

## CHAPTER 3.

# ICTD APPLICATIONS IN CORE SECTORS OF DEVELOPMENT

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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; lack of mobility; lack of access to jobs for young people; and increased vulnerability to the consequences of natural disasters and conflicts. Often, a simple lack of awareness and information about entitlements and facilities can aggravate the conditions of poverty.

In such circumstances, it is critical that the basic needs of food, clothing and shelter, and the income needed to address these basic needs are first addressed. Given a multidimensional understanding of poverty, the process of poverty alleviation will include the facilitation of empowerment,<sup>89</sup> promotion of opportunity and enhancement of security. This can be done in a number of ways. The use of ICTs for addressing core sectors of development is, on the one hand, to provide access to information and knowledge, access to income generation opportunities, and access to public services and facilities in agriculture, rural development and education, and so forth. On the other hand, ICTs can be used by governments, public authorities, NGOs and private sector initiatives to build large-scale decision support information systems that will help in the speedy, efficient and effective delivery of services.

### 3.1 ICTs in Agriculture and Poverty Alleviation

In most developing countries, agriculture is the mainstay of the economy. Small farm holdings, low productivity, and poor access to finance and to markets to sell produce at favourable rates lead farmers into a vicious cycle of poverty.<sup>90</sup> The importance of providing timely information about agricultural practices, markets, finance and other opportunities has been recognized by countries, and many countries have a long history of agricultural extension activities in which they have used conventional media, specifically radio and TV in support of agricultural growth and rural development. Radio continues to be the most omnipresent medium, followed by TV. In recent years, the agricultural sector has worked towards exploring and tapping the potentials that digital ICTs have to offer. Many agricultural extension systems have yet to understand and apply the opportunities that digital media offer for mapping weather conditions, applying the benefits of remote sensing to agricultural systems, and the ability of ICTs to provide quick response mechanisms.

Both kinds of ICT interventions, the direct interface between the services and the poor, and the more supportive and indirect interventions that include natural resource mapping and the revamping of the programme management information systems (MIS), are ways in which to address the poverty reduction goals. If one integrates, for instance, the use of technology for mapping of natural resources and weather conditions with the input provided by the agricultural extension system, and matches these with the active participation of the agricultural community in the process, opportunities for maximizing the benefits of ICTs for poverty reduction exist.

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<sup>89</sup> Empowerment refers to increasing the spiritual, political, social or economic strength of individuals and communities. It often involves the empowered developing confidence in their own capacities. The term empowerment covers a vast landscape of meanings, interpretations, definitions and disciplines ranging from psychology and philosophy to the highly commercialized self-help industry and motivational sciences.

<sup>90</sup> In India, nearly 200,000 farmers have committed suicide as a result of poverty during the past ten years.

**Figure 10. An ICT e-Choupal initiative for farmers to check commodity prices in India**



Source: Payal Kapadia, "Boss, Can U Spare Some Change?" *Outlook India*, 7 August 2006, <http://www.outlookindia.com/article.aspx?232105>.

Evidence from the many experiments underway in different parts of the world has shown that effective use of ICTs could help small and medium 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. In Viet Nam, villages such as Bat Trang and Hoi An are reported to have created websites by themselves to promote the selling of village goods.<sup>91</sup>



### **Case 3. Reuters Market Light, India**

A farmer in India receives only 20-25 per cent price for their final produce vis-à-vis 40-50 per cent in the developed world. They suffer economic losses because there is a lack of timely and reliable information on prices, weather and other news that affect crop or input prices, government schemes and sources of finance.

Reuters Market Light (RML) is the first mobile phone-based, highly personalized, professional information service that is specially designed for the Indian farming community. Launched on 1 October 2007, the information provided by RML is personalized to the needs of the individual farmer and includes daily spot prices, localized weather details, crop advisories and commodity news—all dynamically updated.

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

**Figure 11. A farmer uses his mobile phone to receive information from RML**



All this is delivered as per the individual preferences of crops, markets and location of each farmer in his local language. Through sharing, it is estimated in 2010 to have been used by over a million farmers in over 15,000 villages across all handsets and telecom operators. To use this service, a farmer needs to purchase a pre-paid card with a value of INR 260 (USD 5) for three months from a variety of rural outlets. The information provided by RML enables farmers to take informed decisions and reduces their production and marketing risks, thereby increasing their incomes.

The biggest change RML has brought about among the farmers is that it has provided them with knowledge that has led to direct financial benefits. The model is both financially and socially sustainable, having become part of the daily routine of farmers.

*Sources:* <http://www.youtube.com/watch?v=MYZsWWhfO1I>; and author's personal field visit and interviews with farmers in Maharashtra, India in September 2010.

Another specific way in which ICTs are directly impacting upon rural economies is through remittances from non-resident citizens and the diasporas<sup>92</sup> abroad. The G8 group of countries estimates that international remittances are now approaching USD 100 billion annually. The simple mobile phone is proving to be an important factor facilitating the flow of remittances, both international and national, as it is in the flow of goods and services within nations.<sup>93</sup>

These are direct approaches, where the poor are directly linked through ICTs to markets and economic opportunities and income sources; and where they can receive financial remittances directly through a mobile-enabled link. For governments, it is equally important to address the multidimensional aspects of poverty through the creation of effective ICT-based systems for supporting large public development programmes addressing poverty issues. Such public programmes, supported by ICTs, can be dynamic, readily expandable and/or replicable.

An example is the use of ICT applications by the Government of India to support a commitment to provide the rural poor with employment for at least 100 days annually under India's National Rural Employment Guarantee Act (see case 4).

<sup>92</sup> A diaspora is any movement of a population sharing common national and/or ethnic identity. While refugees may or may not ultimately settle in a new geographic location, the term diaspora refers to a permanently displaced and relocated collective group of people, for instance, a Bangladeshi community living in the United Kingdom or United States.

<sup>93</sup> OECD, "Good Practice Paper on ICTs for Economic Growth and Poverty Reduction", 2005, <http://www.oecd.org/dataoecd/2/46/35284979.pdf>. For a case study of the mobile wallet in Bangladesh, see David Murphy, "Comviva Powers M-wallet Service in Bangladesh", *MobileMarketing*, October 2010, <http://mobilemarketingmagazine.com/content/comviva-powers-m-wallet-service-bangladesh>.



## Case 4. The Mahatma Gandhi National Rural Employment Guarantee Act, India

In India, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) passed in 2005 aims to enhance the livelihood security of people in rural areas by guaranteeing 100 days of wage-employment in a financial year to rural households that volunteer to do unskilled manual work. The programme, under implementation in many Indian states, has been using ICTs very effectively for providing both the managers and the poor ready access to information.

Figure 12. Screenshot of the MGNREGA website



The implementation of this massive programme posed a series of problems, from its management to issues of social accountability and transparency in the system. This led to the use of ICTs to provide an end-to-end MIS solution that links and interconnects all villages and villagers, and all officials through an ICT backbone. The Web-enabled MIS system makes data transparent and available in the public domain for all to access.

The village level household database has internal checks for ensuring consistency and conformity to normative processes. It includes separate entries for approximately 250,000 villages across 34 States and Union Territories. The portal places complete transaction level data in the public domain, for example: job cards, demand for work and muster rolls that are attendance cum payment sheet for workers.

All critical parameters are monitored in the public domain, including workers' entitlement data and documents, work selection, procurement, execution and payment. Data such as employment demanded and provided, and financial data such as funds available and used are also monitored.

All stakeholders in the programme have access to the data, including the poor village labourers, the local and state level administrators and implementation personnel, public and elected officials, the Ministry of Rural Development and administrators of the Government of India.

The programme had to overcome considerable stumbling blocks of resistance, yet it has been successful in providing up-to-date information for policymakers and implementation personnel. More importantly, it has enabled the poor and the village communities to seek and question the data, as stipulated in India's Right to Information Act. Any poor person, can, with a little help, access the information and seek redressal for grievances, thereby encompassing social accountability of the government mandated under the programme.

Across the board, independent evaluators have testified to the fact that the success of the programme has largely been due to the use of ICTs in managing and administering the programme. There are, of course, opportunities for improvement, and the continuous monitoring feeds into such improvements.

*Sources:* Ministry of Rural Development, Government of India, "The Mahatma Gandhi National Rural Employment Guarantee Act 2005", <http://nrega.nic.in/netnrega/home.aspx>; and author's personal field visits and discussions with independent evaluators from the Administrative Staff College of India, India.

There are a variety of initiatives throughout Asia<sup>94</sup> that use ICTs to provide vital linkages between rural communities and the global markets. In Bangladesh, the e-Krishok or e-Farmer offers information and advisory services to farmers.<sup>95</sup> Similarly, Sri Lanka's eFarms website offers information and training resources to farmers in Sri Lanka in Tamil and Sinhalese.<sup>96</sup> Another example is the Ningxia ICT Project in China (see case 5).



