to reverse the damage caused by long-term exploitation. The project uses various ICTs to document environmental damage, gather data, and raise awareness of what can be done to reverse the damage. According to John Liu, Director of the Environment Education Media Project:

> The success of the Loess Plateau Rehabilitation Project has resulted in profound changes for the local people; their economy, incomes and quality of life have improved tremendously. The seemingly hopeless cycle of poverty and ecologic[al] destruction has been broken… millions of people have been lifted out of poverty.[40]

The film "Earth's Hope" made by the project partners visually documents the change that has taken place over the last 10 years.

In the global development agenda, disaster management is not treated as an isolated sector. Disaster management is important for equitable sustainable development to take place. To some extent, the use of ICTs to map natural resources is closely linked to the role of ICTs for disaster management, whether preventive, relief or rehabilitation. The same GIS can be used to predict disasters and to provide critical networks during times of crisis. Even before a disaster strikes, GIS and remote sensing data can help identify high-risk areas so that early warning can be made to communities in danger. Radio and television, cellular and satellite phones, ham radio sets, SMS systems, e-mail and the Internet all have a role to play in alerting communities to impending disaster. During the crisis, communication systems not built on terrestrial wired communications can prove invaluable, especially when land-based systems are destroyed.

Wattegama[41] has undertaken an extensive inventory of ICTs in early warning systems and in relief and rehabilitation efforts in the Asia Pacific region. Many of these are still in the development stage. But efforts after the Asian Tsunami in 2004 to develop ICT-based systems to provide early warning and to assist in relief operations are worth mentioning *(see the case study below)*. Gunawardena and Noronha's book, *Communicating Disasters,*[42] is also an excellent resource to understand the complexities of using ICTs for disaster relief and rehabilitation.

39 John D. Liu. *Environment Challenges Facing China: Rehabilitation of the Loess Plateau* (2005), http://www.unep.org/pcmu/project_reference/docs/BB_170707Large_scale_ecosystem_restoration_JPMorgan_Essay_2005.pdf.
40 Ibid., 6.
41 Chanuka Wattegama, *ICT for Disaster Management* (Bangkok: UNDP and Republic of Korea: UN-APCICT, 2007), http://www.unapcict.org/ecohub/resources/ict-for-disaster-management.
42 Nalaka Gunawardene and Frederick Noronha, eds., *Communicating Disasters: An Asia Pacific Resource Book* (Bangkok: UNDP and Nugegoda: Tve Asia Pacific, 2007), http://www.apdip.net/publications/CommunicatingDisasters.pdf.

A Tsunami Early Warning System for South-East Asia

The Tsunami Early Warning System (TEWS) is a collaborative effort by several countries of South-East Asia to establish "early warning arrangement that would cover the technological and societal components of warning (end-to-end) and integrate early warning with preparedness, prevention, mitigation, and response (comprehensive) within a multi-hazard framework." The countries involved are Cambodia, China, Lao PDR, Myanmar, the Philippines, Thailand and Viet Nam.

What is significant about TEWS is that it is the small countries of Asia that have come together to cooperate on this initiative which is funded by international donor agencies such as UNDP, USAID and DANIDA. The Asian Disaster Preparedness Centre (ADPC), a non-profit organization supporting the advancement of safer communities and sustainable development throughout the Asian region, serves as the regional centre or focal point for the project.

ADPC develops and implements disaster risk management programmes and projects by providing technical and professional services in formulating national disaster management policies, capacity building for disaster management institutions, programme design for comprehensive disaster risk management, post-disaster assessment, public health and emergency management, land-use planning, disaster-resistant construction and the planning of immediate relief response and subsequent rehabilitation activities.

Source: Adapted from Chanuka Wattegama, *ICT for Disaster Management* (Bangkok: UNDP and Republic of Korea: UN-APCICT, 2007), 18-20, http://www.unapcict.org/ecohub/resources/ict-for-disaster-management.

Further reading: Asian Disaster Preparedness Centre, "Early Warning System," http://www.adpc.net/v2007/Programs/EWS/Default.asp; and United Nations International Strategy for Disaster Reduction, "Platform for the Promotion of Early Warning," http://www.unisdr.org/ppew/tsunami/project-overview/dp-introduction.htm.

Something To Do

What agencies in your country or region use ICTs to address disaster preparedness, relief and mitigation? Briefly describe what the agency/agencies does/do.

Disaster warning systems need not necessarily be for one country alone. Natural disasters such as typhoons, earthquakes and tsunamis often affect several countries within the same geographic area. The same is true of environmental disasters such as oil spills and nuclear contamination (especially in the South Pacific), as well as health disasters such as the avian flu. Thus, cooperation is the key in coping with such disasters and collaborative efforts like TEWS have the potential to be highly effective. Sentinel Asia[43] is a disaster management support group in the Asia Pacific region that brings together 51 organizations from 18 countries and seven international organizations in a "voluntary and best-efforts-basis initiative by participating organizations" for sharing information on a digital platform.

43 Masahiko Honzawa, "Sentinel Asia: Asia Branch Activities," Japan Aerospace Exploration Agency, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN025931.pdf.

There are other efforts that use ICTs to address the consequences of disasters. However, much depends not on the technologies but on the use they are put to, especially the human element that can make the difference between successful use and dismal failure. A comprehensive framework that integrates ICTs in poverty reduction strategies and natural resource mapping is needed to enable pro-poor growth and sustainable development. It is critical that there be a seamless link and equal partnership between farmers and farming communities, agricultural and veterinary extension institutions, financial institutions and ICT providers for the MDG goals relating to food security and sustainable development to be met. The absence or non-participation of any one partner in the overall process could render the entire effort ineffective. ICT diffusion alone cannot deliver results. It must be accompanied and supported by a range of development programmes with strong ground support among the poor.

To sum up

- ICT-based remote sensing and disaster warning systems have changed the way we understand and respond to weather and climate.
- Disaster management, being a critical part of a country's arsenal to address issues affecting the vulnerable and marginalized, must be accompanied by a range of development programmes with strong support among the poor.

Something To Do

Identify one ICT-based natural resource or disaster management system that your country subscribes to or has developed. Describe it in detail and determine how it takes the interests of the poor into account. If it does not do so, what modifications would you make to ensure that it meets the needs of the poor?

3.6 ICTs, Government and Governance

Module 3 describes e-government and e-governance applications extensively, while Module 2 focuses on the governance of ICT infrastructure and services. Therefore, this module will simply provide readers with a bird's eye view of government and governance and the role of ICTs in facilitating both.

Government consists of a superstructure that makes rules, and takes and implements decisions that become visible as outputs. The processes of government include many internal transactions between individual officials and government agencies long before the outputs of consequent decisions come to public knowledge and impact upon the system at large. Governance concerns the transactions between the government and the citizenry, and is therefore a process with many pathways. Governance consists of functionalities, processes, goals, performance and coordination, and it is visible as participatory processes between government and citizenry.

A number of studies have proven the positive correlation between governance and growth. Kaufmann and Kraay[44] show how "per capita incomes and the quality of governance are strongly positively correlated across countries." Most major international donors and developing country governments now recognize that stable, democratic government and well-managed public institutions are essential for the improvement of the living conditions of the poor and for combating poverty. There is ample cross-country evidence of a strong association between good governance and improved investment, growth rates, better economic performance, improved adult literacy, a reduction in state corruption and improved service delivery. There is also growing recognition of the idea that a well functioning and capable state alone is insufficient to ensure quality public service delivery to citizens that meets citizens' needs and aspirations and that the state also needs to be accountable and responsive to its citizens.

