

Connecting People – Changing Lives in Asia



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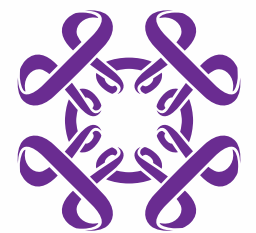


About Pan Asia Networking (PAN)

The Pan Asia Networking (PAN) program initiative supports research into innovative ways of adopting Information and Communication Technologies (ICTs) to address key development challenges, namely in the areas of health, education, livelihoods and governance. PAN focuses on building Asian capacity to apply ICTs for community development and to share knowledge on how this can be achieved. Emphasis is placed on applied research related to community uses of ICTs - particularly those practices that lead to more equitable access, collaborative networking, local application development, and a better understanding of the socio-economic effects of ICTs.



Connecting People — Changing Lives in Asia



**Pan Asia
Networking**

Acknowledgments

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Introduction

“Many developing countries remain poor largely because they had let the Industrial Revolution pass them by. They can ill afford to miss the information technology revolution.”

M.S. Swaminathan



ICTs are essentially information-handling tools - a varied set of goods, applications, and services that are used to produce, store, process, distribute, and exchange information. ICT4D initiatives endeavour to minimize the proverbial digital divide by supporting innovative means to provide equitable access and empowering knowledge to marginalized communities.



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Traversing the harsh and barren Mongolian landscape

With 30% of the world's landmass, 60% of the world's population, and over 3500 languages (according to United Nations' figures), the Asia-Pacific region is arguably the most diverse on the planet. Of the 38 economies in the region (excluding Australia and New Zealand), the 28 that are classified as lower-income economies include 94% of the region's population of over 3.3 billion people (ITU 2004). Using the United Nations' purchasing power parityⁱ index, the number of people in Asia living in extreme poverty exceeds that of any other region in the world. In addition to high levels of poverty, there is considerable disparity between the "haves" and "have-nots," both in terms of income and access to information and communication. At the end of 2003, only 22.6% of people in the lower-income economies had telephones, compared with 139.4% in higher-income economies (ITU 2004).

Asia includes some of the world's most advanced economies and some of its poorest. Some — notably South Korea, Taiwan, Japan, and Singapore — have sustained their growth, in part, through the adoption of an information-based economy. In these countries, information technology and telecommunications have assumed an ever-increasing role in the creation of wealth at all levels. However, the Asian information and communication technologies (ICTs)ⁱⁱ landscape reflects vast disparity. Although some Asian countries have substantial technological bases, strong and proven institutions, and well-developed human resources, others are at the early stages of adopting ICTs and are eager to "leapfrog" into the burgeoning knowledge society.

Information and Communication Technologies for Development (ICT4D) is an approach that recognizes the growing gap between those with

access to ICTs and those without — what is commonly referred to as the "digital divide." The digital divide (or lack of "digital inclusion" or "digital opportunities") is perceived by some as a key cause of growing inequality between rich and poor countries. Certain scholars state that technological innovation and the benefits of networks are key drivers of growth that have allowed more advanced economies to maintain their economic hegemony over the past few decades.ⁱⁱⁱ

Pan Asia Networking

The Pan Asia Networking (PAN) program initiative supports research that helps to determine how ICTs can contribute to development through capacity building and knowledge sharing. It is the longest-standing ICT4D program at the International Development Research Centre (IDRC). Building on more than 30 years of IDRC support for research in information sciences in the developing countries of Asia, PAN helps Asian institutions adopt ICTs to address development problems. At the heart of its programming are people — PAN believes that everyone in Asia should have an opportunity to harness ICTs for their social and economic well-being. To meet this objective, PAN adapts its programming to the shifting contexts and needs of developing countries in Asia, while ensuring that its research partners remain at the leading edge of technological improvements and development approaches. This includes supporting regional efforts to develop an understanding of the various symptoms and causes of the digital divide.

The IDRC tradition of information and communication programs

The ICT4D program area builds on a longstanding history and tradition of innovation at IDRC. The

centre was among the first development agencies to embrace ICTs as a key means of fostering development and alleviating poverty. The decision to establish the Information Sciences (IS) division in the 1970s was innovative and, in hindsight, inspired. It anticipated the importance that ICTs would have in development for years to come. Initiatives such as the international cooperative bibliographic information system, the information system for agricultural science (AGRIS) managed by the Food and Agriculture Organization and a similar cooperative system in Benin known as DEVSIS (development sciences information system) placed the IS division at the vanguard of its field.

The ICT4D program is also active in Africa through the Acacia program initiative and the Connectivity Africa project, in Latin America and the Caribbean through the Pan Americas program initiative and the Institute for Connectivity in the Americas project, as well as globally through the telecentres.org and Bellanet projects.

PAN's evolving focus

Today, PAN works with researchers within civil society and academia, as well as the public and private sectors, to facilitate ICT4D research that enables the creation of a knowledge society for all Asians. Emphasis is placed on applied research related to community uses of ICTs, particularly those practices that lead to more equitable access, collaboration and networking, local application, and a better understanding of the socioeconomic effects of ICTs.

Networking — a key element in PAN's mandate — includes building local, regional, and global networks of people, organizations, projects, and ideas that address development issues. It includes

networking digital pioneers in the region, an objective that is exemplified through collaborative events such as PAN's All Partners' Conferences. The first such conference was held in 1997 in Ulaanbaatar, Mongolia, with an emphasis on the PAN cornerstones: connectivity, collaboration, content, and communication.

In March 2003, PAN held an All Partners' Conference in Vientiane, Laos. This conference reflected a shift from connectivity to applications and concentrated on the development of applications for distance education, rural connectivity, local languages, telehealth, and e-commerce. The conference signaled new priority areas and programming needs. Many of the issues raised in Laos were reaffirmed at the World Summit of the Information Society I (WSIS) in Geneva. A third All Partners' Conference is slated for 2006. The shifting themes of these conferences reflect PAN's evolution and its efforts to respond to changing global contexts and the varying capacities and needs of its partners.

When PAN started programming in 1994, many countries in Asia lacked the capacity to transfer basic files between computers and to exchange e-mail, much less support their own web sites. From establishing the first online file transfer between Ho Chi Minh City and Hanoi to supporting the establishment of Internet service providers (ISPs) in Viet Nam, Mongolia, Sri Lanka, Laos, Cambodia, and Bhutan, PAN has followed the distinct stages of ICT adoption in various countries. Now, PAN simultaneously reflects on over a decade of support of ICT4D research and looks forward to implementing its next 5-year strategic plan, in which it will continue to form partnerships, build capacity, and provide a means to empower many more Southern researchers.

Telemedicine

“I had been going to many places to get treatment for this illness but nothing cured me. But the telehealth centre has benefited me a lot and now I feel that I am 90% cured ... I will continue to come here and also refer my other friends and relatives to the 'computer doctor'.”

- Ghulam Mohammad, patient at telehealth facility

In the remote mountain community of Skardu, Northern Pakistan, Ghulam Mohammad patiently waited his turn at the telehealth centre. Mohammad, 65, was waiting to see the doctor - in his case, a dermatologist located at Abdullah Hospital some 800 km away in Islamabad. Mohammad was able to “see” the doctor via videoconference - one of the services provided by Skardu's telehealth centre, a collaborative ICT4D project supported by PAN. Using ICTs, the centre provides access to health specialists in Islamabad through video links.

Mohammad made his first visit to the telehealth centre in June 2005, seeking diagnosis and treatment for a skin condition that had worsened over time. Discouraged at the amount of money and time he had spent seeking relief from the skin lesions that at times covered his body, Mohammad acted on the advice of one of his relatives and visited the telehealth centre in Skardu. There, he was booked an appointment with a dermatologist. Following his novel experience of meeting the doctor via videoconference, Mohammad was diagnosed with psoriasis and prescribed the proper treatment.

This joint project, with the Commission on Technology for Sustainable Development in the South (COMSATS), the Karakoram Area Development Organization (KADO), the Baltistan Health and Education Fund (BHEF), and the Aga Khan Rural Support Programme (AKRSP), researches how internet-based telemedicine and distance learning applications can benefit the people of Hunza, Gilgit, and Baltistan (Skardu).



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Celebrating PAN and its partners

The goal of this collection of project experiences and findings is to share some parts of the ICT4D journey taken by PAN and its partners. Throughout the past 10 years, PAN has forged relations with some inspirational individuals and watched their innovative ideas and leadership create positive change. These “digital pioneers” and their stories are interwoven in the following pages with narratives on some of the projects that have stood out in PAN’s history or that carry great potential for future success. Organized by theme, these stories outline noteworthy projects, organizations, and leaders in the areas of infrastructure development, rural access, capacity building, technology tools, distance learning and telemedicine, gender equity, and influencing policy.

The following chapters do not provide an exhaustive look at PAN-supported projects, but rather a snapshot of some of the key projects and partners PAN has worked with. A more complete listing can be found on PAN’s web site — www.idrc.ca/panasia.

Notes

¹THE NUMBER OF CURRENCY UNITS REQUIRED TO BUY GOODS EQUIVALENT TO WHAT CAN BE BOUGHT WITH ONE UNIT OF THE CURRENCY OF THE BASE COUNTRY, USUALLY THE UNITED STATES DOLLAR (US\$), OR WITH ONE UNIT OF THE COMMON CURRENCY OF A GROUP OF COUNTRIES.

²ICTS INCLUDE THE “OLD” ICTS, RADIO, TELEVISION, AND TELEPHONE AND THE “NEW” ICTS, COMPUTERS, SATELLITE AND WIRELESS TECHNOLOGY, AND THE INTERNET (UNDP EVALUATION OFFICE 2001).

³PARTICULARLY PROPONENTS OF NEW GROWTH THEORY.