### Case 5. The Ningxia ICT Project China, 2007-2008

Ningxia is a province located in western China, with a rural population of 3.4 million, that is 53 per cent of the total provincial population. The ecological climate of the province is dry and there are water shortages. The economic development of Ningxia is relatively slow and the regional GDP is well below the national average.

The application of ICTs to address rural needs in China is part of national policy. Collaborators in the Ningxia ICT project included the Ningxia Branch of China Telecom, the General Bureau of Ningxia Broadcast and TV, and other related departments such as the West China Electronic Company. The intervention was supported by the Knowledge Networking for Rural Development in the Asia-Pacific Region (ENRAP) ICT for Rural Livelihoods Initiative.<sup>97</sup>

Through the integration of three platforms (telecommunications, TV and the Internet), a new integrated operational platform was created. The Ningxia ICT project consisted of an Internet protocol TV system, a comprehensive information service website for rural Ningxia, a call centre for agricultural farmers in the rural areas, and a village information centre to campaign for rural development.

94 UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia*.

95 See e-Krishok, <http://www.ekrishok.com> and Bangladesh Institute of ICT in Development, "e-Krishok", in *WSIS Stocktaking: Success Stories 2011 - Case Studies* (Geneva, ITU, 2011), pp. 43-48, [http://groups.itu.int/Portals/30/documents/WSIS/WSIS\\_ST\\_Success\\_Stories\\_2011\\_E.pdf](http://groups.itu.int/Portals/30/documents/WSIS/WSIS_ST_Success_Stories_2011_E.pdf).

96 eFarms, <http://www.efarms.lk>.

97 For more information on ENRAP see case study entitled, "Knowledge Networking for Rural Development in the Asia/Pacific Region".

The comprehensive information website provides information on topics such as agriculture, markets, weather, financial instruments and health. Call centres provide voice and video support on aspects such as agricultural technology and processes. The village information centre provides an access point with facilities for the farmers to download and upload information to websites. The call centre is connected to each village information centre using video technology, making face-to-face communication between experts and farmers possible.

An extensive impact assessment of the project was carried out in 2010. Results showed that the use of ICTs varied among various groups according to gender, age, education, occupation and economic level. Education level was a key factor in determining the use of ICTs.

The impact assessment also showed that the ICT application in Ningxia has had an impact on rural livelihoods, but the potential of the project depends not only on financial resources but also on access to a broad range of social, political and educational resources. Where ICTs have been used well, they have been used as a supplement to, not a substitute for existing information systems and technology extensions.

Source: Nie Fengying, et. al., "Evaluation of a rural information project in Ningxia, China", in *Strengthening Rural Livelihoods: The Impact of Information and Communication Technologies in Asia*, David J. Grimshaw and Shalini Kala, eds. (Ottawa, IDRC, 2011), pp. 109-132. <http://idl-bnc.idrc.ca/dspace/bitstream/10625/45947/1/132419.pdf>.

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 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.



### **Case 6. Knowledge networking for rural development in the Asia-Pacific region**

ENRAP was a collaboration between the International Fund for Agricultural Development (IFAD) and IDRC that was designed to bring the benefits of accessing and sharing global information resources to IFAD-supported rural development projects in the Asia-Pacific region. Its third and final phase ended in 2010. Based on the lessons learned and best practices from ENRAP, IFAD Asia (<http://asia.ifad.org>), a new knowledge sharing portal has been created for IFAD partners, stakeholders and others working to reduce rural poverty.

The ENRAP initiative developed skills in accessing, managing and sharing knowledge relevant to IFAD project objectives and implementation. Users of the knowledge sharing system included project staff and their partners who work directly with rural communities and help make the knowledge available at the grass-roots level. The project sought to foster a culture for knowledge sharing and learning among all of the stakeholders of IFAD projects.

ENRAP investigated strategies, processes, methods and technologies to support rural communication and knowledge networking, and developed recommendations for future activities. It initiated 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 were a special focus. Local electronic newsletters, agricultural market information dissemination, and shared electronic libraries were examples of ENRAP-supported activities.

ENRAP included selected groups of projects in the Asia-Pacific region. The Ningxia ICT project reported as a case in this primer is an example of an ENRAP-supported project. Other countries not receiving direct assistance from ENRAP were able to benefit from free training materials, documents and databases available on the ENRAP website, as well as technical advice and allocation of working space on the ENRAP website.

ENRAP pursued a participatory and inclusive approach and engaged all stakeholders in decision-making processes. It also promoted knowledge sharing and collaboration through its website. It allowed for interactive database access, posting of documents and photographs in native formats by all users, conducting electronic conferences, and contributing Web pages online.

The effective use of the Internet and electronic communication by project staff and, ultimately, by project communities contributed to the empowerment of rural people and helped them better address their development objectives.

A static full copy of the ENRAP website is available at <http://asia.ifad.org/web/956-IDRC>.



### Points To Remember

- There is enough evidence to show that there is a direct connection between investment in ICTs and poverty reduction strategies.
- Direct ICT interventions that address poverty reduction link the poor to markets and market information.
- Equally important are indirect ICT interventions that support poverty alleviation programmes.
- Such interventions can be in the form of government programmes, NGO interventions and corporate social responsibility projects of the private sector.



### Youth In Action 2. Smallholders Farmers Rural Radio

To develop relevant e-content to improve agricultural production and promote environmental conservation, a Nigerian youth developed the Smallholders Farmers Rural Radio and broadcasts information on agricultural and environmental management techniques, daily market information and farm products. The radio is interactive and invites feedback from listeners through the deployment of interactive radio mobile devices. This is a simple communication system intended to link those off the cellular and electrical grid with the rural radio. The device is small, rugged

and solar-powered. It records user voice input, and then asynchronously forwards voice feedback to the radio station via an ad-hoc delay-tolerant network. Due to the low power footprint, ease of use, and use of wireless connectivity between devices, users do not incur any costs. The project reported to have improved the livelihood of 65 per cent of the listeners, increased farmers' household income from USD 1 to USD 1.50 per day, and restored over 700 hectares of rainforests.

*Sources:* Smallholders Foundation, "The Smallholders Farmers Rural Radio", [http://smallholdersfoundation.org/our\\_projects.html](http://smallholdersfoundation.org/our_projects.html); and World Summit Youth Award, "The Smallholders Farmers Rural Radio", <http://www.youthaward.org/winners/smallholders-farmers-rural-radio>.



### Youth in Action 3. Nahrani.com

To alleviate poverty and hunger, a Bulgarian youngster developed Nahrani.com that involves users in a word game. The food that users donate through playing the word game is provided by the website's advertisers. For them, it is a simple ad; for the people in need it is a hope to overcome their misery.

*Sources:* Nahrani.com; and World Summit Youth Award, "Nahrani.com - Improve your vocabulary and provide food to people in need", <http://www.youthaward.org/winners/nahranicom-improve-your-vocabulary-and-provide-food-people-need>.

## 3.2 ICTs in Education

The right to education is well recognized as fundamental, and education is seen as a vital input to addressing issues of poverty, gender equality and health in the MDGs. This has led to an expansion of demand for education at all levels. Given limited education budgets, the opposing demand for increased investment in education against widespread scarcity of resources puts intolerable pressure on many countries' educational systems. Meeting these opposing demands through the traditional expansion of education systems, such as building schools, hiring teachers and equipping schools with adequate educational resources will be impossible in a conventional system of education. ICTs offer alternate solutions for providing access and equity, and for collaborative practices to optimize costs and effectively use resources.

Just as there are different pathways to achieving a country's educational goals, different ICTs have different potentials to contribute to the different aspects of educational development and effective learning. Planning for use necessitates an understanding of the potential of various ICTs to meet different objectives. This understanding affects the choices of technologies and the modalities of their use.

The impact of ICTs on education has been second only to their impact on business practices around the world. A quick broad survey of national efforts will reveal that the use of ICTs is as extensive as it is diverse, ranging from a long history of use of conventional media—radio and TV in countries like China, India and Mexico—to the more recent and very successful use of ICTs in education in Singapore (see figure 13).<sup>98</sup>

Decision makers and teachers, who were earlier very skeptical, now want to know how this innovation will increase access to educational opportunities, what the costs are and what impact there will be on the key issues plaguing developing countries' attempts to address educational

<sup>98</sup> In 1997, Singapore launched a Master Plan for IT in Education. This has led to a highly successful and innovative ICT for education programme with four specific pillars: curriculum and assessment; learning resources; human resource development; and physical and technological infrastructure.



issues related to access, equity, resources and quality. Generally, access and equity are enabled by extending reach, while quality of digital content remains the same irrespective of time and distance, and ICT-based systems are cost effective in the long run.