Government-to-government (G2G), government-to-business (G2B) and government-to-citizen (G2C) linkages form the backbone of the application of ICTs in government and governance. The intention is to make governments both efficient and effective in delivering services (e-government) while making them more transparent, accountable and responsive to citizen participation in democratic processes. The terms 'e-government' and 'e-governance' are often used interchangeably and consequently lead to some confusion. Governance is a broader topic dealing with a wide range of relationships between government and the citizenry, while government deals with the day-to-day functioning of government in the provision of services to the public in areas such as education, health, taxation, land administration, and the like. If government is the formal apparatus for administering the system effectively, governance is the outcome as experienced by those on the receiving end. e-Government can be a more effective application of government in general, if well implemented and managed, while e-governance can evolve into participatory governance if it is well supported with the appropriate principles, objectives, programmes and architectures.[45]

Some countries in the Asia Pacific region, such as Hong Kong, Japan, Republic of Korea and Singapore rank very highly on the e-readiness index and already have sophisticated e-government mechanisms. Much of the business of government in these countries is carried out electronically. However, most of the other countries in the region rank low on the e-readiness index and only a few government services are computerized.[46] Bhatnagar in his review of 20 case studies of e-governance from the Asia Pacific region states:

44 Daniel Kaufmann and Aart Kraay, *Governance and Growth: Causality which way? - Evidence for the World, in brief* (Washington, D.C.: World Bank Institute, 2003), 1, http://www.worldbank.org/wbi/governance/pdf/growthgov_synth.pdf.

45 Thomas B. Riley, *E-Government vs. E-Governance: Examining the Differences in a Changing Public Sector Climate*, International Tracking Survey Report '03, Number Four (London: Commonwealth Secretariat, 2003), http://www.rileyis.com/publications/research_papers/tracking03/IntlTrackRptMay03no4.pdf.

46 Subhash Bhatnagar, *Paving the Road towards Pro-poor e-Governance: Findings and Observations from Asia-Pacific Case Studies* (Bangkok: UNDP, 2006), 1, http://www.apdip.net/projects/e-government/capblg/casestudies/Overview.pdf.

> The focus of most of the applications is on internal efficiency rather than service delivery. The few projects that focus on service delivery are confined to licenses and taxes. Choice of application is mostly urban focused. The needs of poor have not been specifically targeted.
>
> Countries like India where some states have made considerable progress in electronic delivery of services to urban populations face the following challenges in implementing pro-poor e-Governance: a) to bring clarity to the objectives of pro-poor targeting, b) to ensure delivery of public services in rural areas, c) to balance standardization and localization, d) to leverage the private sector and build PPPs to serve rural areas, [and] e) to make independent impact assessment of what has worked. Moreover, there is a lack [of] internal capacity in e-Governance project conceptualization and implementation.[47]

The popular model for delivery of e-government services is through a portal, but even a cursory glance at many such portals will show that there is a one-way transmission of information with little or no interaction. Few countries other than India have created common service centres in urban areas where operators working with computer terminals deliver online services to clients. In some of India's services, even the rural poor are able to access and benefit from such applications. The best known of these services include the Computer-Aided Administration of Registration Department, Bhoomi and e-Seva. In another part of developing Asia, the Mongolian government has made advances in the use of ICTs for simplifying procedures for citizens to pay their taxes.

Mongolian Taxation Authority Online

The website of the Mongolian Taxation Authority (http://www.mta.mn) contains not only information about the Authority but also an extensive list of services for citizens and organizations. Among them are downloadable tax forms previously only available in printed form to be acquired at a cost from tax agents. Businesses or individuals can download the forms from the website, fill them out and submit them at the 'one-point service'. This is a big step in the use of ICT in tax administration in Mongolia.

However, only those with access to Internet services can access the website and benefit from its use. A 2003 survey showed that there were only 50,000 Internet users in Mongolia, representing around 4 per cent of the population. While the project has achieved most of its goals, there are still problems regarding how to reach marginalized groups, how to improve the interface with beneficiaries and ensure community participation, and how to retrain the workforce and change organizational attitudes.

Source: Adapted from Mongolian Taxation Authority, http://www.mta.mn.

47 Ibid., 2.

e-Government systems such as the Mongolian Tax Authority can reduce transaction costs for both government and for the citizens, thereby raising tax collections and increasing transparency in government operations. However, the case of the Mongolian Tax Authority also illustrates the challenges of bringing e-government to the poor. These challenges include lack of infrastructure and connectivity, language differences and illiteracy, lack of human capacity within governments to perform different tasks, weak demand, top-down planning and administration, and lack of effective monitoring and evaluation frameworks.

Something To Do

Examine two government portals (including that of your own country), identify potential weak or problem areas, and suggest solutions for the problems identified.

Other e-government applications in the Asia Pacific region are in various stages of planning and implementation. In Cambodia, the Government Administration Information System was established to improve land and vehicle registration, put in place an electronic approval system, improve administrative services and generate revenue for the government to offset the revenue lost as a result of joining ASEAN. Revenue generation has been achieved, but improvement of administrative processes through the electronic approval system has yet to be realized.

Both China and Thailand[48] have taken steps to develop e-government programmes that address the needs of the vulnerable and the poor, but with varying results. An initiative called OTOP for promoting e-commerce in Thailand's rural areas has not been very successful in the absence of other inputs such as facilities to move products to markets. This example shows that supporting interventions are needed to reap the potential benefit of ICTs. In China, video conference technology to interview migrant workers is an innovative idea that saves costs for the poor. The Chinese application puts the social problem rather than the technology ahead, which explains its success.

The e-government applications briefly described above are examples of government-to-citizen services, which focus on the supply side. e-Governance focuses on the demand side. It is important to note this particular characteristic as we begin to explore the concept of e-governance.

e-Governance is one of the most effective ways of combating corruption. Electronic voting, for example, can curb election-related anomalies. When all government procedures and processes are available for public scrutiny online, the media, citizen groups and civil society organizations can monitor government action or inaction.

e-Procurement is another example of how ICTs can help improve governance. The introduction of automated procurement systems standardizes the tender process, increases efficiency, reduces bureaucratic intervention, ensures objectivity, and makes the procurement process transparent. Removing supplier and buyer interaction during pre-bidding and post-bidding stages ensures objectivity in receipt and evaluation of tenders and significantly curbs opportunities for bribery. To ensure transparency, tender documents containing all details are

48 Ibid.

hosted on a website and can be downloaded by interested suppliers free of cost. At any time in the tender process, a bidder has access to all necessary information, including names and details of competing suppliers, price quotations, evaluation results and action taken by the concerned government agency.

e-Governance makes possible other forms of public engagement with government. Government websites and portals can include citizen charters for citizens to be aware of their rights with reference to specific services. The websites can promote online discussions and online voting on specific issues, making decision-making more participatory. The websites can help concerned agencies track public grievances and respond to citizen complaints and issues more effectively. Citizens, in turn, can interact with government officials, draw attention to public issues, get quick responses and action for their requests for information or for redress of grievances, and even develop citizen report cards and other measures of social audit of how efficiently and effectively government is functioning. All of these can be done at a lower cost and with greater efficiency than previously possible. Using appropriate access infrastructure at affordable prices (e.g. community telecentres), governments can ensure that even the poor can reap these benefits of e-governance.

The efficient, effective and stable functioning of government in an atmosphere of peace and with civil engagement is what will enable countries to meet the MDG targets more effectively.

To sum up

- Government consists of a formal superstructure while governance is concerned with outcomes of government functioning.
- The purpose of ICT interventions in government is to optimize efficiency while providing citizen-friendly services that encourage greater citizen participation in governance and public affairs.
- ICT interventions in government significantly reduce the levels of corruption by making procedures transparent and minimizing opportunities for irregularities in transactions with government personnel (e.g. bribery).

Something To Do

1 Visit the website http://www.esevaonline.com and explore how this award-winning e-government service of India's Andhra Pradesh government can be replicated in your country context.

2. Pick an example of an e-government initiative from your own country and discuss what you consider to be its strengths as well as its weaknesses, if any. Where you identify any weaknesses, suggest how these can be addressed.

3.7 ICTs and Peace

There can be no development without peace. It is as simple as that. Development and prosperity can only be achieved if the local situation is peaceful and stable. Regions experiencing conflicts invariably have low levels of development. Decades of excellent development work by countries and international organizations can be destroyed by conflict in a matter of weeks. The returns on investing in conflict prevention, or in building lasting peace, are definitely larger than the investments that are required to reconstruct countries and build peace after conflict.