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*Pan Asia Networking (PAN)
All Partners' Conference,
March 2003, Vientiane, Laos*

Chapter 1

Capacity building for ICTs: different approaches for a diverse continent

“To us, the PAN R&D grants program has given much impetus not only by way of funding, but also in words of encouragement for accomplishing what many in Bangladesh thought would be impossible to accomplish. The partnership thus developed, made us feel as if we are working together for a common goal”

PAN R&D grant recipient





Capacity building for individuals and organizations has always been central to IDRC's work in the South. The centre emphasizes strengthening indigenous research capacity, especially when it is directed toward achieving greater social and economic equity, better management of the environment and natural resources, and more equitable access to information. Generally, IDRC's approach to capacity building "focuses on professional competencies, capabilities, and the tools needed to conduct research. When targeting individuals, IDRC talks about capacity building in terms of 'the ability to do something' that was missing before" (Lusthaus and Neilson 2005). The last point is especially true of the ICT work supported by PAN.

In PAN's early days, the program initiative focused on enabling access to online resources and building skills in Internet applications in a number of institutions for which this was new territory. In 1995, PAN installed a server in the IDRC regional office in Singapore to enable Asian institutions to gain basic expertise in web site development and online conferencing until such facilities became available in their own countries.

In parallel, PAN began to build capacity at the national level, starting with development of ISPs in countries without access to the Internet (Mongolia, Viet Nam, Laos, Cambodia, Sri Lanka, and Bhutan) and support for content development and applications where ISPs were already in place. One such example is the PAN Information and Networking Services project that established an information server at the Philippines Department of Science and Technology. The server was to provide opportunities for development organizations based in the Philippines to use modern networking technologies.

Asia comprises a diverse mix of economies. There are leaders in innovation and creativity (e.g., Japan); there are those that are already adopting and adapting ICTs (e.g., China); and there are those that have yet to engage to any extent in these innovations (e.g., Cambodia). Economies at the second level (the adopters) have yet to reach out from their capitals to provincial and district levels or into rural communities where the mass of their population resides. Countries at the lowest level, those that have yet to begin the economic transition, are dangerously poised to follow that precedent and concentrate resources in the capitals.

— PAN prospectus, 2001–2005

PAN pursued a two-pronged approach that represents the realities of Asian diversity captured in the quote above. This approach is reflected in how PAN strengthens research and development capacity to apply ICTs in education, health, and employment at the community level. In recognition of the differences among Asian countries in terms of human resources for ICTs, PAN also aims to encourage the more advanced countries in Asia to engage in capacity building and mentoring in slower-adopting countries.

Documenting the state of ICTs in the Asia-Pacific

Asia may now contain the world's largest group of Internet users, but access to the Internet is still restricted for many people and is determined to some extent by gender, income, language, social status, and level of literacy. Formulating policies for applying ICTs to development requires knowledge

and awareness of a burgeoning field that can be bewilderingly complex. ICT implementation, equitable access, applications, content development, and policy considerations are pressing issues in Asia. Policymakers need access to the information necessary to make informed decisions. Unfortunately, access to such essential information is often obstructed by intellectual property rights or lack of resources. A published overview of the state of ICTs in the region that would speak to policymakers was non-existent.

PAN decided to begin documenting the state of ICT development in Asia and sharing the knowledge with researchers and practitioners. In 1994, a consulting team began the Pan Asia Networking Survey, conducting Internet needs assessments in 10 Asian countries. Then, following the first PAN All Partners' Conference in Mongolia in 1997, and with the financial support of an S-ONE grant from the Government of Singapore, development began in earnest on what was to become the *Pan Asia Networking Yearbook* (PANY). The online PANY was launched in 1998 on the virtual bookshelf system of PAN's e-commerce mall. It reported the state of Internet development in 22 Asian countries.

The evolution of this type of regional overview is seen in the *Digital Review of Asia Pacific* (DirAP), a biennial publication that acts as a comprehensive reference on ICTs in the Asia-Pacific region. Support for this venture comes not only from PAN, but also from the United Nations Development Programme (UNDP), the Orbicom Network of the United Nations Education, Science and Cultural Organization (Unesco) Chairs in Communications, and l'Agence de la Francophonie.

DirAP not only elucidates ICT issues in the region, but also plays the integral role of building the

capacity of the authors in the various countries. These developing country authors have an opportunity to research, analyze, document, and publish the macro-level states of ICT practice in their various countries. DirAP provides retrospective regional comparative analyses of what has been done in specific technology fields and conducts forecasting across the entire region to provide a holistic picture of regional technology trends.

The first edition, published in 2003, opens with an overview article chronicling the diversity of the region in ICT access and use; it discusses local content production and features several sidebar articles addressing online services, governance issues, and the open-source movement. The bulk of the publication is taken up by national profiles by local authors in 29 countries in the region. These profiles cover the state of local content development, online services, industries, key national initiatives, enabling policies and the regulatory environment, the open-source movement, research and development, and trends. DirAP is published as an online database, an electronic publication on CD-ROM, and a printed monograph.

The second edition is scheduled for official release at the World Summit on the Information Society (WSIS) in November 2005, although some chapters have been made available in advance online (www.digital-review.org). The new edition features a preface that addresses challenges to building information societies in the Asia-Pacific:

Stifling intellectual property rights regimes are quickly replacing the lack of Internet connectivity as the main obstacle to nurturing information societies in the region. While many of us from the ICT sector have been preoccupied with the

Digital pioneer Onno Purbo

The Indonesian ICT specialist, Dr Onno W. Purbo is definitely not one who rests on his laurels. One moment he is at home in Indonesia, then he is in Washington on an Eisenhower Fellowship, then he is at IDRC headquarters on a 1-year sabbatical. During that sabbatical year he stepped up the pace and made globe-hopping visits to Vancouver, Boston, Geneva, South Africa, India, Bangladesh, Bhutan, and Malaysia, delivering training at a variety of workshops and conferences. What does he train you to do? Well, have you ever used an empty Pringles chip can to make an antenna? No? Onno can show you how to do it, and when it's finished you have a wireless fidelity (WiFi) antenna. This is Onno's way of demonstrating that ICTs for development need not rely on the most expensive and latest hardware available, but can be fashioned from off-the-shelf, low-cost wireless local area network (LAN) equipment — and, in a pinch, using an antennae made from junk. In addition, Onno wrote two "how-to" cookbooks for community WiFi networks and voice over Internet protocol. (They are available for free download from PAN's web site.)

Onno's larger goal is not technical, but social. His vision is nothing less than to transform Indonesian youth into knowledge producers by imparting technical knowledge about ICTs and a desire to produce local knowledge about ICTs for development. In his view, these knowledge producers are the building blocks for a knowledge-based society in Indonesia.

Onno began on a conventional enough path, completing an electrical engineering degree at the Bandung Institute of Technology in Indonesia. In 1987 he went on to do a master's degree in electrical engineering at McMaster in Canada, then a PhD in the same discipline at the University of Waterloo. When Onno returned to Indonesia in 1993, he began teaching at the Bandung Institute of Technology. His passion for spreading his ideas and information to a broader public led him to travel widely delivering workshops and seminars.

(Continued on page 11)

“The Collaboratory’s training of trainers activities [in which] I participated have equipped me with valuable ICT knowledge and prepared me to become a better trainer in the Community Training and Learning Centers (CTLC). I am now more capable and confident in delivering the training materials to the participants.”

— Ms Delima Silalahi, trainer at Prapat, Indonesia, CTLC



ICT4D Asean Collaboratory is a regional ICT incubator and training facility

WSIS process over the past few years, trade agreements have been negotiated and concluded that have begun to further curb the flow of information and technologies. Unlike the WSIS resolutions, these negotiations lead to binding treaties and agreements that compel governments to comply with the trade regimes, which they created.

Multiplying ICT capacity

Human resource development is critical to bridging the technological gap known as the “digital divide” and is increasingly linked to the ability to effectively use ICTs. The Association of Southeast Asian Nations (ASEAN) Foundation, an intergovernmental organization, includes among its objectives human resource development in such fields as social development, science and technology, education, and environmental and civil service.

The ICT4D Collaboratory is a Jakarta-based partnership between the ASEAN Foundation and IDRC/PAN, two organizations that share the mission of improving social and economic development and alleviating poverty. The general objective of the ICT4D Collaboratory is to reduce the digital divide within a country and between countries in the Asian region through human resource development in technical, managerial, and training capacity for ICTs. A “training the trainers” approach is employed, whereby a network of in-country resource persons is developed through face-to-face training; these people can subsequently train others and provide demonstration help to learners, as needed. Continued learning and application building takes place using e-mail, help desks, discussion lists, and other distance-education approaches. Instruction is given in e-commerce, educational technologies,

e-government, geo-information systems, bibliographic and textual database systems, system-generated discussion and mailing lists, electronic conferencing, and multimedia applications.

Planting seeds of ICT research and development

In the world of ICTs, research funding is most accessible to teams from developed countries. As such, developing world institutions lack financial support to conduct their own research on ICTs, even when the required funding is relatively modest. IDRC needed a way to identify potential new partners in Asia and their research priorities through a mechanism other than the extensive project development process used for larger projects.

The answer was the Pan Asia ICT R&D Grants Programme. It provides funding opportunities for researchers and institutions in Asia that have identified local development problems and would like to pursue innovative ICT-related research to find appropriate solutions. The funding partners include IDRC/PAN, the Asia–Pacific Development Information Programme of the UNDP, the Asia–Pacific Network Information Centre, the Internet Society, and, most recently, Microsoft Corporation. The Asia Media Information and Communication Centre is the regional implementing agency.

Two competitions for small grants are held each year, in which the maximum research grant of US\$ 30 000 is given to each of the winning proposals. Since the program was launched in 1997, some 79 grants have been disbursed in over 28 countries. The grants result in projects that address research on such diverse topics as using ICTs for rural development, improving Internet access and performance, piloting telemedicine and e-learning,

assessing the effectiveness of e-governance projects, using ICTs for enhancing agricultural production and environmental conservation, and cultural preservation through the use of digital tools.