**Figure 13. ICT usage in Singapore<sup>99</sup>**

In 1997, Singapore launched a Masterplan for IT in Education (MPITE) was initiated to:

- enhance linkage between schools and the surrounding world
- generate innovative processes in education
- enhance creative thinking, lifelong learning and social responsibility
- promote management excellence in the education system.

This has led to a highly successful and innovative ICT for Education program, based on four key dimensions:

- 1. Curriculum and Assessment**  
Focusing on achieving a better balance between skills and knowledge, encouraging pupils to engage in independent learning and including assessment modes that include information, thinking and communication.
- 2. Learning Resources**  
Emphasizing the development of appropriate educational software, facilitating use of relevant internet resources, and providing effective procurement systems.
- 3. Human Resource Development**  
Training every teacher and trainee teacher in the appropriate use of ICT, and involving partnerships with industry and institutions of higher learning.
- 4. Physical and technological infrastructure**  
Providing access to IT in all learning areas of schools, with school networks, a pupil: computer ratio of 2:1 and a teacher: computer ratio of 2:1.

See <http://www.moe.gov.sg/edumall/mpile/overview/index.html>, accessed 6th May 2005.

There is often confusion in understanding what the term “ICTs in education” means. In some instances, it has meant “ICT education”, that is the creation of a pool of human resources to cater to the growing knowledge society needs. In other countries, the use of ICTs in education has meant “ICT supported education” and this has resulted in a large number of distance learning systems providing learning opportunities and consequently increasing access to education. In still some other cases, the term has meant “ICT enabled education”—essentially meaning the use of ICTs as a primary channel of educational interaction, that is e-learning and m-learning. Very rarely has ICT education been understood as ICTD education or the deployment of ICTs to address development goals.

**Figure 14. The 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.

Other activities have also come under the rubric of ICTs in education. The trends that are emerging and that involve ICT adoption are specifically in the areas of open learning models (both as distance learning and as knowledge networks); the collaboration and sharing across schools and school systems (Schoolnets); the creation of text and audio-visual resources as “learning objects”<sup>100</sup> available as open educational resources;<sup>101</sup> and the different ways in which teachers are using ICTs to enhance teaching and learning processes in their classrooms. Adding to the array of applications are the sectors in which ICTs are increasingly being deployed—formal, non-formal, distance and teacher education settings, and for broad educational and specifically instructional purposes.

99 Tim Unwin, “Capacity Building and Management in ICT for Education”, in *Monitoring and Evaluation of ICT in Education Projects: A Handbook for Developing Countries*, Daniel A. Wagner, et. al. (Washington, D.C., infoDev / World Bank, 2005), p. 50, <http://www.infodev.org/en/Publication.9.html>.

100 A learning object is a resource, usually digital and web based, that can be used and reused to support learning.

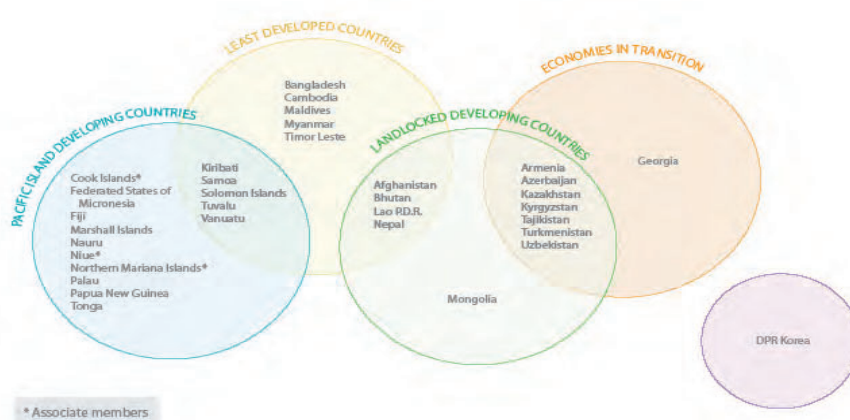
101 Open educational resources are digitized materials offered freely and openly for educators, students and self-learners to use and reuse for teaching. See [http://en.wikipedia.org/wiki/Open\\_educational\\_resources](http://en.wikipedia.org/wiki/Open_educational_resources).

This section examines the use of ICTs in the broad areas of educational settings—the formal, curriculum-based settings of school and distance education; and the more development-oriented non-formal education. Teacher education efforts will also be examined. While a few large-scale country models will be described, the analysis will focus on the collaborative efforts between island communities and small landlocked states that have very unique and special conditions to consider.

### ICTs in Formal Education

A UNESCO study<sup>102</sup> categorized the Asian countries into three broad groupings based on the level of integration of ICTs into the education systems. Advanced countries with integrated ICT in the education system included Australia, the Republic of Korea and Singapore. In these countries, almost all classrooms are equipped with computers and other ICT tools; student computer ratio is high; Internet access is available; curriculum reform and revision has taken place; and delivery of education is increasingly online. A second grouping, which includes countries such as China, India, Japan, Malaysia, the Philippines and Thailand, are those where various ICT integration policies have been formulated but ICTs are not fully integrated into the systems. The third and last group of countries, for example Bhutan and Nepal, is where work has just begun and pilot projects are running, but much work still needs to be done; and it is also where ICT infrastructure and penetration are still limited. Most of the ESCAP high priority countries<sup>103</sup> (landlocked developing countries, least developed countries, economies in transition, and the Pacific Island developing countries) would come under the third grouping where there is an urgency to look at models that have a potential to succeed in addressing ICT for education needs. These high priority countries of the Asia-Pacific region are listed in figure 15.

Figure 15. ESCAP high priority countries



Source: Usha Rani Vyasulu Reddi, *Module 1: Linkage between ICT Applications and Meaningful Development*, 2<sup>nd</sup> edition, *Academy of ICT Essentials for Government Leaders* module series (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy/>.

To provide education for all, and reduce the deficiencies in quality with limited resources, many developing countries have established open school systems. These systems provide formal education through distance learning methods to out-of-school youths and disadvantaged and poor communities who would otherwise, for financial or social reasons, not be able to access education. The case study of “eSkwela” in the Philippines presented below, is one that best blends the requirements of formal education with the potential that ICTs offer for addressing educational problems.

102 UNESCO, *Integrating ICTs into Education: Lessons Learned* (Bangkok, 2004), <http://www.unescobkk.org/education/ict/online-resources/e-library/elibrary-themes/teaching-and-learning/integrating-icts-lessons-learned-volume-1/>.

103 Goal 8, Target 18 of the MDGs charges the international community with the commitment to address the special needs of landlocked, small island states and the least developed countries.



## Case 7. eSkwela, Philippines

Educational data in the Philippines had showed that only 43 per cent of those enrolled in the school system completed high school. This led to the exploration of new and different ways of providing schooling to out-of-school youth.

The Philippines' eSkwela Project is an initiative of the Commission on ICT. It aims to:

- Provide ICT-enhanced educational opportunities for Filipino out-of-school youth and adults.
- Enhance the capacity of these individuals to be successful participants in a global and knowledge-based economy.
- Help reduce the digital divide.

The initiative responds directly to a national development priority. It brings e-learning opportunities and ICT for learning resources to teachers, instructional managers and out-of-school learners in the Philippines in an exciting, innovative and locally meaningful way.

Under this project, community-based e-Learning Centres or eSkwelas are being established across the country to conduct ICT-enhanced alternative education programmes. These centres serve as venues where out-of-school learners and other community members can learn new skills and competencies, review for the Accreditation and Equivalency Exam of the Bureau of Alternative Learning System, and/or help prepare learners to rejoin the formal school system, if so desired.

The eSkwela Project utilizes an ICT-enabled, inquiry-based, interdisciplinary, and thematic approach to learning and teaching. At the heart of the eSkwela Project is its instructional design. It is a blended type of learner-centred instruction where students will have one hour of computer-aided learning via interactive e-learning modules, one hour of teacher-led instruction (based on the current needs of the learners), and one hour of collaborative group activities and projects. The project currently has 123 of the 283 targeted e-learning modules certified by the Bureau of Alternative Learning System of the Department of Education.

Partnerships with other government educational systems, universities, NGOs and communities has helped to make education interactive, appealing, relevant, enriching and readily available for Filipino out-of-school youth and adults, with a curriculum that has the enhancement of life skills and lifelong learning skills at its core.

Sources: eSkwela, <http://eskwela-apc-nstp.wikispaces.com/about+the+project>; and eSkwela, "The eSkwela Project: The Establishment of Community e-Learning Centers for the Out-of-School Youth and Adults", <http://alseskwela.ning.com/page/the-eskwela-project-1>.