ICT4Peace[49] (ICT for Peace) is a new and emerging area of engagement that is very broadly defined at present. It includes the different types of ICT-supported activity that are carried out in conflict prevention and management, peace operations, humanitarian relief and disaster assistance, and post-conflict peace-building and reconstruction. Some examples are briefly described below.

ReliefWeb,[50] a service of the United Nations Office for the Coordination of Humanitarian Affairs[51] (OCHA), is a hub for humanitarian information. The website offers a 'Web feed' service to deliver customized content to partners' websites, and users can create password-protected profiles to manage material of particular interest to them. It posts some 150 maps and documents daily from over 2,000 sources, and has offices in three time zones to ensure that news items are updated round the clock.

Alertnet[52] is a project of the Reuters Foundation that focuses on rapidly developing humanitarian emergencies and on early warning about future emergencies. For instance, through their service of breaking stories, photographic coverage of disasters, and 'aid agency news feed', they provide timely, reliable and relevant information for aid agencies to act upon.

The Governance Out of a Box (GooB) initiative[53] is an example of how ICTs can be used in immediate post-conflict reconstruction. The GooB project aims to find new approaches and tools to tackle challenges in state-building. What is envisaged in the project is a set of tools or a 'toolkit' that would help to quickly build up the administrative functions in countries in crisis, thus enabling them to offer their citizens the necessary public services. These tools should be at the disposal of international actors whenever they are operating in post-conflict situations and countries. The toolkit should accelerate and improve support and assistance to nascent state administrations. The tools provided should be standard but also as scalable and flexible as possible, to adjust to differing circumstances.

In post-conflict reconstruction, ICTs can be used to disseminate the terms of a ceasefire agreement to warring factions and local communities, and in the process clarify the situation and build support. It can also be used to raise awareness of war crimes tribunals or truth commissions, increasing common understanding of the processes necessary to support the rule of law.

49 This section is drawn from the publication: Daniel Stauffacher, William Drake, Paul Currion and Julia Steinberge, *Information and Communication Technology for Peace: The Role of ICT in Preventing, Responding to and Recovering from Conflict* (New York: United Nations ICT Task Force, 2005), http://www.unicttaskforce.org/perl/documents.pl?id=1571.
50 See "ReliefWeb," OCHA, http://www.reliefweb.int.
51 See OCHA, http://ochaonline.un.org.
52 See "Alertnet," Reuters Foundation, http://www.alertnet.org.
53 "Crisis Management Programme: Governance Out of a Box," Crisis Management Initiative, http://www.cmi.fi/?content=cpcr_programme.

ICT-supported campaigns to promote reconciliation can influence political leaders and promote information exchange and dialogue between local communities. In the final analysis, it is the creation of a space for dialogue and discussion on a people-to-people basis that goes a long way in creating an atmosphere of good will that will propel the peace-building process forward.

To sum up

- ICT interventions can be used for building peace, beginning with preventing conflict and later mitigating the effects of large- and small-scale conflicts.

Something To Do

1. Go over the OCHA website and determine who its target audiences are. What does the website aim to achieve? How effective do you think is the website in peace-building?
2 Look for information about armed conflict in your country or elsewhere in the world. Describe the conflict (what is it about, when and how did it start, who is involved, what is the impact). And then come up with specific recommendations on how ICTs can be used to resolve the conflict or to mitigate some of its effects. Be as specific as possible when describing the ICT intervention you are recommending (i.e. which technology or combination of technologies, how is the technology to be used, who should be involved in the effort, who are the targets, what are the target outcomes).

In this section, various possible applications of ICTs to meet the needs of specific development sectors in the Asia Pacific region have been described. Although the discussion has been organized in terms of sectors, it should be noted that the use of ICTs for meeting the MDGs provides opportunities to adopt a more integrated approach to development. Such an approach is necessary because in development, failure in one sector will have an adverse effect on another (for example, failure to provide education for all will mean that poverty alleviation efforts will meet with little or no success). However, while some countries are able to effectively harness ICTs for development, there are many countries where putting ICTs in the service of development remains a daunting challenge. The next section discusses ways of addressing this challenge.

Test Yourself

Choose a sector of development in your country and propose how ICTs can be used to improve, optimize and accelerate progress toward the MDG targets in this sector. Describe the sector and how it relates to other development sectors.

Write your answer in such a way as to justify the use of ICTs in the chosen sector to the finance ministry of your country.

4. KEY FACTORS IN THE USE OF ICTS IN DEVELOPMENT

This section aims to:

- **Discuss key issues determining success or failure of ICTD projects and programmes;**
- **Conclude the discussion of macro issues in the relationship between ICTs and development; and**
- **Establish key linkages between this module and other modules in the *Academy of ICT Essentials for Government Leaders*.**

4.1 ICTD Policy

There is invariably a debate about what comes first — ICT policy or the ICT application. This is a chicken or egg question. In some situations, applications have led the way to the development of policy; in others, policy and regulatory frameworks have determined the application of ICTs. It is not the objective of this module to enter into the debate but to make the case that both policy frameworks and applications are needed and that there is a need for clarity at the policy, planning and implementation levels. For countries in the Asia Pacific region, a clear-cut enabling policy is the first stage at which governmental decision-making is critical. Since Module 2 in this series discusses the ICT policy process extensively and Module 7 focuses on ICT project planning, the effort here is simply to describe the broad issues and concerns in deciding both the nature and extent of use of ICTs in development policies and programmes.

In most developing countries, ICTD policy is the domain of IT and telecom departments.[54] These departments tend to focus more on business and technology issues and be excessively pro-market and not sufficiently development-oriented. Even where some IT and telecom sectors do concern themselves with development, the approach is generally from the technology rather than the development end, with emphasis on connectivity and infrastructure, e-governance, e-delivery and growth, rather than on needs-based and people-centric improvement of 'quality of life'. The development departments, on the other hand, tend not to have a good ICTD orientation and even if they do, they are not able to significantly influence ICTD policy partly because they are not able to engage with IT departments. While the situation is gradually beginning to change, what needs to be understood is that new policies for ICTD involving both the technology and the development departments have to be developed if the unprecedented opportunities for development arising from strategic use of ICT are not to go to waste.

An ICTD policy is very different from an IT policy. It requires the fusion of disciplines as different as engineering and rural sociology. In fact, the use of ICTs for development is a multidisciplinary undertaking, requiring team effort. Partnerships and collaboration are essential in ICTD policymaking, planning and implementation.

54 Anita Gurumurthy and Parminder Jeet Singh, *Political Economy of the Information Society: A Southern View* (Montevideo: Institutodel Tercer Mundo, 2005), 18, http://wsispapers.choike.org/papers/eng/itfc_political_economy_is.pdf.

In Section 2.2 of this module, reference was made to technology convergence as a major driving factor for the increasing use of ICTs. It bears mention here that convergence of ICTs means more than just technology coming together. Today, it means a merger of many disciplines, a convergence of the exact sciences (control theory, systems theory, and statistics), technology (computer science and electrical engineering), and the social and behavioural sciences (management theory, sociology, psycholinguistics, economics, etc.). Accordingly, the introduction of ICTs in any development effort requires significant social and cultural changes within organizations that have been structured to separate functions and responsibilities.

A parallel convergence or national alliance that includes government, the private sector and civil society is required to maximize the opportunities provided by the new ICT-driven environment for national development. Government can create favourable policy and regulatory environments, provide a common fund for the development of underserved locations, commit to e-government, and strengthen national capacity toward greater acceptance and use of ICTs for national development. The private sector in turn can provide the ICT infrastructure and invest in services.

PPPs, which are extensively discussed in Module 8, can be of many types — from simple participation in the development of IT applications as part of corporate social responsibility to a complete project taken on a turnkey basis, built, owned and operated by the private sector. The benefit of such partnerships is that the huge financial and technical infrastructure, which poor governments can ill afford, are shifted to the private sector which efficiently deploys technologies at a much lower cost and based on economies of scale.