The grants program is an incubator for stimulating further innovative ICT for development research. One such example is the work of the Universitas Terbuka (UT) in Indonesia. The early efforts of UT to carry out research on the potential of using ICTs in distance education were supported by a small grant. The institution is continuing to carry out research and has increased the range of ICT-supported applications for distance education through a full-scale research project grant from PAN (see chapter 6).

Although US\$ 30 000 per project is a modest amount, it is highly appreciated by the recipients and has yielded a number of projects with significant impacts for development in Asia and the Pacific region. Of particular note, the Pan Asia ICT R&D Grants Programme continues to provide opportunities for more institutions to build capacity in carrying out ICT for development research projects. The small scale of the funding made it possible to widen the range of institutions eligible to receive the grant, while reducing the risks normally associated with larger-scale projects.

In 2002, external evaluator Mohamed Ally observed: “The funded projects are opening the ‘eyes’ of organizations and governments in Asia on the potential of ICTs in helping people, rural communities, and countries to develop. Project personnel are able to network with other local national and international researchers to share their results and to obtain information on ICTs.”

Networking knowledge for rural livelihoods

The International Fund for Agricultural Development (IFAD) is only too aware of the importance of knowledge management. Its mandate is to support projects aimed at improving the livelihoods of poor rural communities. Significant informal, undocumented knowledge within projects it supports could contribute innovative solutions to other development problems and projects. The sharing of such latent knowledge is a valuable resource, but it is largely untapped. IFAD recognizes the potential benefits of using ICTs, like the Internet, to document and share the knowledge generated within its projects.

With this philosophy, IFAD approached IDRC to collaborate in an initial project — Electronic Networking for Rural Projects in Asia–Pacific (ENRAP) — that aimed to bring electronic networking via the Internet to IFAD’s rural development projects. With its own keen interest and experience in the area, IDRC not only administered the project but also provided significant funding. The second phase of ENRAP moved from the simple electronic networking objective to the more complex one of knowledge networking to share and apply substantive lessons among the IFAD projects and stakeholders at local, national, and regional levels. This phase was aptly re-christened Knowledge Networking for Rural Development in the Asia–Pacific Region.

In this redefined role, ENRAP assesses and strengthens existing connectivity infrastructure and capabilities, and expands present project capacities to use ICTs for knowledge networking. In supporting IFAD projects, ENRAP works with collaborating institutions in government and nongovernment

(Continued from page 9)

Eventually, he was asked to decide where he wanted to focus his energy and he decided to step off the path of convention. In a sense, he was following a family tradition. His late father, Hasan, had been a



Dr. Onno W. Purbo

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pioneer in community development, social mobilization, and environmental awareness in Indonesia. Although Onno had mentors among his professors at Indonesian and Canadian universities, he considers his father to have been a great influence. “My non-engineering side is heavily built by my late father, who was a professor of urban planning and civic design and very much into bottom-up, community-based development.”

Onno Purbo is motivated by having to work for no one and merely being able to focus on the Indonesian people during the last 5 years. He says that inspiration in his work comes from religious sources. “I did my Hajj (pilgrimage) in Mecca in early 2005, which makes me closer to the creator. I am personally inspired by the Prophet’s saying that ‘One’s value depends on one’s benefit to others.’”

Onno believes his greatest achievement in promoting ICTs for development was the campaign he helped lead to liberate the 2.4-MHz WiFi band in Indonesia, which came to fruition on 5 January 2005. “It helps a lot to encourage the Indonesians to build their own low-cost Internet infrastructure,” says Onno.

Richard Fuchs, Director of ICTs for Development (ICT4D) Program at IDRC, followed the evolution of this campaign over the past few years. He recounts that Onno and his collaborators had to deal with much adversity during the struggle, including seized equipment and threats from police and other public officials. According to Fuchs, Onno insists that the time he spent working at IDRC was the lever that moved the Indonesian government to bring about the actual policy change. “I had the knowledge, but IDRC elevated the value of my knowledge,” says Onno Purbo.

“Networking is critical to all good research in Asia, indeed to every Centre program. Yet, networking in Asia bears special challenges of a political, historical and cultural nature (great heterogeneity, highly differentiated major language and cultural traditions, deep cultural and national suspicions, stronger links between Asian researchers and Northern research and training institutions than with each other, state dominated research and training agendas and weak civil society, and so on).”

— Asia Division, IFAD

agencies of China, India, Laos, Nepal, Pakistan, Philippines, Sri Lanka, and Viet Nam.

Although electronic networking is an efficient means of knowledge exchange, there is great intrinsic value in face-to-face exchanges, which also strengthen and sometimes even spark electronic exchanges to share knowledge and generate new ideas. ENRAP has continuously supplemented and strengthened its electronic network by conducting country meetings, where IFAD project and stakeholder staff have the opportunity to meet and share face-to-face as they learn about ICTs, participate in training together, or share project lessons on specific development themes.

The ENRAP website (www.enrap.org) demonstrates the richness of knowledge that has been shared by several IFAD-supported projects in the past few years. This knowledge addresses the themes of indigenous people, micro-credit, monitoring and evaluation, natural resource management, participation, poverty alleviation, and rural communication. For instance, under the last theme, you will find submissions on such topics as “Reflections on Community Radio from the Hills of Uttaranchal” and “Internet for the Village — Internet for Rural Users in Sri Lanka.”

To help reinforce this useful knowledge network that continues to grow, ENRAP is building capacity in community-based organizations and rural communities to integrate electronic media into their operations. One notable example involved collaboration between IFAD, the Government of India, the State of Gujarat, and the Self-Employed Women’s Association (SEWA). Members and staff of SEWA were trained in digital video documentation, which allows people the opportunity to document information at the grassroots using a medium that may be easier than writing an article. Women responded to the video documentation training enthusiastically. The effort also increased their understanding of how filmmaking could provide greater economic opportunity, help women get their voices heard, and build capacity among village women.

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Conducting an interview for a video on Self Help Groups sponsored by ENRAP

Chapter 2

Rural access: demonstrating the value of ICTs

“The effectiveness, usefulness and even acceptance of the rural ICT projects depend on the extent to which communities participate in the various aspects of the project and in its management.”

— Mahesh Uppal, *Lessons Learned from PAN projects on ICTs in Rural Areas*



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“People who had never even heard of the Internet before are asking us why we only provide e-mail and website facilities — they want video phones, even in rural areas!”

— *Dangaasuren Enkhbat, general director, Datacom (Mongolia)*



© S. NANDA

A unique image of a Mongolian yurt with a satellite attached to it

Connectivity and infrastructure

PAN's early days saw considerable effort invested in establishing ISPs in countries and regions where no such services were available and where none were likely to become available within a short time span. It was a challenge for PAN to determine how ISPs could become viable in countries where telecommunication costs were high, infrastructure was limited, and the market was relatively small. But creating the basic infrastructure was an essential prerequisite for any country hoping to join the information economy or to exploit the potential for community development through effective ICT use. PAN supported the former state enterprise Datacom in Mongolia to become the country's first ISP by installing a low-cost Internet dial-up system in 1994. PAN continued similar work in the mid to late 1990s helping countries like Laos, Viet Nam, Bhutan, and Cambodia establish ISPs and create platforms for developing local content. These projects included long-term sustainability strategies based on a sound business approach.

Why is rural access important?

It seems to be accepted wisdom that Asian nations and their major cities must be connected to the Internet and other ICTs. But it is sometimes difficult to understand why ICTs are also important for people living in rural areas. Rural dwellers are among the world's poorest people (IFAD 2001), with less access to health services, education, and clean drinking water than anyone else. Three out of four are undernourished.

For over 10 years, PAN has investigated how poor, and even illiterate people, can benefit from ICTs. The results show that, in fact, ICTs can dramatically improve their lives. A typical rural ICT project uses

technologies, such as computers, networking, and the Internet to deliver content on such topics as livelihoods, government programs, agriculture, health, and education. The ICTs may also deliver services, such as telephony or access to e-governance to a rural community. Content demands vary from community to community and often include information about agriculture (weather reports, appropriate crop rotation), education (lesson plans, teacher resources, student resources), health, and government development plans and services.

Unfortunately, connectivity in most rural areas in Asia is non-existent or substandard compared with urban areas. Also, the often low market potential for rural communications, combined with the substantial added cost of bringing connectivity to rural areas, has forced many telecom providers to forgo their plans to expand to these areas — the return on their investment is just not high enough.

Understanding that rural communities would never have individual access as urban residents often have, PAN has fostered use of ICTs in arrangements where rural communities share access through a common, public space. The most typical model is a community telecentre, a number of which have sprung up in rural areas with PAN's assistance. For a community telecentre to be successful, local grassroots organizations and institutions must be involved and needs assessments must be conducted within the local context.

To assess the continuing social and economic benefits of ICT for rural communities, for a decade, PAN has successfully supported

- A concentration of ICT-enabling projects such as telecentres at the community-level

- A core of networked projects focusing on distance education, small- and medium-sized enterprises, and health care that will contribute to alleviating poverty
- A cluster of regional projects that network ICT innovators in the region at both institutional and individual levels.

In this chapter, we examine PAN's contribution to the empowerment of rural people in Mongolia, Bhutan, India, Sri Lanka, the Philippines, and Pakistan by increasing their access to ICTs.

The pilot project

Just over 10 years ago, Mongolia — a country of 2.4 million — was isolated from the rest of the world, its infrastructure deteriorating or non-existent. It faced the challenge of making a transition from a centrally planned economy to a free market system after the collapse of the former Soviet Union. More than two-thirds of its population lived in remote and rural areas.

Today, Mongolia is a regional leader in Internet-based methods of development. About 30,000 individuals — ranging from the prime minister to teachers and teenagers — are dedicated Internet users.