A similar but smaller experiment in Mongolia revealed what would be major constraints and ground realities that needed to be addressed if ICT use in education would be successful.



## Case 8. ICT in education initiative in rural schools in Mongolia

With the aim of providing developing member countries with better guidelines for using ICTs in Education, the project titled the “Innovative Information and Communication Technology in Education and its Potential for Reducing Poverty in Asia and the Pacific Region” was implemented in four countries, including Mongolia. The ICT for Innovating Rural Education in Mongolia Project was supported by ADB.

In Mongolia, 45 schools in rural areas of the country were provided with an equipment package consisting of at least one laptop, one liquid crystal display (LCD) projector and one digital camera. Teachers were given training in the use of the equipment and in the development of electronic teaching materials, including an introduction to integrating ICT into classroom teaching. A set of Mongolian education software titles for the subject matter, for professional development and for teacher productivity were also provided. In cases where electricity was not available, diesel generators were provided.

In summary, various activities were undertaken as part of the project. They included: capacity building for teachers and administrators, equipment procurement, and follow up training interventions.

The impact assessment conducted at the end of the 21-month project indicated that there are indeed differences to be noted on dimensions of teaching quality between schools that participated in the project and those that did not. At the same time, there were physical constraints, such as lack of electricity and lack of Internet access.

Overall, what became clear is that there are a number of drivers and barriers to the effective use of ICTs by teachers to enhance learning. Drivers and barriers exist at the teacher, school, and system level.

Source: Caarmen Strigel, Lkhagvasren Ariunaa, and Sukhbaator Enkhjargal, “ICT in Education Initiatives in Rural Schools in Mongolia”, in *ICT in Teacher Education: Case Studies from the Asia-Pacific Region*, Ellie Meleisea, ed. (Bangkok, UNESCO, 2007), pp. 95-109, [http://portal.unesco.org/ci/en/ev.php-URL\\_ID=25825&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/ci/en/ev.php-URL_ID=25825&URL_DO=DO_TOPIC&URL_SECTION=201.html).

## ICTs in Higher Education

The most extensive use of ICTs in education has, however, been in higher education, especially with the establishment of open and distance learning institutions. These institutions are founded on the premise that the physical distance between teachers and learners can be bridged through the development of high quality learning materials delivered to students through various technology tools. Many follow the model of the Open University of the United Kingdom and can be found in all the countries of South, East and South-East Asia and the South Pacific.<sup>104</sup> One of the oldest and most successful models of ICT application in formal education with a history of technology application dating more than three decades, especially in the Asia-Pacific region, is the USP.

<sup>104</sup> The website of the Asian Association of Open Universities lists all the member universities at <http://www.aaou.net>.



## Case 9. University of the South Pacific and USPNet

Established in 1968, USP is the only university of its type in the world. It is jointly owned by the governments of 12 island countries: Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu. The university has campuses in all the 12 member countries and is in a region spread across 33 million square kilometres of ocean. The main campus, Laucala, is in Fiji. The Alafua Campus in Samoa is where the School of Agriculture and Food Technology is situated, and the Emalus Campus in Vanuatu is the location for the School of Law. The university also offers programmes through Distance and Flexible Learning in a variety of modes and technologies throughout USP's 15 campuses.

Long before ICTs became a household word in education, USP had operationalized a system of delivering education via a satellite-based two-way audio communication system. The system grew to a modern ICT-based network called the USPNet, a satellite communications network connecting all 12 member countries of USP. Video conferences allow people from several different countries to see and hear each other through a live video feed, and video broadcasts allow one-way transmissions of lectures to the USP Distance Learning Centres.

USPNet is today the USP-owned wide area network incorporating a 5 MHz IP satellite-based technology to deliver and integrate distance learning, and educational and administrative services throughout its 12 member countries.

The university owns and operates this private network, purely for USP use. For USP's distant students and staff, USPNet provides for the opportunity to: participate in interactive audio tutorials (conducted from any campus), communicate by e-mail with lecturers/tutors or other students, access the World Wide Web, access online MIS and banner applications, watch a live video multicast, access multimedia materials via server downloads, and participate in live video conferences (and tutoring) with the Laucala Campus in Suva. The implementation of two-way telephony is being planned for the near future.

The USPNet satellite earth stations are designed with different capabilities to meet the requirements of the university in an efficient way. The "Hub" is at the Laucala Campus in Suva. With a 7.6 metre antenna that has maximum transmit power of 100 watts, it is the master station. The Hub Station is responsible for synchronizing, controlling and allocation of all (outbound) services towards all the remote very small aperture terminals (VSATs) within the whole of USPNet. This is via a 1.9 Mb/s bandwidth pipe allocation from Laucala Campus.

*Source:* USP, "About the University", [http://www.usp.ac.fj/index.php?id=usp\\_introduction](http://www.usp.ac.fj/index.php?id=usp_introduction).

The model of the USP, which is that of a consortia arrangement of 12 countries separated by oceans of water, is one to be examined and evaluated more carefully as a model to follow for the landlocked poor countries of Central Asia, for instance. Instead of discussions on very high technology approaches in each individual country, countries could look at Asian models of success or opportunities like the USP and the emerging Virtual University for Small States of the Commonwealth.<sup>105</sup>

<sup>105</sup> See Virtual University for Small States of the Commonwealth, <http://www.vussc.info>.

## ICTs for Non-formal Education

Experience with using ICTs for non-formal education is extensive in developing countries and the Asia-Pacific region is no exception. Some of the earliest examples of technology applications can be found here. Breaking through traditional constraints of space and time, and with reach extending to the most remote areas, ICT applications for non-formal education have ranged from literacy and basic education to lifelong education and skill enhancement in specialized fields of study, such as continuing medical education.<sup>106</sup>

Today, the term non-formal education is an integral part of a lifelong learning concept that allows young people and adults to acquire and maintain the skills and abilities needed to adapt to a continuously changing environment. It goes beyond the provision of basic education and it assumes different dimensions depending on the needs and interests of the learners, reflecting the diversity of their demographic and socio-economic circumstances. For developing countries, however, a more traditional concept of non-formal education still prevails.

For example, literacy programmes have historically involved face-to-face interactions between and among learners and tutors. Other than radio and TV, ICT has not had much applicability because of the lack of resources and infrastructure in the communities where literacy programmes have typically been offered. But there is evidence that this is changing. A case in point is the Tata Group in India that is taking up the challenge to eradicate adult illiteracy through its computer-based functional literacy programme.<sup>107</sup>

**Figure 16. Computer training in Lao PDR**



Source: United Nations Office on Drugs and Crime, Report on the BLO - Computer Based Training (CBT) Workshop, 11-14 May 2009, Vientiane, Lao PDR, [http://www.unodc.org/documents/eastasiaandpacific/topics/Illicit\\_trafficking/BLO-CBT\\_LAO\\_PDR\\_2009.pdf](http://www.unodc.org/documents/eastasiaandpacific/topics/Illicit_trafficking/BLO-CBT_LAO_PDR_2009.pdf).

The government of the Lao People's Democratic Republic has made technical vocational education and training an economic priority.<sup>108</sup>

106 Anita Dighe, Hameed A. Hakeem and Sheldon Shaeffer, "ICTs in non-formal education in Asia Pacific", in *Digital Review of Asia Pacific 2009-2010*, Shahid Akhtar and Patricia Arinto, eds. (New Delhi, Sage, Montréal, Orbicom and Ottawa, IDRC, 2010), p. 59. <http://www.digital-review.org>.

107 Tata Literacy, <http://www.tataliteracy.com>.

108 ADB, "Proposed Grant Lao People's Democratic Republic: Strengthening Technical and Vocational Education and Training Project in Manila", Report and Recommendation of the President to the Board of Directors (June 2010), <http://www.adb.org/Documents/RRPs/LAO/42278/42278-02-lao-rp.pdf>.

A project in the Solomon Islands is another illustration of the application of ICT in developing literacy skills (in this case, pre-tertiary English and English for all purposes), but in the context of a more specific national development goal. The purpose of the project was to explore the feasibility of using an existing communications network (PFnet) to provide educational opportunities to remote communities. USP established a PFnet gateway base station in the rural community of Sasamunga, Choiseul along with a solar-powered computer centre at the community school. Participants rated the project as very successful and achievements of the distance learners were high. More important, organizational and attitude changes were observed as village leaders came to realize the importance of good leadership in their communities, and staff and administrators at Sasamunga Community High and Primary School now have access to computers.

Finally, while ICTs do offer many beneficial opportunities for education, they are no substitute for formal schooling, even if technology may play a part in meeting the needs of children or adults who, for economic, social, or other reasons, cannot go to a conventional school or class.