Civil society can mobilize communities and create relevant content for poverty reduction and e-inclusion through participatory processes. Ownership or operation becomes community-driven and community-owned, giving a sense of pride in achievement and the return on investment that becomes visible very quickly. In this kind of multi-stakeholder partnership, each partner in the national alliance, in conjunction with the communities that they work with, evolves its own ethos and model which it finds most suitable at the grass-roots level where the ultimate beneficiaries are the poor.

The hype surrounding ICTs, with world leaders, politicians, entrepreneurs and development professionals all jumping on the ICT bandwagon, places upon ICT and development professionals alike a greater responsibility and accountability for both successes and failures. More importantly, ICT has a pervasive influence on society, with changes taking place in all parts of an organization or community and often with unpredictable results. This results in an uncertainty about outcomes and impacts.

It is important to recognize that ICT-based interventions are inherently different from conventional ones. In several countries in Asia Pacific, regulatory and pricing mechanisms control what technologies can be used, and what content is delivered over these technologies. Policy frameworks also tend toward greater centralization and control over the technologies. Such regulatory practices are in conflict with the potential of ICTs. Technologies are not merely hardware but a set of management and operational practices. Thus, policies governing their use need to remain open, flexible, innovative and responsive. Frequent reviews are needed to ensure that the special needs of ICT-based projects and programmes are addressed.[55] Module 2 argues for this kind of coherence in ICTD policy formation and practice.

55 Usha Vyasulu Reddi and Rukmini Vemraju, "Using ICTs to bridge the digital divide," in ed. Anita Gurumurthy, Parminder Jeet Singh, Anu Mundkur and Mridula Swamy, *Gender in the Information Society* (UNDP-APDIP and Elsevier, 2006), http://www.apdip.net/publications/ict4d/GenderIS.pdf.

Initiatives designed and implemented by conventional governments as part of a broad development agenda tend to reflect the 'conventionalism' of existing institutions: they combine hierarchical and bureaucratic systems of administration. But models of project management where projects or initiatives are centrally implemented fail to adequately take local needs into consideration. There is a need to enable the development of local solutions that actively involve the communities for whom they are intended. Module 3 discusses the design and development of ICT applications involving both government and the citizenry.

The conventional approach to project management using ICTs often assumes that infrastructure is needed first and therefore, investment in hardware, buildings, equipment and hiring of staff, is given priority. The bulk of investment generally goes to these overhead costs and few resources are left for project activities. A parallel investment in people, in good quality social research, project management, and community mobilization and involvement, rarely takes place. Thus, it is not surprising to find that the technology aspect of a particular ICTD effort has worked but there was little change in the lives of people. Module 7 focuses on ICTD project management while Module 8 looks at funding models that can help guide investment in ICTD programmes and projects.

Maximizing the use of ICTs for developing countries will require an understanding not only of the opportunities that ICTs present, but also of the limitations and the likely trade-offs. It is important to know when, where and whether to incorporate ICTs as a key element in the project cycle. And once such a decision to use ICTs has been made, it is then necessary to examine how ICTs are integrated into a project cycle. There are a number of concerns to be addressed here and these are discussed in the next section.

To sum up

- ICTD policy requires new systems of planning, management and project implementation characterized by the engagement and active participation of different sectors of the economy and the community.
- Maximizing the use of ICTs requires an understanding of both its potentials and limitations.
- Convergence means more than just technology coming together. It means a merger of many disciplines, in particular the engineering sciences and the social and behavioural sciences.
- Convergence also means a multi-stakeholder partnership where government can implement favourable policy, regulation, funding and capacity building; the private sector can build infrastructure and invest in services; civil society can work with communities; and communities can own and drive initiatives.

Something To Do

Identify the department tasked with ICT policymaking in your country. Does the department have an inter-ministerial or inter-agency consulting or advisory group where both provider and user ministries are included? If yes, review its composition and decide whether all who should be included, are included.

If there is no such consulting or advisory group and you were to draft a proposal for its constitution, what argument would you use to justify its creation and composition (specify which agencies should be represented in the group)?

4.2 Planning ICTD Interventions

When considering an ICTD intervention, the first decision to be made is whether the intervention should be **ICT-driven** or **ICT-supported.** Both approaches are important, and in practice there is great variation in the ways in which ICTs have been used in development programmes and projects. The ICT-driven approach is based on the assumption that access to timely and relevant information through ICTs will promote economic growth as it provides opportunities to generate income. For example, initiatives such as telecentres offering access to e-mail and the use of a website as a marketing tool are favoured because they offer the opportunity to promote goods and to improve sales. Moreover, the ICT-driven approach to development is more likely to emphasize communication as a good outcome in itself. The ICT-supported approach first clarifies the development goal that the project seeks to address; works out the information and communication needs; and then looks at cost-effective ways of using ICTs to address the goals and the needs.

Whichever approach is taken, careful project planning is essential to avoid gaps between design and reality — in contexts, in approaches to planning and implementation, in perceptions and philosophies between the different stakeholders. Without planning, the consequence is often a mismatch between priorities, investments, deliverables and outcomes.

The Australian Agency for International Development (AusAID)[56] has developed a framework and checklist for the design of ICTD projects that will bring clarity to the planning process.

Box 2. Good practice guide for use of ICTD

Why?	Is the use of ICT-based project aimed clearly at achieving a specific poverty reduction goal?
Who?	Is there a clearly specified target group for poverty alleviation?
How	Is the form of ICT to be deployed appropriate in terms of cost, support, maintenance and compatibility with existing information flows?
How?	Is the form of ICT to be deployed scalable to enable it to be replicated and expanded?
How?	Are appropriate intermediaries being used?
How?	What scope is there for public private partnerships?
What?	Is the content transmitted by the ICT relevant to the audience and is it in a language easily understood by the target audience?
How long?	Is the project self-sustaining over what period?
How well?	What performance measurement, monitoring and evaluation processes are in place?
What risks?	Managing risk: 'What unexpected events or situations might arise?' and 'What should be done to manage these?'

Source: Richard Curtain, *Information and Communications Technologies and Development: Help or Hindrance?* (Canberra: AusAID, 2004), 29, http://www.developmentgateway.com.au/jahia/webdav/site/adg/shared/CurtainICT4DJan04.pdf.

56 Richard Curtain, *Information and Communications Technologies and Development: Help or Hindrance?* (Canberra: AusAID, 2004), 29, http://www.developmentgateway.com.au/jahia/webdav/site/adg/shared/CurtainICT4DJan04.pdf.

Addressing these questions up-front in consultation with all partners and stakeholders should help project planners and implementers avoid the pitfalls that have led to the failure of so many ICTD projects. Lessons learned from various ICT interventions[57] confirm that these components of good practice are in fact critical factors in ICTD planning.

First, ICT initiatives should be explicit about their development goals and expected outcomes. In an analysis undertaken for the AusAID – Virtual Colombo Plan, Curtain[58] has argued that ICT project goals should have a sharp focus and be clearly linked to specific MDG goals. The value of creating clear-cut links is that it makes it possible to exclude projects that cannot demonstrate their likely impact in terms of specific development objectives. It would also help in determining whether the project should be ICT-driven or ICT-supported. Technology choices then become simpler. Such an exercise would go a long way in reducing the possibility of project failure.

Second, ICTD interventions should be demand- rather than supply-driven, and the demand should come from the community itself. This implies the need to build partnerships with the community and to foster a sense of ownership by the community.

Third, ICT solutions should be sensitive to local conditions and limitations, including those related to infrastructure, access, relevance and language, and they should be designed to last and be sustainable. The choice of access technologies to provide connectivity; computer hardware and software elements; security systems to protect both the systems and the data from hacking, viruses and other security breaches are critical. Modules 4, 5 and 6 discuss these issues in more detail.