How did it happen? In 1995, IDRC provided technical and financial support to Datacom, a local former state-run software and networking company, in its efforts to install a low-cost dial-up system to connect to the Internet. This was an opportunity for PAN to experiment with methods, approaches, and protocols that might create a model for other developing countries. Within 2 years, a dedicated satellite connection was established and a Mongolian website was created; however, users were mainly urban.

In 1998, a second project to examine the feasibility of wireless technologies and extend Internet access to all 22 provinces began. This project was implemented in collaboration with the Government of Mongolia, which had approved a national plan to provide all government offices and educational and research facilities with Internet access. This indicated an effort to better serve the majority of its citizens, who live in rural areas. Two central network stations and nine remote stations were established in the capital city of Ulaanbaatar, and one central station and two remote stations in the provincial city of Erdenet.

Other projects followed, such as one on Internet-based distanced education to help the government achieve its mission of delivering education to 75% of its population by 2010. In the area of health service delivery, a project aimed to make health care more accessible by testing distance medical diagnosis for rural areas and distance learning for rural physicians.

One of the keys to Mongolia's success is training of informal community leaders — such as well-respected teachers and doctors — to head the rural centres and promote the Internet. The next challenge is local content. Although 90% of Mongolians are literate, few rural people understand English. PAN is working with local nongovernmental organizations (NGOs) to develop and fund content that rural people will be willing to pay for — such as the price of farm equipment or local news.

In recognition of PAN's pioneering work with Mongolian researchers, IDRC was presented the prestigious Friendship Medal from the President of Mongolia, Natsagiin Bagabandi in October 2004.

Digital pioneer Narantsetseg Baljin: shaping the future

In the Mongolian language, *narantsetseg* means “sunflower” and the late Narantsetseg Baljin was a woman who many miss for the light and energy she radiated during her too-short life. In a tribute to



Narantsetseg Baljin

Narantsetseg or Nara — as she was called — after her tragic death at 39, her colleagues at the DirAP wrote: “Nara was a rare visionary working at the distant peripheries of the Internet who bravely embraced the new technologies and made them the centre of her life... To many people outside her country, Nara was not only the representative of the Mongolian Internet but also of Mongolia itself.”

One of the original founders of the digital revolution in Mongolia, Nara was marketing director of Datacom, the first ISP in Mongolia, then established her own IT consulting company, InfoCon. She helped draw up Mongolia's mid-term strategy and plan for the development of ICTs and managed several projects for the World Bank, UNDP, and IDRC. Nara Baljin was a recipient of the Best IT Researcher for 2003 award from the ICT Stakeholders Group and the Best Business Lady award from the Mongolian Business Women's Association.

Her passion was closing the digital divide between those who had access to ICTs and those who do not. Her vision of what the Internet could deliver included distance education and expert medical advice as well as more transparent government and cheaper communications services.

(Continued on page 17)

“The community was open to the technology, willing to learn, and committed to provide resources and to make the project work, not only in the traditional public service mode, but in a manner in which cost is recovered and plowed back into operations.”

— Comment on a telecentre, from final project report on Pilot Multipurpose Community Telecentres



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Accessing information at the local VKC in rural Pondicherry

Paving the way for a knowledge revolution in the villages

To address the digital divide in India, PAN began a partnership with the M.S. Swaminathan Research Foundation (MSSRF) in 1997. The goal was to examine the impact of ICTs in fostering sustainable agriculture and rural development. Using a makeshift modem-and-radio set-up with a solar power back-up, five village knowledge centres (VKCs) were established in the rural areas of Pondicherry, where one out of five people lives below the poverty line. The VKCs are essentially community telecentres, but combined with the proper physical and human infrastructure, they become the main channel for obtaining relevant and timely information. They provide people in rural areas with appropriate knowledge about livelihood, health and social well-being, and economic opportunities. The main impetus for developing the VKCs was to research whether ICT could be a beneficial tool for social and economic development of rural communities. MSSRF succeeded in demonstrating these benefits, particularly due to the high level of community involvement (in the community where each VKC is located, it must provide volunteer staff and guarantee equal access to all, irrespective of their social and economic situation).

In 5 short years, more than 50 000 information-shop users in a dozen communities in Pondicherry have gained access to a new wireless Internet connection. The demand for local, relevant information was relentless. People wanted to know more about government financial schemes for the poor, health care, nutrition, sanitation, employment, food prices, education, and the costs and availability of agricultural inputs such as seeds,

fertilizer, and pesticides. Women, in particular, were interested in the fluctuating price of grain as female agricultural workers are partly paid in grain.

As one writer (Shore 2003) explains,

Fishermen, dairy farmers, and coconut sellers also keep a watch on product prices. Teachers prepare lessons and students do homework. Panchayats, or local councils, do their accounting and correspondence, and gain access to grants for infrastructure such as roads, bus stations, streetlights, and drains. State and federal government representatives put together their reports and use voice lines to consult with superiors about local queries. Job seekers find employment. Older people share traditional medical lore. Many morning users come to centres to read newspapers. Everybody relies on weather reports.

With additional funding from the Canadian International Development Agency, a second phase of the project began in 2001. The goal was to enhance connectivity and assess the potential sustainability of the ICTs. Some VKCs were upgraded to test new technologies with broader bandwidth enabling such new applications as video conferencing. Other VKCs were also established, providing relevant information in the local language, Tamil. As some villagers are illiterate, information such as weather reports was downloaded as RealAudio files and played over speakers in front of the VKCs.

Volunteers have built their own databases containing details of approximately 130 government programs for low income rural families; a directory of

insurance plans for both crops and families; pest management plans for rice and sugarcane; a directory of local hospitals, medical practitioners, and their specialties; a regional timetable for buses and trains; and a directory of local veterinarians, cattle, and animal husbandry programs. An evaluation of the experience of the MSSRF in setting up VKCs describes 28 specific instances of how rural people have benefited from ICTs.

The MSSRF has made it a priority to collaborate with existing agencies and scientific organizations and has more than 25 partners. One of these, the District Rural Development Agency, has begun to use the VKCs to disseminate information and provide loans for micro-enterprises. This application demonstrates the usefulness of ICTs in facilitating initiatives for building capacity at the village level.

Meeting multiple needs

In its IT action agenda, the Government of the Philippines committed to ensuring that every business, government agency, school, and home would have access to information technology by the end of the 21st century. With 70% of its 70 million people living in rural areas where telecommunications capacity is limited, community access rather than individual access is the preferred approach.

PAN supported a 5-year pilot project in the Philippines to establish four multipurpose community telecentres (MCTs) on the island of Mindanao and bring ICT to the rural villages. MCTs contain many resources, including a public telephone office, a reading centre or library, information about the barangay (the village-level government), Internet access to information about agriculture, education, health, and livelihoods, and an Internet café. The goal of the project went

beyond ensuring connectivity to also spur content development at all levels and create an environment for two-way communication and interaction.

A key component was engaging villagers in the content development process to ensure that their concerns and needs were met. Another important component was the staffing of the MCTs by at least 10 volunteers, two a day. The volunteers — high school graduates or individuals with college or university studies — had no previous exposure to computing or the Internet. They were trained not only in ICT skills but also in information literacy and MCT management.

The community meetings revealed a need for information about general health, distance learning for unemployed youth, weather advisories, and pest control management, among other topics. One community decided to work on an application that would directly address malnutrition. Village health workers and daycare centre teachers participated in the development of this digital content and its applications, making use of indigenous knowledge as well as government or civil society information and services that could be delivered to the rural community.

Significant impacts from the MCT project included building the capacity of DOST (Department of Science and Technology) staff and local people and creating awareness among Philippine government units of the value of rural ICT initiatives. In addition, the MCTs became entry points for other rural development projects in the barangays.

In its final project report, the research team argued that information resources cannot be delivered the same way to all locations, but have to be adapted to the community: “In this context, what is made

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Nara’s level of energy and capacity for work impressed her colleagues. Despite her many professional commitments, business interests, and travel, she somehow found time to pursue a doctorate.

“Our last sight and remembrance of Nara was of her indefatigable energy at work and her joy, care, warmth and laughter shared over meals and in friendship,” says Maria Ng Lee Hoon, regional senior program specialist, IDRC. “She often expressed her concern that her country should recognize the ICT4D research and development work that IDRC had contributed to Mongolia. On October 21, 2004, His Excellency, Natsagiin Bagabandi, the President of Mongolia, visited Ottawa and presented the Friendship Medal of Mongolia to IDRC. As we watched IDRC’s president receiving Mongolia’s highest medal of honour for a foreign country, we knew for certain that Nara was looking down, smiling on us.”

Rural Access

The immediate usefulness of information obtained through the multipurpose community centres (MCTs) is illustrated by an experience in Malingao. There, a banana farmer found that leaves on her banana trees had turned brown or black. The symptom spread and many trees died or did not bear fruit. Unable to find the appropriate remedy, the farmer visited the nearby MCT to look for answers. Through the MCT, she obtained remedies for preventing the disease's spread and was able to save her banana plantation. Moreover, she provided the same information to other banana growers in the village.

available in the MCT has to be translated, repackaged and disseminated by the community, in their language, to their membership through traditional and other means like radio Internet browsing.”

This PAN-supported project was presented to the Philippines Cabinet as a model for designing a large-scale government project aiming at connecting thousands of rural communities.

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Multipurpose Community Telecenter (MCT) in Taguitic, Kapatagan, Lanao del Norte

Chapter 3

Technology tools: instruments for community empowerment and development

“The barrier [is] not actually the tool. The barrier would be the education process. To educate the society to share the knowledge within the society, to encourage the society to produce their knowledge in local languages.”