### **ICTs and Teacher Training**

If the use of ICTs in formal and non-formal education has a significant impact making education flexible, relevant and effective, its impact upon teachers is great. ICT use calls for a completely new teaching and learning paradigm, one that has to be taken into account at induction and in-service orientation programmes for teachers. Reasons why the context of teaching changes are because first, while there is no substitute for a good teacher, ICTs will make certain teaching resources (static textbooks) obsolete. Second, ICTs will make some forms of assessment redundant. Third, it will become necessary for teachers to encourage critical thinking skills, promote information literacy and accept and integrate collaborative learning practices. Finally, teachers will have to reassess the way in which they meet their students' learning needs.

For all these reasons, teachers need to be empowered to use ICTs so that they can gain the confidence and skills to work in an ICT-driven environment. When large numbers of teachers have to be trained in a short time, the best and most cost effective method would be through the use of ICT-enabled distance education. The success of Singapore's ICT in education effort was largely structured upon 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. The effort was synchronized with the deployment of hardware in schools so that post-training, teachers would use the technology more effectively. After the first round of teacher training, the second phase saw the integration of ICTs into the curriculum as a pre-requisite for the Bachelor of Education programme.<sup>109</sup>

Similar efforts are underway in Bangladesh and Nepal where teachers are trained in a range of technologies—from computers to digital cameras.<sup>110</sup> Similar initiatives are underway in countries as different as Mongolia, Samoa and Thailand (see case 10). Despite the differences, there is a common recognition that without effective teacher training in the use and application of ICTs as part of a teaching and learning process, a major component of educational reform would be left out.

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109 Ellie Meleisea, ed., *ICT in Teacher Education: Case Studies from the Asia-Pacific Region* (Bangkok, UNESCO, 2007), [http://portal.unesco.org/ci/en/ev.php-URL\\_ID=25825&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/ci/en/ev.php-URL_ID=25825&URL_DO=DO_TOPIC&URL_SECTION=201.html).

110 Ibid.



## Case 10. Teacher education in Thailand

In Thailand, the Institute for the Promotion of Teaching Science and Technology (IPST) is charged with the mandate of developing a Teacher Professional Development (TPD) programme in support of educational reform.

The TPD contains a component that aims to improve the ICT skills of teachers so as to enable them to use ICTs effectively as tools for teaching. The ultimate goal of the IPST is to improve student learning outcomes; and the pathway chosen is to build up the ICT capacity of teachers through a “training of trainers” approach.

Well-skilled ICT teachers from schools all over the country were recruited to be IPST lead trainers. IPST, in collaboration with university partners, began a series of train-the-trainer workshops for these lead trainers. With this approach, the lead trainers provided training to other teachers both in their own schools and other schools in their areas.

The content of the ICT training courses were frequently revised and updated with respect to content, pedagogical practices and assessment.

In the ten years since the implementation of the programme, the lead trainers became valuable resource persons for the IPST, for the Thai Ministry of Education and other ICT education projects.

Such a sustained effort has played a major role in building teacher capacity in ICTs. However, there remain challenges—that of scaling up to larger numbers of teachers, provision of a support system for teachers, and quality control and evaluation.

Source: Pompun Waitayangkoon, “ICT Professional Development of Teachers in Thailand: The Lead-Teacher Model”, in *ICT in Teacher Education, Case Studies from the Asia-Pacific Region*, Ellie Meleisea, ed. (Bangkok, UNESCO, 2007), [http://portal.unesco.org/ci/en/ev.php-URL\\_ID=25825&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/ci/en/ev.php-URL_ID=25825&URL_DO=DO_TOPIC&URL_SECTION=201.html).

China, as part of its long-term educational reform and strategy, has incorporated the training of teachers in the use of ICT tools. Standards have been established, digital resources created for teacher support, and teacher training programmes developed. Four areas of training—attitude and awareness; knowledge and skills; implementation and innovation; and social responsibilities—along with precise indicators—have been developed so that teachers can self-assess their progress.<sup>111</sup>

There are many constraints in the integration of ICTs in the education process. Such constraints pale in comparison to the challenges of educational provision—the need to quickly reach the majority of the poor and uneducated rural populations and to find out how to fund, implement and maintain the educational part of the ICT networks. The issues are not merely those of access, but of equity, relevance and local content.

The importance of large-scale reform in educational policies and practices and in the understanding of the role of ICTs in education cannot be stressed enough. Real learning gains and improvement in an educational system will only come when all the elements of educational change, from policies and practices, to teachers and learners come together in a partnership to benefit from the potential offered by the ICTs.

<sup>111</sup> Ibid.





### Youth In Action 4. AIESEC Switch Project

The Switch Project, developed by the Association Internationale des Étudiants en Sciences Économiques et Commerciales (AIESEC), the world's largest student-run organization, is a project that seeks to promote the use of computers in high schools in Cameroon. In order to provide the exposure that high school students are missing out on, AIESEC assembles a team of college students from around the world to act as ICT tutors in Cameroon's secondary institutions, using students to educate students. The main goal of the project is to educate students in their last year of high school and ensure that they have the ability to use computers in their jobs and college life. It is hoped that with this know-how, so essential in the modern day economic system, students will be empowered and able to pursue many opportunities that were hitherto closed to them.

For more details on the Switch Project see <http://www.aiesec.org/cms/aiesec/Al/Africa/CAMEROON/AIESEC%20DOUALA/Pboxes/swITch/>.

For those interested in participating in AIESEC projects visit: <http://www.aiesec.org>.

### 3.3 ICTs in Gender

Contrary to biological sex, gender refers to the socially constructed relations between women and men in a particular society. Therefore, gender perspectives and the roles of women and men, and girls and boys are culture bound and may differ from one society to another and from time to time.

Situated within a rights framework, this means that women and men should have equal rights to the benefits of development, to recognition for their contribution to society, and to participation in decision-making processes. Gender disparities have a debilitating effect on overall growth and human development, and unless these are directly addressed, development will simply not take place, whatever the pace.

The fundamental issue from a gender perspective is that economic growth need not necessarily impact on the status of women in a society. Proof of this is that women's issues remain at the forefront of the debate on rights even in the most advanced and developed countries.

Gender is a critically important development issue. Global data point to the great gender disparities and discriminations that exist in many parts of the world. There is also a recognition that the problems of national development (i.e. poverty, education and health), cannot be addressed and development goals achieved unless women and girls are part of the mainstream of society. Because social considerations are not easily incorporated into institutions such as policies, laws, markets and organizations, Goal 3 of the MDGs specifically charges the global community with the task of promoting gender equality and the empowerment of women.

The *Millennium Development Goals Report 2007*<sup>112</sup> reported that women's participation in paid non-agricultural employment was increasing slowly, especially in the Asia-Pacific region where women have some presence in the labour market. Women's political participation has also been growing, albeit slowly. Even in countries where previously only men were allowed to stand for political election, women now have a seat in parliament. However, this is no cause

<sup>112</sup> DESA, *The Millennium Development Goals Report 2007* (New York, 2007), <http://www.un.org/millenniumgoals/pdf/mdg2007.pdf>.

for complacency. In gross numbers and in global percentages, women remain one of the most deprived and marginalized groups, often without access to education, health, sanitation and income generating activities.

Part of the problem can be traced to the lack of clarity at all levels of decision-making and implementation. A lack of understanding among governments and policymakers of the intersection of gender policy and ICTs can lead to general development policies that are gender blind; ignoring, by omission, the needs, requirements and aspirations of women as a specific target group. For instance, an agriculture department may have been developing plans for the country, but gender is assumed and subsumed in the policy and the importance of gender considerations bypassed with perhaps a sentence or two of mention. If women are the target of the programme, it is necessary that women be specifically identified as the target group in an ICT and gender intervention for there to be any tangible or visible results. "The first step in correcting this situation is to convince national IT policymaking bodies to apply gender as a cross-cutting component in all its policies in much the same way that gender mainstreaming is being implemented by many governments."<sup>113</sup>

Two critical pre-requisites for bringing ICT-based economic benefit to as large a group of women as possible are access and engagement with women as active participants in the process by promoting initiatives that include them specifically. Access must be affordable and effective, must be in a woman-friendly and safe physical and social atmosphere, and must be inclusive in drawing in women from both the formal and informal sectors. Engagement with women means they must be active participants in the development of content, must use their knowledge and experience as a basis for improvement, and must establish a real relevance to and evidence of clear economic benefits for them.