Fourth, a strong political commitment from the government is required. Such a commitment must be backed by a budgetary allocation that is adequate both in quantity and in the nature of its distribution. Where resources are limited, multi-stakeholder partnerships can lessen the burden of everyone involved. By ensuring multi-stakeholder partnerships, the government can reduce its own role to that of facilitating the creation and equitable diffusion of infrastructure and the adaptation and scaling up of successful pilot projects. Private sector and civil society organizations could provide funding assistance in the development of content, and facilitate and enable community participation. Strategic international and regional partnerships could also be explored. By pooling scarce resources, universal systems can be created for the benefit of all. Collaboration at this level takes time to build, but the results are definitely likely to create a win-win situation for all.

Fifth, it is necessary to ensure that ICT projects are process-oriented and not duration-specific or merely target-driven. Most development projects, especially if they are donor-funded, operate with fixed targets and fixed time frames. While these are planning constraints, it also has to be recognized that using ICTs effectively as development tools requires their long-term and sustained use. This is because the use of ICTs requires both attitudinal and systemic changes in organizations and communities and it is necessary to provide a sufficient lead time for ICTs to be embedded in the social fabric of the community. There are also time lags associated with the decision to use, the deployment of appropriate technologies, capacity building and use. These processes, although ideally parallel, are often done in a sequential and linear manner, necessitating more time than originally planned.[59] For this reason, sometimes by the time the project starts to show dividends, the fixed time frame is over, donor support is withdrawn and the project flounders.

57 Accenture, Markle Foundation and UNDP, *Creating a Development Dynamic: Final Report of the Digital Opportunity Initiative* (2001), http://www.opt-init.org/framework/DOI-Final-Report.pdf.
58 Curtain, op. cit., 29.
59 Farrell, op. cit.

How technology choices are made is also an important area of concern. Reddi and Dighe list the following questions for making technology choices:

- Is the technology easily available? Are the physical conditions appropriate for the chosen technology (e.g. electricity)?
- What steps are being taken to ensure access? Where is the technology centre located? Is the location physically and socially suitable and safe for target groups, especially women, to come and go without much effort and without disruption to their many responsibilities?
- Who owns and controls access to the technology?
- What is the cost of the technology being deployed in terms of funding and effort for the agency and for the user? What are the opportunity costs?
- How easy or complex is the technology to use?
- Is the technology interactive? How is interactivity built in?
- Is the technology portable? Can it be used any time, anywhere, or is it fixed in time and space, like television for instance?
- How easy is it to install, maintain, correct, modify and update the technology? Whose responsibility is it to undertake these tasks?[60]

As Reddi has pointed out:

> Often the choice of location of the technology is determined by questions of 'safety', not accessibility. Where the technology is placed in a community setting also determines the social issues that underpin access. If the technology is located in a local government office or school, what opportunities do the poor, who live at the fringes of the community, have to access it? Can women and girls visit the venue at any time convenient to them? If there is a custodian or facilitator identified to manage the location and use of the technology, what power roles does the custodian play? If control and operation is placed in the hands of a government employee or school teacher, how will that affect access to the marginalized?[61]

The cost of using the technology is also a key dimension of accessibility. Countries can capitalize on the opportunities provided by convergence to look for low-cost solutions. The telecentre is one such solution that has been proven to be useful. As discussed in section 2, a telecentre is a small kiosk or info shop in a village community with a volunteer or young village entrepreneur providing the vital link between the village and the world. The telecentre can have multiple functions, including serving as a community space not only for accessing information but also for village conversations, discussions and activities.

Other questions that need to be addressed when planning ICT-driven and ICT-supported interventions concern content. Dighe and Reddi suggest the following guide questions:

- Who are the users and what are their needs — i.e. what is the user profile, including their learning needs, levels and styles? Who is the content suited for?

60 Dighe and Reddi, op. cit., 43.
61 Usha Vyasulu Reddi, "Using ICTs to Remove Barriers in Education" (paper presented at the SEAMEO - UNESCO Education Congress and Expo: Adapting to Changing Times and Needs, Bangkok, Thailand, 27-29 May 2004).

- What biases — social, cultural, economic, religious, linguistic and gender-related — does the content address?
- Is the content relevant to the community? For instance, is it relevant in terms of the women's experiences? Is it locally developed? What is the community's involvement in content development?
- How is the content organized?
- Is the content accurate and up-to-date?
- How has the technology been modified to make it easy for the users to use, hear and understand the content?
- Are both individual and group learning built in and encouraged?
- Does the content encourage, promote and facilitate interactivity and feedback?
- What support systems, such as ground-level facilitators and learning materials, have been included and made available?
- What mechanisms are in place for correction and modification of the content?[62]

ICT projects run into difficulties for many reasons. Divergence between the project goals of the managers and those of the target groups is a common cause of failure. Gaps between design and reality caused by different contexts and conditions that are operating are also a frequent cause of project failure. While this may be true for many development interventions, it is particularly so for ICTD interventions, since issues of available data, technology infrastructure, work processes, cultural attitudes and motivations, staffing and skills, project time frames, management structures and inadequate budgetary provisions and gaps between planning and implementation lead to mismatches.[63] Many of these issues are discussed in Module 7 of this series.

Finally, ICT interventions in developing countries face the challenges of scale. Countries that have invested in large-scale systems have had to address the issues of centralized planning and deployment versus local relevance and regional needs and demands. All of them have had to face issues of access, equity and interactivity and have been, to some extent, overtaken by technological developments emerging out of the digital revolution. In contrast, digital ICT interventions tend to be small initiatives, locally friendly, responsive to the community, and problem-sensitive. This has been their strength. However, many have remained as 'pilots' and have not been mainstreamed. As a result, when donor funding has ended, these pilots end as well. When they have been successful, efforts have been made to replicate them or to scale them up but sometimes without taking into account the differing contexts and conditions and thereby negating the very features that made them successful. As the Asia-Pacific Development Information Programme (APDIP) of UNDP has pointed out, "localized adaptations to the opportunities offered by ICTs are fairly easy to achieve…adjustments at national levels require wholesale institutional reform and change management practices that can be expected to encounter entrenched resistance, scepticism, and interests that are vested in the status quo."[64]

62 Dighe and Reddi, op.cit., 46.
63 Richard Heeks, *Failure, Success and Improvisation of Information Systems Projects in Developing Countries*, Development Informatics Working Paper Series, Paper no. 11 (Manchester: Institute for Development Policy and Management, University of Manchester, 2002), http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/di_wp11.htm.
64 APDIP, "ICTs for Governance and Poverty Alleviation in India," UNDP, http://www.apdip.net/projects/2003/in.

There have been several analyses of success or failure of ICTD projects done by scholars and global agencies.[65] Clarity of objectives, target groups, intermediaries, policy environments, institutional arrangements, key linkages, processes, capacity building efforts, technology choices, and funding models — these are all factors that have been found to make the difference between success and failure.

To sum up

- A people-centric rather than ICT-centric approach is critical for ICTD programmes and projects to succeed.
- The factors that spell the difference between success and failure of an ICTD project include clarity of objectives, target groups, intermediaries, policy and institutional arrangements, capacity building efforts, technology choices and funding models.
- A successful small-scale initiative requires more than just replication in a different context to succeed. Scaling up an ICTD effort requires wholesale institutional reform and change management.

Something To Do

Select any one ICTD programme in your country, and analyse it in terms of policy, planning and implementation. In looking at the policy angle, determine what ICTD policy or policies complement or support the programme. In looking at the planning and implementation aspects, use the good practice guide for ICTD projects (Box 2) to evaluate the programme. Finally, on the basis of what you determine to be the programme's limitations, suggest ways of improving the programme.

Test Yourself

Using the basic log frame provided (see next page),

1. Identify a specific ICT-supported programme you will develop and describe the overall programme aims and specific objectives.
2. Define the performance indicators for the programme in specific terms. What mechanisms will you set up to achieve the programme objectives and target? What framework or systems will you set up? How will they work?
3. What methods will help you to assess performance? At what stages will you assess performance? What will be your indicators of impact? How will you feed that into your next programme?