— Onno Purbo, ICT digital pioneer, educator and writer





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Satellites and other technology tools can improve livelihoods, namely in the areas of health, education and governance

Technologies are only tools for creating a desired result. In the case of PAN's support for research on ICTs for development, the intended result is useful information and knowledge placed in the hands of the most disadvantaged of society to empower them or help solve their development problems. Indeed, technology can be an important tool to improve health, bolster learning, and create economic opportunities. Certain recent technological innovations have opened up a whole new "spectrum" of opportunities to help communities access the knowledge they need. Among them is the creation of inexpensive equipment that allows for wireless local areas networks (WLANs), commonly known as "WiFi," which stands for wireless fidelity. These networks use high-frequency (2.4-MHz) radio signals to transmit and receive data over distances of a few hundred feet. WiFi is also known by the specification 802.11, conferred by the Institute of Electrical and Electronics Engineers (IEEE).

WiFi has revolutionized connectivity since it has, to a certain extent, "liberated" the Internet. In Indonesia, for example, key PAN partners, including Onno Purbo, have been teaching people how to create WiFi networks to ensure that poor communities can share the cost of access to the Internet. Purbo also teaches these communities how to set up voice over Internet protocol (VoIP), which is the routing of voice conversations over the Internet or any other IP-based network, so that communities can more readily telephone each other. And Purbo explains the usefulness of adopting open-source software, which refers to computer software developed by a community that is available to anyone who wants to study and improve its design. Since open-source software is often, although not necessarily, free, using it is a way of avoiding the high costs of proprietary software. WiFi, open-source software

and VoIP are key technological innovations that have an important role in reducing the digital divide.

However, all of these technological innovations assume there are Internet connections and services in a country. This connectivity dimension is exactly where PAN's work has been breaking ground in Asia. PAN actually ensured that several countries in Asia, notably Cambodia and Viet Nam, were able to develop their first Internet connection, allowing transmission of the first e-mail from within the country. Once the challenge of simply getting an Internet connection to a country had been dealt with, access in the main cities increased greatly. However, communities in rural areas seemed even more isolated from the world and were left out of the burgeoning "new economy." In response, PAN's focus shifted to supporting experiments in rural connectivity, particularly through the piloting of telecentres. More recently, PAN has looked at ways in which rural communities could more effectively use technologies such as WiFi, VoIP, and open-source software. At the same time, PAN has focused on activities, such as localization, that facilitate the use of ICTs in local languages, which helps the vast majority of Asians, who do not speak, read, or write in English (the dominant operating language for software), use software applications.

Access to knowledge for rural development and poverty reduction

In most developing countries, Internet services are available to those who can pay and who are in large cities with reliable telephone infrastructure. However, finding solutions to the problem of connecting far-flung rural communities to Internet services demands technical ingenuity, creative minds, the marriage of a variety of technologies, and the ability to pursue unconventional approaches. The situation in each

country, and within the regions of such vast countries as India, can vary hugely. Moreover, the digital universe is never static, but is a dynamic place where what was not feasible a month ago may become feasible in a month's time as technologies develop or as costs fall.

To advance research in improving access for underserved areas, PAN supported a number of projects in rural areas of different countries, namely Pondicherry in Southern India; Nangrong in rural Thailand; Bario, a remote village of Sarawak, Indonesia; Mindanao in the Philippines; as well as in Bangladesh, Laos, Sri Lanka, and Bhutan. Research support had to include attention to challenges of illiteracy, a diversity of local languages, and the scarcity of web content in local languages.

Experience in India's Union Territory of Pondicherry provides one model of how affordable ICTs can be harnessed to serve people's interests in poor, rural communities. PAN supported the M.S. Swaminathan Research Foundation (MSSRF) in its efforts to respond to the information needs of villages near the regional centre of Villanur. In 1998, the area had a reasonable telecom infrastructure, but the 11 villages had an average of less than one telephone (public and private combined) for every 500 inhabitants. The cost of running copper or fibre-optic cables to the villages was out of the question, even for the region's telecom operator. The innovative solution was to set up a hub-and-spokes model, with the hub centre in Villanur able to serve satellite villages using wireless Internet connection. Initially, the villages achieved access to the network using wireless VHF (very high frequency) radio. Today, the "last mile" connection to the villages has been upgraded to a proprietary spread-spectrum technology that enables much more efficient communication between the hub and the villages. The larger bandwidth now makes it possible, for

example, to hold interactive video conferencing with people in the villages. The computers and other electrical equipment are backed up by hybrid solar energy systems, which gets around the problem of unreliable electricity supply.

Although getting the technology right — which means that it must be technically robust but low-cost at the same time — was a necessary step in creating village information centres, the technology had to be matched with the right kind of social infrastructure. Community ownership must be emphasized, the community must want the centre, and information and services must be demand-driven. Finally, the centres must be located in public spaces and focus on inclusion of all castes and groups, gender equity, and accessibility. Project staff regularly hold village meetings to promote the knowledge centres, and they also use participatory rural appraisal techniques to ensure that peoples' information needs are being met.

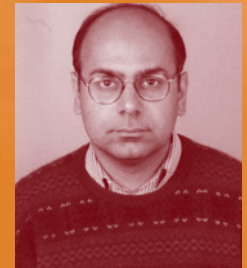
Hybrid technologies: do not throw away your public address system

Information captured from the Internet and relayed to villagers can be highly relevant to peoples' livelihoods. For example, information on the height of waves on the Pondicherry coast is retrieved daily from the US navy website, translated into Tamil, and broadcast to coastal villages using an old, but functional, public address system. Another older technology — the newspaper — has proven its worth as part of the technology chain that brings useful information to villagers. A community newspaper containing a mix of information items is published twice monthly and distributed to those beyond the electronic reach of the village knowledge centres (VKCs).

In the 7 years since the VKC project was first established, new technologies have come on the

Digital pioneer Sarmad Hussain

Dr Sarmad Hussain has a passion to help his compatriots in Pakistan enter the information age by building the tools that allow access to ICTs in their own language. He took on this mission after almost 10 years of study outside his native land of Pakistan, beginning with a BSc in computer engineering at the University of Texas. Next came a master's degree from Cambridge in computer speech and language processing, and finally a PhD in linguistics from Northwestern University in Illinois.



Dr. Sarmad Hussain

A turning point occurred when he came home to take up his current position as professor of computer science at the National University of Computer and Emerging Sciences in Lahore. Although he feels that his early interest in speech and language processing had been merely an intellectual pursuit when he studied abroad, coming back to Pakistan opened his eyes to certain realities in the computer science field, he recalls. What struck Dr Hussain are two dominant features of computers: software and operating systems are generally in English and they use a textual interface. Thus, their use was out of reach for most of his fellow Pakistani citizens, 95% of whom do not understand English and at least 50% of whom cannot read or write. "Why should I need to learn a foreign language or, for that matter, be literate to access information?"

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“We want to show people how effective it is to get information and government services through such technology.”

— Sangay Wangchuk, deputy director, Department of Information Technology, Royal Government of Bhutan

market at affordable prices. The VHF radio system was replaced by wireless spread-spectrum technology, and soon, even more cost-efficient WiFi or WiMax networking equipment will replace the spread-spectrum system. The latest MSSRF project supported by PAN is also testing 2.5-G mobile technology, a global positioning system (GPS), and sonars for fisherfolk to improve knowledge of fishing zones and ocean hazards, VoIP for low-cost long distance voice communication, and caching servers for more efficient data management among villages and greater local content development. In this project, ICTs will be tested for use in village health programs, education for rural children, an indigenous knowledge directory, food security, and knowledge management for local women.

The success of the VKCs has captured the attention of media around the world, including *The New York Times*, the *Economist*, the *Times of India*, and *New Scientist* magazine. The centres have also been recognized through the 1999 Motorola Dispatch Solution Award and the 2001 Stockholm Challenge Award (global village category).

The rural knowledge centres have had a positive impact on villagers lives by providing access to information that increases the profitability of their farming, fishing, and other enterprises; allows better use of medical services; and informs people of valuable government services and entitlements. The centres have also contributed to acquisition of better ICT skills and higher educational levels and economic status, especially for women.

Bhutan: reducing the cost of rural access

As in Mongolia, the rural communities of Bhutan are extremely isolated and the country's

mountainous terrain not only makes the installation of communications infrastructure difficult and expensive, but it also makes travel demanding and arduous for the average Bhutanese. It can take as much as 12 days of walking to reach some towns from a road.

Internet access was introduced to Bhutan's citizens on 2 June 1999 on the 25th anniversary of the King's coronation. The country's first ISP, DrukNet, was established in part with support from PAN in a project that also established international e-mail access and built training capacities in Bhutan's Division of Telecommunications and the Royal Institute of Management.

From the beginning, the Government of Bhutan's Division of Telecommunications (now a private company known as Bhutan Telecom) made a concerted effort to equalize the cost of accessing the Internet throughout the country. Thus, the fees for dialing up to the DrukNet server are the same as those for making a local telephone call, whether one lives in the city or in the country. Unfortunately, dial-up Internet service still requires access to a telephone line, and the low bandwidth of dial-up systems means end-users cannot benefit from useful applications that can only run on a broadband Internet connection (e.g., live videoconferencing and distance learning).

To overcome the limitations of dial-up Internet services, the Department of Information Technology of the Ministry of Information and Communication is undertaking a new research project supported by PAN. The pilot project will examine the viability and robustness of WiFi as an appropriate technology to reduce the cost of land-based infrastructure. It also addresses the development of local content. The project will identify two communities that still have



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Children in Pondicherry access information about their village at the local VKC

no access to Internet services, then equip them with Internet access. Using WiFi technology, the communities will be linked to a larger centre that has Internet connectivity. Residents will be able to access services and information that were previously unattainable without walking great distances. Using participatory planning methods, people in these rural communities will identify their need for information about agriculture, education, governance, and health. The socioeconomic impact of these interventions will also be measured to inform future policymaking processes.