At an individual level, ICTs offer possibilities for women to directly engage in e-commerce, access education and e-government, bypassing the socio-cultural barriers that have hindered access to economic advancement. As the education level of women has grown, ICTs have offered employment opportunities, which in turn have created greater empowerment. At a different level, among women's groups, the use of technology has enabled women to collectively organize advocacy campaigns for rights and participation by providing a new communication forum for the expression of their views and to raise 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, lack of awareness, poverty, lack of time, low confidence and self-esteem, and socio-cultural factors that can severely restrict a woman's mobility. This lack of mobility can hamper women's ability to benefit from opportunities particularly if she needs to travel some distance to access the developmental programmes, or if the venue of the programme is either unsafe or is at a culturally inappropriate place, or if the time is inconvenient.

Then there are barriers to the availability of technology. While such barriers affect both women and men, it is the rural women who are more adversely affected. In order to ensure the availability of technology, it is necessary to provide access to equipment, access to an adequate communications infrastructure, electricity access, Internet access, and access to technical support that includes the provision of information and repair services to women.

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113 Chat Garcia Ramilo in "Information and communication technologies (ICT) and their impact on and use as an instrument for the advancement and empowerment of women", Report from the online conference conducted by the United Nations Division for the Advancement of Women, prepared by Gillian M. Marcelle, 17 June to 19 July 2002, <http://www.un.org/womenwatch/daw/egm/ict2002/reports/Report-online.PDF>.

There are other barriers to women's access to ICTs, which can be summed up under three major categories: relevancy, availability and usage. The major barrier to the use of ICTs for women is its lack of relevancy to their lives. "Women encounter barriers to the use of ICTs when the content is not directly relevant to their livelihood, and when it does not value their knowledge, wisdom and experience. Unless the content delivered by ICT has a direct impact on women's lives, they will not perceive the need and benefits of ICTs. A large number of research studies have corroborated the above research findings."<sup>114</sup>

According to a Swedish International Development Agency (SIDA) study<sup>115</sup> there are a number of areas where ICTs have helped to alleviate poverty. However, most ICT projects have focused on the "poor" as a general category without necessarily paying attention to issues of women.<sup>116</sup> As a consequence, the benefits of the projects have not reached women.

Another barrier to overcome is the lack of knowledge of how to access the benefits of ICTs. The best known example of a direct ICT intervention that has helped women obtain and sustain a livelihood is Bangladesh's Grameen Phone.<sup>117</sup> While Grameen Phone has sometimes been criticized for having used an older generation of mobile technology, it nevertheless treads a new path; especially if one argues that the "newness" or "oldness" of a technology is to be seen within a context where nothing existed before.

There are other efforts in the world that address women's needs directly. Traditional means are sometimes the best to overcome this barrier. In Sri Lanka, the Siyath Foundation<sup>118</sup> provides educational and income generating information to women by downloading information from the Internet, translating it into Sinhala and distributing it throughout the island by post or fax. Other women's groups such as the Centre for Women's Research in Sri Lanka are using ICTs more extensively for training and as tools for women's education.<sup>119</sup>

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114 Sophia Huyer and Swati Mitter, *ICTs, Globalization and Poverty Reduction: Gender Dimensions of the Knowledge Society* (Mimeo, 2005), <http://unpan1.un.org/intradoc/groups/public/documents/unpan/unpan037351.pdf>.

115 Alan Greenberg, "ICTs for Poverty Alleviation: Basic Tool and Enabling Sector" (Stockholm, Swedish International Development Agency, 2005).

116 Anita Dighe and Usha Rani 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), p. 33, [http://www.cemca.org/CEMCA\\_Womens\\_Literacy.pdf](http://www.cemca.org/CEMCA_Womens_Literacy.pdf).

117 Grameen Phone's Village Phone (VP) Project provides door-to-door telecommunications services to the rural poor in Bangladesh. 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. Most of the VP operators are women, and are often called the Village Phone Lady. The operator's income is derived from air time charges paid by the customers and a flat service charge. The project has now spread to more than 35,000 villages in 61 out of 64 districts of the country, and has distributed over 150,000 VPs across Bangladesh. Similar projects have been replicated in India and Africa by local organizations in partnership with Grameen Phone. See [NextBillion.net](http://www.nextbillion.net), "Grameen Phone 'Village Phone' project", World Resources Institute, <http://www.nextbillion.net/archive/Grameen-village-phone-bangladesh>.

118 See Siyath Foundation, <http://www.siyath.org/portal/>.

119 UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia*, p. 137. (see footnote 91)



## Case 11. The Info Lady in Bangladesh

An Info lady is a trained rural young woman who visits households in the villages with a set of ICTs (small portable laptop, digital camera, mobile phone, General Packet Radio Service [GPRS] Internet connectivity, headphone, webcam, and other light equipment such as a weight measurement machine, blood pressure machine, pregnancy test kit, sugar test kit etc.) She listens to the villager's livelihood problems and assists them with preloaded offline Bangla language livelihood and audio-visual content, and with online information from the Web. The Info lady can also arrange remote consultation with livelihood experts, including doctors, lawyers and agriculturists. A poor woman in a village can now discuss her problems and seek advice using modern ICTs. This is empowering both for the Info lady and for the women she attends to.

Women have been chosen for the Info lady initiatives since they have better access to conservative households as well as to those people with handicaps who are unable to come out from their home. By providing ICT access through the Info lady, it is possible to overcome the huge challenge of creating infrastructure and the triple illiteracy of the rural people (illiterate, ICT illiterate and information illiterate). Through this initiative, the Info lady offers a range of services and serves the poor and marginalized at their door steps with low-cost solutions, and earns an adequate amount herself.

The Info lady provides communication services as well; she connects the rural people with their relatives abroad using Internet telephony service providers such as Skype. The Info lady provides health check services to pregnant women, and also guides them on diet suggestions during pregnancy. She supplies contraceptives and hygiene napkins to the rural women who have never visited the market to purchase these goods. Through the services that the Info lady provides and the goods that she sells, she is able to generate a good steady income for herself. As she expands the range of services that she provides, she is also able to increase her earnings.

This is a practical low cost and viable model for connecting rural people and facilitating the creation of knowledge networks in rural Bangladesh. At the same time, it offers new technology-based self-employment opportunity for the educated rural women.

The Infolady initiative requires a tri-partied effort. The parties are: (1) a Lead Agency (D.Net); (2) local hubs; and (3) Infoladies.

*Sources:* Pallitathya, <http://www.pallitathya.org.bd>; and the author's review of the project.

This case study shows that access to ICTs in women friendly and safe locations can go a long way in creating an environment where the enabling features of ICTs can have a positive effect.

Once women have access to ICTs, it is also possible to empower women through innovative means. Evidence that ICTs have created new economic opportunities for women can be seen in the large number of women, especially in countries such as India and the Philippines, who have entered the workforce in the ITES sector that includes call centres and help lines.

ICT-enabled economic opportunities such as telework and e-commerce enable women to work from home, and better juggle family responsibilities and work commitments. Such opportunities tend to be more successful when designed, operated and managed by women, as in the case of eHomemakers, Malaysia.



## Case 12. Salaam Wanita

Salaam Wanita is an initiative of the pioneering eHomemakers network of Malaysia and is an online community operated and managed by homemakers who, wanting to work from home experimented with ICTs as early as 1998, even though they had been termed a “digitally under-privileged group”. Initially, eHomemakers primarily addressed the needs of Malaysian women from middle- to low-income groups—women who wanted to and needed to stay at home to look after their children but also needed to be economically self-sufficient. Much of the preliminary work of planning, designing, and executing the effort was done by women volunteers who had similar needs. In a short period of a few years, eHomemakers enjoyed both financial success and recognition.

**Figure 17. Examples of baskets created by Salaam Wanita homemakers**



Source: Just Marketing Eco-Basket Project, <http://www.justmarketing.info/index.asp?p=/static/photo-gallery-exhibitions.html>.

Since receiving a government grant, a pilot project entitled “Salaam Wanita” was launched to address the needs of disadvantaged women, among them vulnerable groups like the abused, disabled, chronically ill, 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.

Expanding access to those who were not in a position to access IT-based options, the training was extended in 2003 to include skills-based training such as basket weaving and the baking of cookies. eHomemakers helped the Salaam Wanita members to source bulk orders of the products from private companies.

Recently, an appeal for the donation of mobile phones made through their website brought them forty handsets, which were distributed to Salaam Wanita members. Through a Web-linked service, the women receive SMSes for filling-in orders, which saves them precious resources including time, energy and of course, money. Once their products are ready they message back and the produce gets picked up.

Besides skill training, the women also receive business management training that includes costing their products and handling finances. This has provided the women with a better understanding of how to go about organizing a small business. Since its inception, two hundred women have been trained under this pilot, most of them socially and economically disadvantaged in some way, receiving no support from any quarter, and often abandoned by family. But networking through eHomemakers has turned around the lives of its members, giving them self-confidence and much needed support.