65 See Karen Eggleston, Robert Jensen, and Richard Zeckhauser, "Information and Communication Technologies, Markets, and Economic Development," in ed. Geoffrey Kirkman, et al., *The Global Information Technology Report 2001-2002: Readiness for the Networked World* (New York: Oxford University Press, 2002), http://cyber.law.harvard.edu/publications/2002/The_Global_Information_Technology_Report_2001-2002; and S. Batchelorand S. Sugden, *An Analysis of infoDev Case Studies: Lessons Learned* (Readings: Gamos Ltd. and Big World, Washington D.C.: infoDev, 2003), http://www.sustainableicts.org/execsumm.htm. For case studies from the region, see APDIP, "ICTD Case Studies," UNDP, http://www.apdip.net/resources/case. For case studies from India, see Avik Ghosh, *Communication Technology and Human Development: Recent Experiences in the Indian Social Sector* (New Delhi: Sage Publications, 2006).

ICTs and MDG—Planning Framework for Policymakers/ Programme Implementation Managers
Data Collection Framework for Each Task, Activity and Impact

Overall Programme Goals and Objectives	Performance Indicators for the programme	What systems, procedures will be set up	How will you assess progress, output, impact

SUMMARY

This first module in the *Academy of ICT Essentials for Government Leaders* module series addresses the broad issues of development and argues for the meaningful application of appropriate ICTs toward accelerating the pace of development in developing countries of Asia Pacific.

The first section of the module introduces readers to the broad contours of the Millennium Development Goals and the progress of the Asia Pacific region toward the achievement of these goals. The section also introduces readers, in particular those with limited or no background in technology, to ICTs and the characteristics that make them strategic tools for development.

The second section of the module explores the use of ICTs in specific MDG sectors. Using selected case studies to describe the diversity of ICT use, the section highlights both the strengths and the weaknesses one might find in ICT applications in key sectors of development.

The final section of the module describes, in broad terms, challenges in the application of ICTs for development. It underscores the need for ICTD programmes and projects to be 'of the people, by the people, and for the people'. People-centric, rather than technology-centric, approaches are always more successful.

ANNEX

Further Reading

MDGs and ICT

ADB, ESCAP and UNDP. 2007. *The Millennium Development Goals: Progress in Asia and the Pacific 2007.* Bangkok: ADB, ESCAP and UNDP. http://www.unescap.org/stat/mdg/MDG-Progress-Report2007.pdf.

Asia-Pacific Development Information Programme. ICTD Case Studies. United Nations Development Programme. http://www.apdip.net/resources/case.

Curtain, Richard. 2004. *Information and Communications Technologies and Development: Help or Hindrance?* Canberra: AusAID. http://www.developmentgateway.com.au/jahia/webdav/site/adg/shared/CurtainICT4DJan04.pdf.

Dougherty, Michael. 2006. *Exploring New Modalities: Experiences with Information and Communications Technology Interventions in the Asia-Pacific Region - A Review and Analysis of the Pan-Asia ICT R&D Grants Programme*. Bangkok: UNDP-APDIP. http://www.unapcict.org/ecohub/resources/exploring-new-modalities.

UNDP. 2005. *Regional Human Development Report – Promoting ICT for Human Development in Asia: Realising the Millennium Development Goals*. New Delhi: UNDP, Elsevier. http://www.apdip.net/elibrary#rhdr.

UN Millennium Project. 2005. *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals*. New York: UNDP. http://www.unmillenniumproject.org/reports/fullreport.htm.

United Nations. 2007. *The Millennium Development Goals Report 2007*. New York: United Nations. http:// www.un.org/millenniumgoals/pdf/mdg2007.pdf.

Poverty Reduction and ICT

Harris, Roger. 2005. *APDIP e-Note 6 – ICTs for Poverty Reduction: Necessary but insufficient.* Bangkok: UNDP-APDIP. http://www.apdip.net/apdipenote/6.pdf.

Harris, Roger W. 2004. *Information and Communication Technologies for Poverty Alleviation.* Kuala Lumpur: UNDP-APDIP. http://www.apdip.net/publications/iespprimers/eprimer-pov.pdf and http://en.wikibooks.org/wiki/Information_and_Communication_Technologies_for_Poverty_Alleviation.

Kelles-Viitanen, Anita. 2003. *The Role of ICT in Poverty Reduction.* Finnish Ministry for Foreign Affairs. http://www.etla.fi/files/895_FES_03_1_role_of_ict.pdf.

OECD. 2005. *Good Practice Paper on ICTs for Economic Growth and Poverty Reduction*. Paris: OECD. http://www.oecd.org/dataoecd/2/46/35284979.pdf.

Telecentre.org. http://www.telecentre.org.

Education and ICT

Farrell, Glen and Cedric Wachholz. 2003. *Meta-survey on the Use of Technologies in Education in Asia and the Pacific*. Bangkok: UNESCO. http://www.unescobkk.org/index.php?id=1807.

ICT in Education Unit. e-Library. UNESCO Bangkok. http://www.unescobkk.org/index.php?id=799.

InfoDev. 2005. *Knowledge Maps: ICTs in Education*. Washington D.C.: The International Bank for Reconstruction and Development / The World Bank. http://www.infodev.org/files/2907_file_Knowledge_Maps_ICTs_Education_infoDev.pdf.

Wadi D. Haddad and Alexandra Draxler, eds. 2002. *Technologies for Education: Potentials, Parameters, and Prospects.* Paris: UNESCO and Washington, D.C.: AED. http://unesdoc.unesco.org/images/0011/001191/119129e.pdf.

Gender and ICT

Association for Progressive Communications Women's Networking Support Programme. *Gender Evaluation Methodology for Internet and ICTs: A learning tool for change and empowerment.* http://www.apcwomen.org/gemkit/home.htm.

Cummings, Sarah, Henk van Dam, and Minke Valk, eds. 2005. *Gender and ICTs for Development: A Global Source Book.* Oxford: Oxfam Publishing. http://publications.oxfam.org.uk/oxfam/display.asp?ISBN=0855985658.

Dighe, Anita and Usha Vyasulu Reddi. 2006. *Women's Literacy and Information and Communication Technologies: Lessons that Experience has Taught Us*. New Delhi: Commonwealth Educational Media Centre for Asia and Commonwealth of Learning. http://www.cemca.org/CEMCA_Womens_Literacy.pdf.

Thas, Angela M. Kuga, Chat Garcia Ramilo and Cheekay Cinco. 2007. *Gender and ICT.* Bangkok: UNDP-APDIP. http://www.apdip.net/publications/iespprimers/eprimer-gender.pdf and http://en.wikibooks.org/wiki/Gender_and_ICT.

Health and ICT

Economic and Social Commission for Asia and the Pacific. undated. *e-Health in Asia and the Pacific: Challenges and Opportunities.* Bangkok: United Nations. http://www.unescap.org/esid/hds/lastestadd/eHealthReport.pdf.

Rasmussen, Stine Loft. 2007. *APDIP e-Note 22 - e-Health Tools for the Asia-Pacific Region.* Bangkok: UNDP-APDIP. http://www.apdip.net/apdipenote/22.pdf.

Ouma, Stella and M. E. Herselman. 2008. E-health in Rural Areas: Case of Developing Countries. *In Proceedings of World Academy of Science, Engineering and Technology,* Volume 30 July 2008, 560-566. http://www.waset.org/pwaset/v30/v30-96.pdf.

Management of Natural Resources and ICT

ITU. 2008. *ICTs for e-Environment: Guidelines for Developing Countries, with a Focus on Climate Change.* Geneva: ITU.
http://www.itu.int/ITU-D/cyb/app/docs/itu-icts-for-e-environment.pdf.

Wattegama, Chanuka. 2007. *ICT for Disaster Management.* Bangkok: UNDP and Incheon: UN-APCICT. http://www.apdip.net/publications/iespprimers/eprimer-dm.pdf and http://en.wikibooks.org/wiki/ICT_for_Disaster_Management.