Technology and culture in Sri Lanka

The Sri Lanka Virtual Village project addresses the question of how to integrate ICTs into rural communities where temples, indigenous medicine, and farming have great cultural significance. The project will extend the reach of ICT and the Internet beyond the telecentre to address the last mile issue that often plagues many rural areas. Wireless technology will bring information and services beyond the telecentre to the household, school, community library, and the traditional *ayurvedic* doctor. One component of the project examines the appropriateness and adaptability of various ICTs (WiFi, open source applications, and other low-cost ICT applications) for last mile connectivity. Another component will be a socio-anthropological study that looks at how diverse community groups, including women, respond to the new technologies and how they affect community life.

How do you say “download” in Urdu?

While PAN initially focused on establishing connectivity and infrastructure in unserved or underserved countries, in recent years energies have turned to the issue of “localization,” i.e.,

adapting ICTs to the user’s local language, whether it is Urdu in Pakistan, Bangla in Bangladesh, or Dzongka in Bhutan. Localization is critical in widening the reach of ICTs and opening up the vast resources of the Internet to the majority of the population in many countries.

Sarmad Hussain is coordinator of the PAN Localization project in Afghanistan, Bangladesh, Bhutan, Cambodia, Laos, Nepal, and Sri Lanka. He makes the point that Asia is the most culturally and linguistically diverse region of the world, where several thousand languages are spoken. Only about 20% of Asians can communicate in English, which means that English language content on the Internet is inaccessible to most Asians, especially rural populations. Writing in the journal *i4d* (information for development), Hussain (2004) states, “Unless these large non-English speaking populations have the ability to generate and access content in their native languages, they will not be able to use ICTs for their development effectively.” The first step toward content manipulation in local languages is to have the devices — computer tools and mobile phones — interface with the user in local languages.

PAN Localization is a collaboration with the Centre for Research in Urdu Language Processing (CRULP) of the National University for Computing and Emerging Sciences in Lahore, Pakistan. CRULP coordinates the work of the PAN Localization multistakeholder partnerships in seven countries. It is tackling an ambitious program to create tools to translate Internet content into local languages, strengthen capacity for local-language computing, and influence policy to promote local-language content across Asia. The project involves collaboration with institutions in each partner country — institutions that may continue the work beyond the life of the project. The challenge is quite enormous, and as Sarmad Hussain notes,

(Continued from page 21)

For Dr Hussain, access to information is a basic human right. “In today’s age, one cannot fight for legal, political, economic, social, health, or cultural rights unless one is empowered with information. It cannot be separated from other issues, and is part of the solution to these issues,” he says. Dr Hussain is able to contribute to improving access to information through his role as head of CRULP and leader of the PAN Localization project. This regional initiative is developing local language computing capacity in eight Asian countries.

According to Dr Hussain, “Localization and language processing is an important area for effectively disseminating technology to our people. This was not considered an issue at all when I came to Pakistan, as most people were concerned with IT infrastructure. I have played a significant role in making localization and language processing an integral part of national ICT policy in Pakistan. In addition, I started CRULP, which is still the only centre working on language processing in Pakistan. This discipline did not exist in Pakistan and has been formally introduced by our efforts. We are certain that our work in our languages will provide significant ICT accessibility and eventually developmental benefits to our people.”

Dr Hussain is inspired by what he says is the incredible capacity of his students to learn and perform. “I know no greater pleasure than what I get when, given an assignment, my students go the extra mile to deliver more than what was expected. Educated rightly, they are the best asset of our future. I would retire a very happy person when one of them takes over my job, more intelligent and learned than myself. Looking at the raw energy of our youth, I have already started preparing for an early retirement!”

Technology Tools

A dramatic demonstration of the value of the VKCs came during the tsunami of December 2004. Vijayakuma Gunasekaran, a young man from Nallavadu village, where a VKC was established by MSSRF, was living in Singapore when he heard of the unfolding disaster after the earthquake in Indonesia. A telephone call to his sister in Nallavadu led to villagers breaking into the rural knowledge centre and using the PA system and siren to warn other villagers to evacuate. The lives of the 3600 residents in Nallavadu were saved, although many homes and fishing boats were destroyed. An MSSRF fellow, Professor Subbiah Arunachalam, notes that following the tsunami, villages with knowledge centres were able to respond in a more orderly way compared with the chaos experienced in villages without such resources. Villages with knowledge centres used the databases in their computers to help with “organizing relief measures and for distributing aid and material received from government and other sources.”

Localization is only starting for many Asian languages. One obstacle has been the lack of commercial incentive to address markets that may not bring adequate financial returns to software companies. Another is the complexity of Asian languages. Although many major Asian languages have developed character sets, other standards are required to carry out data processing. One example is collation sequences, which need to be defined to enable applications that sort such data as a voters list.

Creating virtual marketplaces through e-commerce

Electronic commerce (or e-commerce) is a form of economic activity that is increasing throughout the world, although in Asia, Japan accounts for 70% of revenues generated via this means. Nonetheless, e-commerce represents an important form of commercial transaction even for smaller Asian economies. The benefits can reach disadvantaged communities through employment growth, lower materials costs for businesses, and better marketing of goods from small producers.

The challenge of e-commerce is compelling to PAN, as IDRC supports research into innovations that can contribute to the knowledge and information economies of developing countries. When PAN introduced an e-commerce initiative in 1999, many countries where partners were operating were still worried about the initial problem of getting connected. But e-commerce is a way to add value to the Internet infrastructure that PAN helped establish in many areas.

PAN supports research on various aspects of e-commerce, from electronic payment systems and authentication to studying the policy environment

for e-commerce activities. In this way, it has been able to help local researchers investigate obstacles they encounter when trying to advance this unique business model.

One of IDRC’s steps into the world of e-commerce is its support of the PAN e-commerce mall. This not-for-profit e-commerce portal (www.panaseanemall.org) serves the development community in the Asia–Pacific region. It is a way of offering to the world the products of development organizations that otherwise would have limited market outlets. The initiative was the first of its kind in the region to overcome the issue of secure electronic payment. With contributions from 13 countries in the region (Bangladesh, China, India, Indonesia, Laos, Malaysia, Mongolia, Nepal, Pakistan, the Philippines, Singapore, Sri Lanka, and Thailand) in the form of arts and crafts, publications, videos, and CD-ROMs, this truly regional e-commerce site has been in operation since June 2000. The PAN e-commerce mall is part of a larger undertaking — the ICT4D Collaboratory, hosted at the ASEAN Foundation in Jakarta, Indonesia (www.ict4dasean.org). According to project leader Eddy Bahfen, annual sales at the e-mall stand at about US\$12 000. Some 400 items are displayed, of which 80% are publications and the remaining 20% made up of handicrafts and CDs. Most buyers at the e-mall are from the United States and Europe.

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“If you look at the opportunities and the threats which exist in the context of globalization, information technology can become a tool of either decreasing the inequalities that already exist in the world or increasing it. And these inequalities include inequalities along the lines of human rights, of inclusion, the whole issue of class, of language, of the North–South divide, and increasingly of gender, of the divide between men and women, and even among women, between those who have the skills and the education and those who do not have them.”

— Noeleen Heyzer, executive director, United Nations Development Fund for Women

Chapter 4

Gender equity in ICTs for development





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PAN integrates a gender perspective into many of its projects, guided by a view of sustainable and equitable development in which women participate fully and women and men are represented equally. Recognizing the difference between projects that integrate an element of gender and social analysis to create gender-positive research outcomes and those that place gender equality and women's empowerment (social, economic, or political) at the centre of the research problem, PAN is working toward building a solid base of research findings in the area of ICTs for development and gender issues.

The inequities facing the general Asian population with regard to accessing ICTs are reproduced and accentuated when we look at Asian women as a group. More specifically, rural women have less access than urban women, women find no content available on the Internet in their own languages, and, given the fact that women's illiteracy tends to be higher than men's, women are less able to understand available content. Education and income levels are lowest among poorer women, which means these women have fewer opportunities to develop skills to use computers, e-mail, and the Internet. Moreover, relatively few women have the financial resources to rent time at an Internet kiosk, much less acquire equipment of their own.

For these reasons, PAN's applied research approach aims to encourage investigation that addresses questions of equitable access, including how to overcome the gender divide. Over the years, PAN has supported research examining such issues as women's participation in ICT-related fields, the opportunity costs for women to use ICTs, how ICTs fit with women's dual responsibilities for work and family, and what impact distance education has on learning opportunities for women. In addition to addressing the gender divide within specific

projects, PAN has also monitored its portfolio of projects in Asia to ensure there is gender balance in the composition of research teams.

ICT tools to reach grassroots women in Asia and the Pacific

The advent of ICTs has given women the opportunity to share information and interact to counter gender discrimination and improve the lot of women and girls throughout Asia. But in many respects, this potential remains theoretical. In terms of actual participation, women's use of, and access to, ICTs remains low in Asia. There are barriers to access owing to location (rural or urban), level of IT skills, gender stereotyping, and income levels, among others.

In 2000, PAN supported Isis International Manila through an R&D grant to examine how women's organizations use ICTs in Asia. The study, carried out jointly with the Asian Women's Resource Exchange and the United Nations Economic and Social Commission for Asia and the Pacific, surveyed some 76 women's organizations. The researchers found that although many organizations had acquired ICTs, they were not being deployed to their full potential. Generally speaking, ICTs were not being used for more strategic functions such as database management, desktop publishing, and website development. According to the study results, "the issues of infrastructure availability, costs and know-how, and the ubiquitous question of women's multiple burdens suggest the need for policy changes for women to fully benefit from today's information and communication technologies."

PAN recently awarded Isis International funding for a project to carry out further research to determine the most effective ICT tools used by NGOs to reach

women at the grassroots level in five countries of the Asia–Pacific (Fiji, India, Papua–New Guinea, the Philippines, and Thailand). This research will explore the validity of the notion that access to ICTs and their effective use will lead to women’s empowerment and development.