Sources: Rukmini Vemraju, “Empowering Homemakers to Become Homepreneurs: eHomemakers Malaysia”, *EduComm Asia: A Quarterly of the Commonwealth Educational Media Centre for Asia*, Vol. 11, No. 3 (March 2006), pp. 9-11, <http://www.cemca.org/newsletter/mar2006/mar2006.pdf>; and JustMarketing, “JustMarketing: Salaam Wanita Project”, Corpcom Services Sdn. Bhd., <http://www.justmarketing.info>.

ICTs can also facilitate women's participation in government and political affairs by providing a communication platform to exchange opinions, to articulate and aggregate interests, and engage with political leaders particularly about women's issues. Women's advocacy groups can effectively use ICTs to network and connect with each other, and to mobilize public opinion.

The Centre for Women's Research<sup>120</sup> that 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, in a strife-torn society, women's groups in Sri Lanka have become better connected with similar international groups and activists around the world.

In another pioneering effort, the Women's Networking Support Programme of the Association for Progressive Communications<sup>121</sup> has developed a globally accepted Gender Evaluation Methodology<sup>122</sup> for use in incorporating gender in development projects and in the evaluation of the extent to which gender considerations have been addressed by programmes and projects.

**Figure 18. Female indigenous leaders of the Organization of Indigenous People in Bolivia**



*Note:* Female indigenous leaders of the Organization of Indigenous People in Bolivia receive ICT training to increase their participation in lobbying and decision-making processes.

*Source:* IICD, "Gender: Africa and Latin America", (Amsterdam, IICD, February 2009).

But there are challenges. Social and cultural attitudes are so deep-rooted, and with a majority of women in rural areas being deprived of education and livelihood skills, it is difficult to imagine how they can harness the full potential of the ICTs. These problems are greater for non-English speakers who must add language difficulty to the irrelevance of content and packaged software that call for skills beyond what they possess. Furthermore, issues of access and affordability make the acquisition of ICT hardware so much more difficult.

Unless key players in national ICT policymaking and implementation integrate gender and women into every aspect of their plans, and target women as a specific group rather than just including them as part of a broader community to be served, visible results from women's use of ICTs will be limited and gender equity especially hard to achieve.

120 See <http://www.cenwor.lk>.

121 See [http://www.apcwomen.org/en/about\\_wnsp](http://www.apcwomen.org/en/about_wnsp).

122 See <http://www.apcwomen.org/gem>.



### Youth In Action 5. HARASSmap

HARASSmap, created and maintained by a group of young volunteers, is an SMS system for reporting incidences of sexual harassment in Egypt. This tool gives women a way to anonymously report incidences of sexual harassment as soon as they happen, using a simple text message from their mobile phone. By mapping SMS reports on a public website displaying location and details provided by the victim, the Advocacy Online Map creates a powerful documentation of the extent of the problem. HARASSmap will pinpoint hotspots to increase police presence in high harassment areas. For victims of harassment, HARASSmap's Assistance Information and Referral System provides a list of services. Other projects include community outreach activities, social media awareness and blogging campaigns against sexual harassment. The entire HARASSmap system acts as an advocacy, prevention, and response tool, highlighting the severity and pervasiveness of the problem, as well as offering proactive responses.

Sources: HARASSmap, <http://harassmap.org>; and World Summit Youth Award, "Harassmap", <http://www.youthaward.org/winners/harassmap>.



### Youth In Action 6. NextDrop

NextDrop, a project developed by a group of students from the United States, addresses the challenge of unreliable piped water in India where water is only available a few hours at a time. As a result poor households and women in particular, who are often responsible for collecting water, lose significant amounts of time waiting for the water to arrive. NextDrop harnesses the ubiquity of mobile phones in India and dependability of crowdsourcing to provide accurate information on water availability. NextDrop works by relying on utility employees who report when they open city water valves and residents who confirm that the water has begun to flow. Participants receive micro-payments in exchange for calling the NextDrop system when water begins to flow in their locality. NextDrop verifies this information and then pushes announcements to other subscribers nearby.

See NextDrop, <http://nextdrop.org>.

## 3.4 ICTs in Health

Three of the MDGs directly address issues of health among the poor. Other MDG goals are also relevant since the intersections between poverty, education, gender and health are so blurred they are almost non-existent. It is therefore difficult to look at health in isolation from other goals, but it is equally necessary to segregate it to understand the different stakeholders, and the different kinds of ICT interventions that can be implemented in the area of health.

Key stakeholders in the health sector in need of critical ICT support can be categorized into two groups. The first group is comprised of ordinary people who need health care, especially those people whose access to health services and/or health-related information is limited. This group also includes the poor, vulnerable and marginalized, such as victims of disasters and conflict, as well as persons with disabilities. In short, the first category of ICT-supported health

care beneficiaries includes those for whom the services are intended. A second major group of stakeholders includes the health care providers, comprised of policymakers and government officials working in the area of health, and medical professionals, such as doctors, nurses, care givers at the primary health care level, researchers and health managers.

For the first group, ICT interventions can be direct, linking the patient 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 medical education.

e-Health is the umbrella term that includes all aspects of ICT use in health care. e-Health includes telemedicine, where medical advice or consultation is provided over long distances via satellite, broadband, radio, telephone or other communication technologies. This is the most commonly reported ICT application in health. Telemedicine is often used to connect patients in rural and remote communities to medical specialists in the city. An added advantage is that it is now possible to capture and transmit clinical data from multiple sources to facilitate diagnosis and treatment.

One form of telemedicine is interactive video conferencing where doctors and patients at different sites 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 when there is an acute shortage of medical practitioners.

Pakistan has been running a telemedicine system since 1998,<sup>123</sup> which uses a “store and forward” method whereby the patient’s medical information is collected locally (stored) and then transferred to a qualified doctor (forward) in any part of the world; a response usually takes about 24 to 48 hours.

Thailand<sup>124</sup> is among other Asia-Pacific countries to have also developed telemedicine systems. The Trans-Eurasian Information Network 2 is linking hospitals across a region that spans Australia, China, Indonesia, Japan, the Republic of Korea, Malaysia, the Philippines, Singapore, Thailand and Viet Nam, and supports a global community of over 30 million users.<sup>125</sup> In Afghanistan, an innovative public-private partnership has provided telemedicine services to remote locations (see case 13).



### Case 13. Telemedicine in Afghanistan

Roshan, a telecommunications operator in Afghanistan, is expanding its first-of-its-kind telemedicine solution in Afghanistan beyond Kabul to include provincial hospitals. Bamyan Provincial Hospital will be the first provincial medical facility linked to the innovative telemedicine project, which uses broadband technology, wireless video conferencing and digital image transfer to provide hospitals in Afghanistan with real-time access to specialist health care diagnosis, treatment and training expertise from abroad.

Roshan has teamed up with Cisco, the Government of Afghanistan, Aga Khan University Hospital (AKUH) in Karachi, French Medical Institute for Children (FMIC), Aga Khan Health Services, Bamyan Provincial Hospital and other technology suppliers to undertake the project. Launched in 2007, the project already links FMIC in Kabul, Afghanistan to AKUH in Karachi, Pakistan, enabling access to a broad array of radiology expertise provided by AKUH.

123 TelmedPak, <http://www.telmedpak.com/>.

124 PubMed, “The Ministry of Public Health Telemedicine Network of Thailand”, National Center for Biotechnology Information, <http://www.ncbi.nlm.nih.gov/pubmed/11311665>.

125 DANTE Ltd., “TEIN2”, <http://www.tein2.net>.



Applications include the ability to send real-time X-ray, ultrasound and CAT Scans for evaluation. The technology also enables e-learning and learning through video conferencing. The initial service provided is tele-radiology, the electronic transmission of radiological patient images. An average of 40 tele-radiology cases are evaluated monthly between FMIC and AKUH and ongoing training is provided to medical professionals to build capacity. Telemedicine capabilities will gradually be expanded to other rural regions of Afghanistan, to include the use of smart phone and other hand-held devices, and to address different services and procedures including evaluation of tissue samples and the online performance of medical and surgical procedures.

“This project not only represents cooperation between the companies and institutions involved, but is also an important collaborative effort between Afghanistan and Pakistan to address regional healthcare needs,” said Firoz Rasul, president of Aga Khan University. “Telemedicine will dramatically expand the healthcare diagnostic and education of health professionals, who will be accessible to the people of Afghanistan and will allow hospitals across the nation to leverage AKUH’s world-class medical expertise.”

Sources: Wireless Healthcare, “Roshan And Cisco To Take Telemedicine to Afghanistan”, 21 June 2007, <http://www.wirelesshealthcare.co.uk/wh/news/wk25-07-0001.htm>; and Medpedia, “Telemedicine”, <http://wiki.medpedia.com/Telemedicine>.