Governance and ICT

Bhatnagar, Subhash. 2006. *Paving the Road towards Pro-poor e-Governance: Findings and Observations from Asia-Pacific Case Studies.* Bangkok: UNDP.
http://www.apdip.net/projects/e-government/capblg/casestudies/Overview.pdf.

Riley, Thomas B. 2003. *E-Government vs. E-Governance: Examining the Differences in a Changing Public Sector Climate.* International Tracking Survey Report ’03, Number Four. London: Commonwealth Secretariat.
http://www.rileyis.com/publications/research_papers/tracking03/IntlTrackRptMay03no4.pdf.

Peace and ICT

Stauffacher, Daniel, William Drake, Paul Currion and Julia Steinberger. 2005. *Information and Communication Technology for Peace: The Role of ICT in Preventing, Responding to and Recovering from Conflict.* New York: United Nations ICT Task Force.
http://www.unicttaskforce.org/perl/documents.pl?id=1571.

Glossary

Analog	Measuring or representing data by means of one or more physical properties that can express any value along a continuous scale. For example, the position of the hands of a clock is an analog representation of time.
Asynchronous	Not synchronized or coordinated in time.
Audio-graphics	Computer-based technology that enables simultaneous transmission of voice, data and graphic images across local telephone lines.
Broadcast	Transmission of a radio or television programme or signal for public use.
Cable television	Cable television is a system of providing television to consumers via radio frequency signals transmitted to televisions through fixed optical fibres or coaxial cables as opposed to the over-the-air method used in traditional television broadcasting (via radio waves) in which a television antenna is required. FM radio programming, high-speed Internet, telephony and similar non-television services may also be provided via cable.
Collaborative learning	Learning through the exchange and sharing of information and opinions among a peer group. Computers can be used to mediate collaborative learning for geographically dispersed groups.
Common service facilities	A common location in a community where multiple services are offered to community members.
Computer-based learning	Computer-based learning, sometimes abbreviated to CBL, refers to the use of computers as a key component of the educational environment. While this can refer to the use of computers in a classroom, the term more broadly refers to a structured environment in which computers are used for teaching purposes. The concept is generally seen as being distinct from the use of computers in ways where learning is a peripheral element of the experience (e.g. computer games and Web browsing).
Conference conferencing (asynchronous)	A computer-based conference where the different participants, who are at different locations, need not be online at the same time.
Conference conferencing (synchronous)	A computer-based conference where the different participants, who are at different locations, must be online at the same time.
Computer file transfer	File transfer is the movement of one or more files from one location to another. A collection of electronically stored files can be moved by physically moving the electronic storage medium, such as a computer diskette, hard disk or compact disk, from one place to another or by sending the files over a telecommunications medium. On the Internet, the File Transfer Protocol (FTP) is a common way to transfer a single file or a relatively small number of files from one computer to another.
Convergence	Convergence means the coming together in a seamless way of telecommunications technology with all media, text, audio, graphics, animation and video such that all are delivered on a common platform while also allowing the user to choose any combination of media to interact with.
Correspondence materials	Materials for a distance education course, where the course of study is conducted by post, and the learning materials and student assignments are also conducted by post.
Corporate social	Corporate social responsibility or CSR (also called corporate responsibility,

responsibility	corporate citizenship and responsible business) is a concept whereby organizations consider the interests of society by taking responsibility for the impact of their activities on customers, suppliers, employees, shareholders, communities and other stakeholders, as well as the environment.
Cybercafés	A shop that offers computing facilities such as Internet access and e-mail.
Digital	Digital describes electronic technology that generates, stores and processes data in terms of two states: positive and non-positive. Positive is expressed or represented by the number 1 and non-positive by the number 0. Thus, data transmitted or stored with digital technology is expressed as a string of 0s and 1s.
Digital divide	The gap between individuals and societies with the resources to participate in the knowledge economy and those without such resources.
Economies of scale	Reduction in cost per unit resulting from increased production, realized through operational efficiencies. Economies of scale can be accomplished because as production increases, the cost of producing each additional unit falls.
Electronic blackboard	A device that looks like an ordinary blackboard or whiteboard, but can be interfaced with a computer.
Electronic bulletin board	A computer that is running software that allows users to leave messages and access information of general interest.
e-Commerce	Electronic commerce (or e-commerce) is the buying and selling of goods and services through the Internet, especially the World Wide Web.
e-Learning	Electronic learning (or e-learning) is a general term used to refer to a form of learning in which the instructor and student are separated by space or time, and where the gap between the two is bridged through the use of online technologies.
E-mail	Electronic mail (or e-mail) is a store-and-forward method of composing, sending, storing and receiving messages.
Facsimile	An exact copy or reproduction transmitted electronically.
First-generation learners	The first generation in a family to benefit from formal schooling.
Information literacy	The ability to recognize the need for information, and find, evaluate and use that information in whatever format (print index, online database, Internet, etc.) it appears.
Interactivity	In computers, interactivity is the dialog that occurs between a human being (or possibly another live creature) and a computer program.
Multimedia	The use of computers to present text, graphics, video, animation and sound in an integrated way. The term is also used to describe systems that support the interactive use of text, audio, still images, video and graphics. Each of these elements must be converted in some way from analog form to digital form before they can be used in a computer application.
Non-formal education	Any organized, systematic, educational activity carried on outside the framework of the formal school system to provide selected types of learning to particular subgroups in the population, adults as well as children.
SMS	Short message service, a service for sending text messages on a cellular

	telephone system. (http://en.wiktionary.org/wiki/SMS)
SchoolNets	Networks of schools. SchoolNets promote the development of knowledge societies by connecting schools to the Internet; building connections among students, teachers and schools; sharing information and resources; and supporting e-learning in online, networked environments.
Synchronous Radio	Synchronous means coordinated in time, if not in place. For radio, this means that transmission and listeners must tune in to the radio station at the same time although they may be in different locations.
Tele-classrooms	A system of creating a virtual classroom with students.
Teleconferencing	Interactive electronic communication between two or more people at two or more sites which makes use of voice, video and/or data transmission.
Teledensity	A term commonly used to describe the number of telephone lines per some unit of the population (often per 100 people).

Notes for Trainers

The module has been written within a particular perspective and with a special focus. The purpose of these 'Notes for Trainers' is to try to align the author's perceptions of the module content with those of national and regional training institutions and individuals who will take the modules forward in their own individual settings.

As noted in the section entitled 'About The Module Series', this module is designed to have value for different sets of audiences and in varied and changing national conditions. It is also designed to be presented, in whole or in part, in different modes, on- and off-line. Case and country studies may change from region to region and from country to country and therefore, the module may require customization to suit local settings. What will be presented and how it will be presented should depend on the situation at hand. The module may be studied by individuals and by groups in training institutions as well as within government offices. The duration of the training sessions will determine the extent of detail in the presentation of content.

These 'Notes' offer trainers some ideas and suggestions for presenting the module content more effectively. Trainers may adopt, adapt or create afresh the training plans presented here.

Further guidance on training approaches and strategies is provided in a handbook on instructional design developed as a companion material for the Academy of *ICT Essentials for Government Leaders* module series. The handbook is available at: http://www.unapcict.org/academy

General Notes on Effective Training Techniques

The module is designed for self-study as well as for 'classroom' delivery. Thus, each section of the module begins with a statement of learning objectives and ends with a summary of key points. Readers may use the objectives and summary of key points as a basis for assessing their progress through the module. Each section also contains discussion questions and practical exercises that may be accomplished by individual readers or used by trainers.

Case studies form a significant part of the module content. These are intended for discussion and analysis, particularly in terms of the extent to which the key concepts and principles presented in the module work in real-world projects and programmes. It is important for readers to appreciate the need to adapt ICT-based and ICT-supported approaches and models to suit local conditions.