Among the project components is a survey of the economic, social, and political environment of the countries under study, and their populations, geographies, and ICT infrastructure and access. In addition to new ICTs, study informants will be questioned on the importance of older communication and information tools such as publications, audiovisual media, theatre and performing arts, telecommunications, and indigenous oral traditions. Some 20 organizations from each of the five countries will provide information on the ICT tools they use, their views on development processes and networking, the communication needs of their members, and issues of women’s empowerment and effective tools of communication. The organizations will share their experiences about whether the infusion of new ICTs has effectively addressed fundamental problems in education, health, human rights, and poverty.

Homeworkers and ICTs in Southeast Asia

Women on the losing side of the digital divide are those who are unemployed, physically disabled, chronically ill, spouses or widows of AIDS victims, or those who must care for disabled or ill family members. Because these women are nearly always housebound, access to employment and business opportunities is limited. They could achieve economic sustainability if they had knowledge of market opportunities and were able to access these markets to sell their products and services.

Research has shown that women homeworkers have the least access to ICTs and little control over decisions that affect their lives, both within the public sphere and at home. As a result, inequalities in opportunities and participation arise both between men and women, and among women — between the haves and have-nots — with respect to ICTs.

eHomemakers is a Malaysian organization that encourages homemakers, especially the disadvantaged, to generate income through home-based activities. In 2003, PAN provided eHomemakers with an R&D grant to conduct research on what combination of ICTs would be best suited to the needs of homeworkers. It allowed eHomemakers to explore the possibility of helping women use ICTs and, in the process, strengthen their individual skills, explore the option of teleworking, improve their chances of operating home businesses, and become socially empowered.

A year later, PAN supported eHomemakers in a larger research project to document the situation of homeworkers and contribute to policy development for this largely overlooked sector. The project includes a participatory study to identify issues surrounding home-based work. The information collected will contribute to a knowledge portfolio on homeworkers that will create opportunities for home-based communities to harness ICTs for their benefit. The study will be carried out in the urban areas of Thailand, Indonesia, and Malaysia. Interviewees will be drawn from among agencies promoting women’s issues, family and community development, ICTs, entrepreneurship, and human resource development, as well as from among independent contractors and “homepreneurs.” The research is intended to examine gender-specific issues faced by women homeworkers in deploying ICTs for work within the public sphere and in their

Digital pioneer Chong Sheau Ching

Is it possible for ICTs to be used as tools for Malaysian women working from their homes to network, acquire new skills, and earn a living? Chong Sheau Ching fervently believes in the truth of this idea and her efforts over the past decade to prove it have made her a digital pioneer in Malaysia.

Chong Sheau Ching’s academic path did not focus on computer science or ICTs, although it did address women’s domestic work. She has bachelor’s degrees in agriculture and home economics from the University of Saskatchewan, and a master’s degree in international administration from the School for International Training at Brattleboro, Vermont.

In the late 1980s and early 1990s, Ms Ching worked in project management and ICT planning for several international organizations, including the World Health Organization, the United Nations High Commissioner for Refugees, and the United Nations Population Fund. Then she suddenly found herself in unexpected circumstances — a single mother at home! “I became a single mom, facing another social prejudice I never dreamt would happen to me. That was what initiated my building ‘Mothers for Mothers’” — launched in 1998 in Malaysia as a network of mothers and persons from multi-ethnic communities working at home. Mothers for Mothers later became eHomemakers, whose mandate is to use ICTs so that homemakers, especially mothers, can earn incomes from their homes and maintain their family responsibilities in the Malaysian social context.

“Single-handedly raising funds and motivating like-minded people to build a women-centred social movement in Malaysia is not easy,” Ching admits. She faced considerable apathy and ignorance about the plight of women working from home and the potential of ICTs to offer livelihood options and capacity building. “The corporate sector and the government sector were not interested in women and ICTs. The corporate sector saw us as cash-strapped consumers that were not worth their advertising dollars, and government did not understand where the digital divide gaps were and what were the characteristics of the gaps.”

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“ICT4D Project has exposed the people of this mountainous and remote part of the world to a new light and opened new horizon of opportunities for development. When I shared this initiative with heads of different colleges from North Pakistan, some of them said that now cities would have to look at remote villages for new ideas! This is just because of ICT4D Project.”

— Ms. Yasmeen Ali Panah, principal at Degree College for Girls, Hunza, Pakistan



© J. IOBAL
Women offer training to one another in the telecentre located in Northern Pakistan

homes. It will also identify ways in which women homeworkers can use ICTs to improve production capability and quality and reach and create new markets. A key objective will be to bring the research results to policymakers in the three countries.

In the process of scaling up from the small R&D grant to the larger research project, a new and richer understanding of the ICTs and homemakers research problem has emerged. It became clear that this area of research deals with gender relations at different levels (intra-household, community, policy). Therefore, a fuller understanding of women's use of ICTs requires gender analysis in both the public and the private spheres.

One early result of this project is a trilingual website (www.ehomemakers.net) that provides information and resources to improve the efficiency of home-based work, embark on entrepreneurship, share knowledge, and ask questions of experts about working from home or starting an Internet business.

ICTs for rural development in Northern Pakistan

Pakistan's northern areas contain some of the world's highest mountain ranges, including the Karakoram and the western Himalayas, the Pamir mountains in the north, and the Hindu Kush lying to the west. Since the opening of the Karakoram Highway in the late 1980s the region is better served, but the population remains isolated from economic opportunities and political activities in the rest of the country. Understandably, this dramatic and forbidding glacier-ridden territory poses many difficulties for communication, including installing the infrastructure for ICTs.

In the late 1990s, PAN supported the Commission on Science and Technology for Sustainable Development in the South (COMSATS) to establish an ISP facility in Gilgit, Pakistan. This facility allowed many organizations and enterprises to connect to the Internet and allowed many students to get training in computer skills.

The million residents of Gilgit, Hunza, and Baltistan survive through subsistence agriculture, even though only about a fifth of the land is suitable for cultivation. For many of these people, quality health care, agricultural information, and formal education are simply unavailable. Women face further disadvantages owing to a strict gender hierarchy, low literacy rates, and limited participation in the public sphere.

In 2004, PAN support was renewed to COMSATS for a collaborative project, ICTs for Rural Development in Mountainous and Remote Areas of Northern Pakistan. Along with COMSATS, the Karakoram Area Development Organization (KADO), the Baltistan Health and Education Fund, and the Aga Khan Rural Support Programme are project partners.

A fully functional telehealth centre was established in Skardu, allowing for consultations with medical specialists in Islamabad. In a study done from April through June 2005, 153 patients were served — 51 men and 102 women. The figures reveal almost twice as many female patients as males. The fact that the general physicians at the telehealth centre in Skardu and the coordinating doctor at the resource centre in Islamabad are all women significantly boosted the confidence of both women doctors and patients in telehealth consultancies.

According to Javed Iqbal Barcha, chief executive officer for KADO, girls and women in the region's villages depend on male family members and relatives for information about educational institutions and scholarships. "In most cases they do not get timely and adequate information and support and many talented girls do not benefit from such opportunities. As a result of the ICT4D project funded by IDRC, both men's and women's access to useful information and knowledge on the Internet is increasing every day. The project is making focused efforts toward capacity building and improving the access of women even in remote villages by establishing village resource centres and capacity building efforts," says Barcha.

A very practical benefit noted by Barcha is that girls now have access to their school results immediately through the Internet. "In the past they would have to travel to Islamabad and back (34 hours each way) or wait for the ordinary post, which takes up to a month, to get their result cards. Now, with Internet access, girls search for educational opportunities — even in universities in the United States."

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Many women work in the fields and tend to their children simultaneously, as is the case with this woman from Nagaland

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She recalls wanting to quit many times. "But I couldn't do it," she says. Every time she met a single mom with less education she thought to herself "If I, an educated woman, find it difficult to live as a single mom wanting to take care of my kid and work at the same time, how can anyone expect a woman with less means to do the same thing?"



Chong Sheau Ching

So Ching persisted. Eventually, she received support from Malaysia's Ministry of Science, Technology and Environment. The modest research that Ching embarked on convinced her that the network required more significant funding to carry out proper studies on the various aspects of female homeworkers and how ICTs could be used for their benefit. A meeting with PAN staff at its 2003 All Partners' Conference in Laos eventually led to a proposal and the current PAN-supported research project (see this chapter above for more detail).

Ching is tremendously motivated to continue the work by the development of her daughter. "I kiss and hug my daughter whose growth and happy status has a lot to do with my working at home. I would ask myself 'She is fortunate to have me work at home, but how about other kids with mothers who need more help? Who is helping them?'"

Ching describes herself as something of a workaholic. "I have many things to do — taking care of my kid and my brother, who has Downs Syndrome. I am the head of the household and also the manager of a lively network with many demands. Before all of this, I was a fun-loving girl!"

Chapter 5

Influencing policy in ICTs for development

“The huge debate throughout history, in fact, has been how can the new capacities that we develop through technology, through new technologies, make a difference in the creation of a fairer world.”

— Maureen O’Neil, President of IDRC





Collection of PAN-supported e-commerce initiatives

A key driver of positive change in countries is the development of appropriate government policies. Indeed, good governance, which is partly attributable to effectively developed and implemented policies, is now considered an important factor in ensuring a country's sustainable development. However, the effectiveness of policies is quite often linked to well-researched recommendations and ideas. Unfortunately, resources for research are scarce commodities in developing countries and, therefore, a primary objective of PAN's work is to support knowledge generation and research capacity to help inform policy.