A report that includes descriptions of various direct telemedicine projects in several Asia-Pacific countries<sup>126</sup> shows that there are initiatives such as HealthNet in Nepal,<sup>127</sup> a mobile telemedicine system with multi-communications links for urban and rural areas in Indonesia, and more.

Direct ICT interventions linking doctors to poor patients in rural areas to provide superior quality medical care can have a major effect upon health and health services in a country. Using ICTs to improve the quality of health care education and management of health care administration are equally important as they 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 clientele of medical students, aspiring doctors and practising health professionals.<sup>128</sup> 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 the Health Inter-Network Access to Research Initiative (HINARI) is a global effort to provide support to health professionals and policymakers worldwide (see case 14).

126 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), pp. 121-140, <http://www.unapcict.org/ecohub/resources/exploring-new-modalities>.

127 Institute of Medicine, Kathmandu, Nepal, “HealthNet Nepal”, <http://www.healthnet.org.np/?p=profile>.

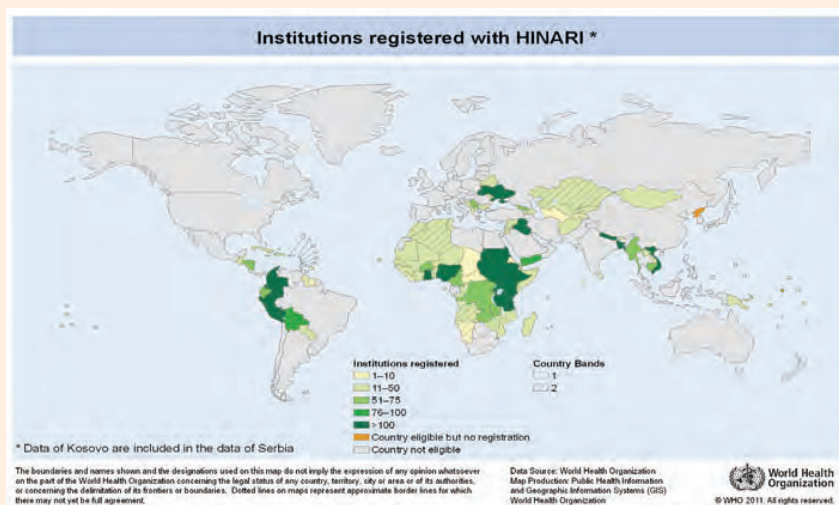
128 MEDRC EduTech Ltd., “SmarTeach”, <http://www.smarteach.com>.



## Case 14. Health Inter-Network Access to Research Initiative

HINARI, set up by WHO together with major publishers, enables developing countries to gain 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.

Figure 19. Institutions registered with HINARI



Source: Hinari, <http://www.who.int/hinari/en/>.

Launched by the United Nations Secretary-General in 2000 and led by WHO, the network has brought together public and private partners to provide equitable access to health information. HINARI was created to bridge the digital divide in health and is currently widely available and effectively used by professionals, researchers and policymakers alike.

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

Similar efforts at modernizing hospital and health administration have led to the development of a large number of health administration software, mostly by private corporate hospitals that have taken the lead in this field. These MIS enable the recording and reporting of patient data of individual departments that are then linked into an online intranet system for effective administration. Public health systems in many of the poorest countries of the region are still far behind in their efforts to modernize, hampered by obstacles such as funding, lack of infrastructure and an unsympathetic bureaucracy.

Critical ICT-based surveillance systems for the prevention, reporting and monitoring of diseases such as HIV/AIDS, malaria, tuberculosis and leprosy exist in several countries of Asia.<sup>129</sup>

129 UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia*.

An often cited example is that of the Central Asian Epidemiology Service.<sup>130</sup> 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 the severe acute respiratory syndrome or SARS and the avian flu has been possible only because of ICT-based health surveillance systems.

However, an equal number of countries in Asia 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 strengthen the health support system, maximizing the potential of ICTs in health care may remain a distant dream.



### Youth In Action 7. Remote Patient Monitoring System

In using ICTs to improve maternal health care in remote areas, Pakistani youths are engaged in the development of a Remote Patient Monitoring System. It is a low-cost patient monitoring system that provides point-of-care decision support to rural women in Pakistan in order to reduce the alarming rates of maternal and infant mortality. The system gathers the physiological data of pregnant women using wearable medical sensors and transmits them via mobile phones to a remote Web server in a main hospital. The data are stored in an electronic medical database and allows an intelligent clinical decision support system to scan for anomalies. A medical consultant can access the generated inferences on his or her smart phone and give a specialized opinion about the patient.

*Sources:* Remote Patient Monitoring System with Focus on Antenatal Care, <http://rpms.nexginrc.org/index.aspx>; and World Summit Youth Award, "Remote Patient Monitoring System with Focus on Antenatal Care", <http://www.youthaward.org/winners/remote-patient-monitoring-system-focus-antenatal-care>.

<sup>130</sup> This is one of the early experiments in using ICTs for health cited by many reports. The project started in 1995 and it is not clear from existing literature whether it is still continuing. It is also not clear how many countries participated in this project. There were some design-reality gaps that stemmed from its largely technical, rather than social-technical orientation. A more detailed analysis of the project is available from: Valeriya Krasnikova and Richard Heeks, "eHealth Case Study No. 7: Design-Reality Gaps - Computerizing a Central Asian Epidemiology Service", eGovernment for Development Information Exchange, University of Manchester's Institute for Development Policy and Management, 19 October 2008, <http://www.egov4dev.org/health/case/epidemiology2.shtml>.



## Points To Remember

- The four basic sectors—poverty reduction, education, gender and health—are very closely linked.
- There are two ways in which ICTs have frequently been used when applied to development programmes—ICT driven and ICT supported.
- Applications in agriculture and rural development have often been to provide direct access to market and weather information for the poor, and to provide knowledge support to research and extension services.
- Management information systems for government in project implementation help to improve efficiency and effectiveness in delivering basic services.
- In education, the use of ICTs has been to enhance access and maintain quality standards while ensuring the best use of resources for formal, non-formal and teacher education.
- For women and girls, ICTs offer opportunities for communication to the outside world, home-based e-commerce opportunities, and networking with other women and forming support groups online.
- ICT is also a sector where a large number of women in developing countries have found income generating activities through call centres, etc.
- Telemedicine is the most frequent application of ICTs in the health sector, followed by continuing medical education and improving the quality of research networks.



## Practical Exercise

From the existing case studies, it seems clear that the same ICTs can be used for multiple purposes; for instance, to expand access to education, enable collaborative networks among women, and provide access to health care.

Based on the case studies, answer the following questions:

1. Can ICTs be innovatively used in the absence of minimum literacy levels among the poor?
2. How can the same ICTs be used for multiple purposes? What steps are needed to use, say the Internet for meeting the educational and health needs of women in an isolated indigenous community in the forests.
3. Try to locate and discuss any experiment or project where this has been attempted, either in your own country or elsewhere in the world. Prepare a write-up on the case study identifying the following elements: background, a description of the project, the major stakeholders, the challenges faced, the ICTD solution opted for, and lessons learned.
4. Present this case study for a classroom discussion.



## Test Yourself

1. The three sets of stakeholders in the ICTD space are:
  - a. Policymakers, service providers and citizens
  - b. IT companies, other businesses and shops
  - c. Regulators, telecommunications service providers and their consumers
  - d. The rural poor, the illiterate and the disadvantaged
  
2. A G2C service in agriculture and livelihood could be termed as:
  - a. An indirect ICT intervention
  - b. A direct ICT intervention
  - c. Both
  - d. Neither
  
3. ICTD education means:
  - a. Creating a pool of human resource to serve the IT industry
  - b. Integrating ICTs in the classroom
  - c. Creating capacities in the use of ICTs for development
  - d. Putting computers in the classrooms
  
4. ESCAP high priority countries do not include:
  - a. Countries like China, India, Malaysia and Singapore
  - b. Pacific Island states
  - c. Countries emerging from conflicts
  - d. Landlocked states
  
5. The two most important factors in bringing about ICT-based economic opportunities to women and girls are:
  - a. Teaching women IT skills
  - b. Providing access and promoting the engagement of women as active participants in the ICTD initiative
  - c. Allowing the education system to take care of women's needs
  - d. Creating a women's welfare department in government
  
6. Telemedicine as an ICT driven intervention:
  - a. Brings patients to the hospital
  - b. Connects patients in a rural and remote area to a doctor in the city
  - c. Provides data to the government about diseases in rural areas
  - d. Provides educational resources to doctors for continuing medical education