The module is written according to the principles of adult learning. For example, it is recognized that adults learn best when they are free from stress and information overload, and they are able to decide for themselves what is important to be learned. The self-study questions and practical exercises are designed to enable readers to draw on their own experience to benchmark the content and to think reflectively on the issues presented. The aim is to make the content as closely relevant to their work experience as possible, and to enable them to link the knowledge gained to their own experience in order to solve problems. It is recognized that the readers of this module could themselves serve as knowledgeable resource persons. Trainers should keep this in mind when using the module as a training resource in different settings and with different groups of audiences. For example, trainers may encourage participants to cite other cases and examples from their own experience to substantiate the content of the module.

Structuring the Sessions

Depending on the audience, time available, and local settings and conditions, the content of the module can be presented in different structured time capsules. What could be covered in sessions of different durations is outlined below. Trainers are invited to modify the session structure based on their own intimate understanding of the country and audience.

For a 90-minute session

For senior policymakers: a broad summary of Section 2 of the module for a general understanding of ICT applications in development, including a detailed explanation of any one example from the case studies cited.

For project implementation staff: any one sector out of Section 3, including a detailed explanation of any one example from the relevant sector for the given target audience.

For programme and/or project management staff: Section 4, which looks into challenges to the use of ICT in development, along with a detailed presentation of any one case study from Section 3.

For a three-hour session

For an audience of policymakers: a broad summary of Sections 2 and 4, and a detailed explanation of any one case study followed by a practical session of 1 ½ hours.

For an audience of programme and/or project management staff: a broad summary of the relevant development sector from Section 3 and a detailed presentation of Section 4, followed by a practical exercise in project design and implementation planning.

A three-hour session may also be divided into two 90-minute sessions containing a summary of a relevant section, and a case study followed by a practical group exercise.

For a full day session (6 hours duration)

Use four 90-minute sessions and design the content progressively starting with Section 1 and progressing to Section 4. Use the same pedagogical approach described above.

For a three-day session

About ½ day could be spent on Section 2 of the module.

A day and a half could be spent on Section 3 of the module, with a field visit on the second day to a nearby ICTD application.

Lessons learned from the field visit could be used to bolster the discussion of Section 4 of the module on the third day. Participants could be invited to link the different challenges to the use of ICTs with the case study/field visit and to the content of the module being presented, so that they take away from the three-day programme a sound understanding of the critical importance of proper planning, design and implementation.

For a five-day session

A five-day session would be ideal for people involved in programme and project implementation. The emphasis in the module should be on the key sections, 3 and 4, and the in-class sessions should be interspersed with field visits to case study locations nearby.

Day 1 could consist of an extensive exploration of Section 2 of the module. Half a day could be spent on exploring progress on the MDGs, and on establishing the inter-sectoral linkages. For instance, a poverty alleviation initiative is likely to have spin-offs in health care and in education. Such linkages should be explored as they are vital to programme design and implementation. The second half of Day 1 could be spent on exploring the different ICTs, with a focus on looking at convergence and digital divide issues. A visit to a nearby telecentre, if possible, could round off the day's activities.

Days 2 and 3 could focus on applications of ICTs for meeting different MDGs (i.e. Section 3), with at least half a day devoted to a field visit. Case studies can be explored in detail. The field visit should be followed by an exercise applying to a planned intervention key principles and design features observed during the field visit.

Days 4 and 5 could continue with the exercise. The material in Section 4 of the module could be presented in an instructor-led session in the morning, followed by extensive practical work by individuals and groups in the afternoon. The fifth day would close with presentations of the exercise followed by peer review.

Trainers are encouraged to adapt for use the training slide presentations available at APCICT's website (http://www.unapcict.org/academy).

Trainers are also encouraged to structure each session to include both a lecture cum discussion, and individual or group exercises.

Ideally, there should be no more than 25 participants in a training session.

Trainers should use the references listed, and look up the original documents and websites cited. Trainers may also use other relevant case studies. However, they should remember to cite all references and sources in the presentation.

About the Author

Usha Rani Vyasulu Reddi is currently Professor of Education and Director of the Centre for Human Development at the Administrative Staff College of India in Hyderabad. From 1998 to 2006, she was Director of the Commonwealth Educational Media Centre for Asia based in New Delhi, India. Her work covered all of the Commonwealth countries of Asia and was focused on providing technical assistance and advice on the application of ICT in education, both formal and non-formal. Until 1998 she was Professor and Director of the Audio Visual Research Centre at Osmania University in Hyderabad. She has published widely in various academic, international and peer-reviewed publications.

UN-APCICT

The United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development (UN-APCICT) is a subsidiary body of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). UN-APCICT aims to strengthen the efforts of the member countries of ESCAP to use ICT in their socio-economic development through human and institutional capacity-building. UN-APCICT's work is focused on three pillars:

1. Training. To enhance the ICT knowledge and skills of policymakers and ICT professionals, and strengthen the capacity of ICT trainers and ICT training institutions;
2. Research. To undertake analytical studies related to human resource development in ICT; and
3. Advisory. To provide advisory services on human resource development programmes to ESCAP member and associate members.

UN-APCICT is located at Incheon, Republic of Korea.

http://www.unapcict.org

ESCAP

ESCAP is the regional development arm of the United Nations and serves as the main economic and social development centre for the United Nations in Asia and the Pacific. Its mandate is to foster cooperation between its 53 members and 9 associate members. ESCAP provides the strategic link between global and country-level programmes and issues. It supports Governments of countries in the region in consolidating regional positions and advocates regional approaches to meeting the region's unique socio-economic challenges in a globalizing world. The ESCAP office is located at Bangkok, Thailand.

http://www.unescap.org

The Academy of ICT Essentials for Government Leaders

http://www.unapcict.org/academy

The *Academy* is a comprehensive ICT for development training curriculum with eight initial modules that aims to equip policymakers with the essential knowledge and skills to fully leverage opportunities presented by ICTs to achieve national development goals and bridge the digital divide.

Module 1 – The Linkage between ICT Applications and Meaningful Development

Highlights key issues and decision points, from policy to implementation, in the use of ICTs for achieving the Millennium Development Goals.

Module 2 – ICT for Development Policy, Process and Governance

Focuses on ICTD policymaking and governance, and provides critical information about aspects of national policies, strategies and frameworks that promote ICTD.

Module 3 – e-Government Applications

Examines e-government concepts, principles and types of applications. It also discusses how an e-government system is built and identifies design considerations.

Module 4 – ICT Trends for Government Leaders

Provides insights into current trends in ICT and its future directions. It also looks at key technical and policy considerations when making decisions for ICTD.

Module 5 – Internet Governance

Discusses the ongoing development of international policies and procedures that govern the use and operation of the Internet.

Module 6 – Network and Information Security and Privacy

Presents information security issues and trends, and the process of formulating an information security strategy.

Module 7 – ICT Project Management in Theory and Practice

Introduces project management concepts that are relevant to ICTD projects, including the methods, processes and project management disciplines commonly used.

Module 8 – Options for Funding ICT for Development

Explores funding options for ICTD and e-government projects. Public-private partnerships are highlighted as a particularly useful funding option in developing countries.

These modules are being customized with local case studies by national *Academy* partners to ensure that the modules are relevant and meet the needs of policymakers in different countries. The modules are also been translated into different languages. Furthermore, these modules will be regularly updated to ensure their relevance to policymakers, and new modules will be developed that focus on ICTD for the 21st century.

APCICT Virtual Academy (AVA – http://ava.unapcict.org)

- An online distance learning platform for the *Academy*.
- Designed to ensure that all the *Academy* modules including virtual lectures, presentations and case studies are accessible online.
- Enables learners to study the materials at their own pace.

e-Collaborative Hub (e-Co Hub – http://www.unapcict.org/ecohub)

- A resources portal and knowledge sharing network for ICTD.
- Provides easy access to resources by module.
- Users can engage in online discussions and become part of the e-Co Hub's online community of practice that serves to share and expand the knowledge base of ICTD.

Register online to fully benefit from the services provided in AVA and the e-Co Hub at http://www.unapcict.org/join_form