PAN has always sought opportunities to influence policy in the area of ICTs for development and to build capacity for research on ICT policy. A well-researched policy instrument that covers key sectors where ICTs are bound to make a difference can have great impact at a national, regional, or local level — provided, of course, it is backed up by sufficient financial and human resources for its implementation. PAN has pursued its objective of encouraging governments in their ICT policy formulation to focus on bringing ICTs to rural and disadvantaged communities. The convening power of IDRC/PAN brings together researchers who can contribute to policy development at all levels. PAN has also sought to strengthen the capacity of developing Asian nations to participate in international negotiations on ICT issues to better serve their own interests. Some projects are designed with built-in policy components. In other instances, the policy influence is only realized in the wake of significant research results, a case in point being India's experience with village knowledge centres (see below).

Oddly enough, policy can be supported in the long run by establishing a presence on the ground in

certain countries and pursuing concrete objectives unrelated to policy. This has been true for PAN in countries like Mongolia, Bhutan, and Laos in the early years of the ICT revolution that brought the Internet and connected these remote and traditionally “closed” countries to the world. PAN's focus in these places was on Internet adoption and capacity building to lay the groundwork for ICT use and applications. Some years down the road, when governments turned to developing ICT policy, PAN — knowing the key players and the weaknesses in policy development — has been in an excellent position to work with partners to find solutions.

Building blocks for ICT policy

ICT policy and implementation are extremely important to Mongolia, as ICTs are a promising tool for improving the quality of life of poor rural and urban communities. Since the demise of the Soviet Union, Mongolia has made significant progress in democratic restructuring and creating a private-sector-led open economy. The very first programming undertaken by PAN was in Mongolia in the mid-1990s to support the building of basic ICT infrastructure and capacity (see chapter 3 for more detail). In 2000, the Government of Mongolia released the policy paper Vision 2010, a national vision for ICT development to 2010. A national strategy and action plan for ICTs followed in 2003. In theory, policy support is the responsibility of a national ICT committee, but such a committee lacks both staff and financial resources to carry out research, or to implement and monitor new ICT policies. Thus, there was a critical need to strengthen institutional capacity in the country to conduct research and assist in planning and implementing the ICT strategy.

In this setting, the Mongolian Information Development Association (MIDAS), an NGO, approached PAN to help build such capacity. MIDAS aims to influence ICT policymaking and contribute to implementing the country's action plan for ICT development. In its PAN-supported project Strategy for National ICT Policy, MIDAS assembled a research team with expertise in government and the public sector, ICT infrastructure, business and industry, education and science, health and social welfare, the natural environment, and international organizations. The team has done literature reviews, consulted stakeholders, and conducted baseline studies in these same sectors. The project also set out to increase awareness throughout Mongolian society about the opportunities offered by ICTs, to develop guidelines for collecting data relevant to policymaking and for monitoring and evaluating policy implementation, and to study the experiences of other Asian countries.

A significant result of this project was a national strategy and action plan to use ICT as a tool for human and economic development, presented to the government for assessment and endorsement. Another result reported by an external evaluation was the success of the project team in convincing the government that it could reduce charges for local calls in Mongolia, thereby lowering costs for customers and permitting wider use of the Internet.

Another positive development since the start of the project was the establishment by the Government of Mongolia in 2004 of the ICT Agency (ICTA). Under the auspices of the prime minister of Mongolia, this agency has taken a leadership role in promoting and developing ICTs in Mongolia. ICTA is working with other ICT stakeholders, including MIDAS and the Mongolian Information Technology Association, another NGO with which MIDAS recently merged.

The policy environment for e-commerce in Viet Nam

One of the obstacles to growth of the e-commerce sector in many countries is lack of policy that addresses its many facets. Early in this decade, Viet Nam faced such a policy vacuum. Policymakers, researchers, and entrepreneurs disagreed on an appropriate e-commerce strategy for the country, and the lack of a supportive policy environment hinders Viet Nam's efforts toward economic integration and addressing problems of globalization.

In response to this problem, PAN funded a study led by the National Institute for Science and Technology Policy and Strategy Studies (NISTPASS), a government agency. The study was headed by Dr Tran Ngoc Ca, deputy director at NISTPASS (a full chapter on the study can be found in Lafond and Sinha 2005).

A review of ministries and government agencies to determine their understanding of issues related to e-commerce revealed a variety of views, some of them contradictory. For instance, some ministries (foreign affairs, commerce, science, and technology) favoured faster integration of e-commerce into the national economy, while others (culture, information, security) took a cautious approach. The regulatory system in Viet Nam was also studied and found to be deficient in many areas critical to e-commerce development, including taxation, customer protection, enforcement of intellectual property rights, technology infrastructure, training, and human resource development. A sample set of businesses was surveyed to gauge the readiness of firms to adopt e-commerce; almost all thought e-commerce was important to their business and would engage in such activity if possible.

Digital pioneer M.S. Swaminathan

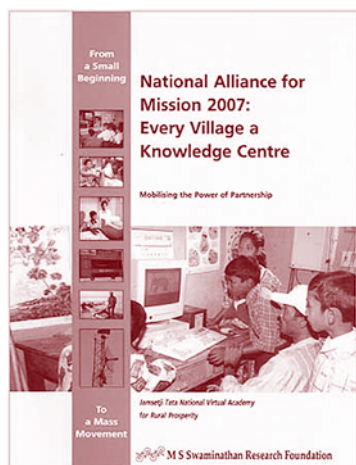
Dr M.S. Swaminathan is a digital pioneer whose training and professional experience are in a field unrelated to ICTs. His global renown comes rather from the field of plant genetics, the discipline in which he earned a doctorate degree from Cambridge University in 1952. In the mid-1960s, he introduced wheat seeds developed in Mexico to India and, after cross-breeding with local species, created a variety that yielded much more grain than traditional Indian wheat. Indian farmers needed to be convinced to adopt the new wheat seeds, but eventually the new variety's impressive yields led to its acceptance. India went from having the largest food deficit in the world to producing enough grain to feed all its people. These efforts, combined with later work developing more productive rice varieties at the International Rice Research Institute in the Philippines, resulted in Professor Swaminathan being widely referred to as the scientific leader of the green revolution movement.

Professor Swaminathan is now recognized not only for his contributions to global food security, but also for promoting the causes of ecology and sustainable rural development. His awards are many and include the Ramon Magsaysay Award for Community Leadership in 1971, the Albert Einstein World Science Award in 1986, the first World Food Prize in 1987, the Volvo Environment Prize in 1999, and the Franklin D. Roosevelt Four Freedoms Award in 2000.

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Dr. M.S. Swaminathan



Mission 2007 endeavours to connect 600 000 villages in India by August 15, 2007

Case studies in nine traditional villages with small enterprises specializing in such products as ceramics, porcelain, and fabrics showed that few of the villages would be willing to adopt ICTs and e-commerce, even in a limited way. Their reluctance was owing to inadequate ICT infrastructure, human resource issues, and lack of purchasing power. One interesting exception was a village called Bat Trang, near Hanoi. In this village, about 20 enterprises used web sites to showcase their ceramics products and establish contact with foreign markets. Many residents had completed computer training courses and there was great demand for more such training.

According to project leader, Dr Tran Ngoc Ca, an immediate impact of the project was the creation of a new department in the ministry of trade, which changed the direction of policymaking and institutional arrangements. Dr Ca says the project also created movement for changing the overall policy environment for e-commerce development. The project findings helped clarify issues, reinforce messages to policymakers, and prepare the legal framework for e-commerce development. The project's survey of enterprises provided impetus for developing policies to address the issues it raised.

Dr Ca believes that although progress has been made in the policy environment for e-commerce in Viet Nam, what is still lacking is a policy that would promote competition in telecom services rather than the monopoly that now exists. He also thinks the country needs an impartial, independent body that would act as a watchdog to ensure fair competition in telecom services.

Every Indian village a knowledge centre

India's VKCs in the Union Territory of Pondicherry represent an international success story of

innovative approaches to making ICTs serve the interests of poor, rural communities (see chapter 3 for more detail). The story has been reported by magazines, newspapers, and television networks all over the world and analyzed at length in academic papers. IDRC/PAN can justifiably claim to be part of this story, as it has been supporting the M.S. Swaminathan Research Foundation (MSSRF), which created the unique approach, at different phases of the project since the beginning (the Canadian International Development Agency has also been a donor). Not only did the MSSRF's innovation benefit the villages in Pondicherry where the knowledge centre model was established, but its policy impact is also now rippling out over the entire nation.

In 2003, PAN supported a workshop for policymakers organized by the MSSRF that would focus on the Foundation's 6 years of experience implementing VKCs. The workshop allowed rural project leaders to interact with officials of state and national governments and develop policy recommendations on such issues as self-help groups, domestic software development, virtual academies, and strategic alliances between the public and the private sectors. The outcome of this workshop and subsequent meetings is the ambitious Mission 2007: Every Village a Knowledge Centre — A Road Map. The objective of Mission 2007 is to build a multistakeholder alliance in India that would enable the establishment of up to 600 000 VKCs by 2007 (to coincide with India's 60th anniversary of independence). According to MSSRF, "We can easily cover the 600 000 villages of our country by 15 August 2007 by generating synergy between different technologies, particularly between the Internet and the community radio and symbiosis among all institutions engaged in the field of technological and skill empowerment of the poor."

The MSSRF also joined with the Tata Social Trust to establish the Jamsetji Tata National Virtual Academy for Rural Prosperity. The goal of the academy is to identify a million grassroots knowledge workers to be enlisted as Fellows. They are to become the cornerstones in ensuring the success of the 600 000 VKCs.

A national alliance for Mission 2007 was formed, with informal organizational structures at national, state, district, and local levels. Through a contribution to MSSRF, PAN is supporting the Mission 2007 secretariat that will facilitate and serve the partners and stakeholders in Mission 2007. Task forces in five sectors have been formed and a steering committee was created with representation from government, civil society, the media, the private sector, and academia.

Learning from ICT4D research to enhance policy in the Philippines

Among Asian nations, the Philippines is a leader in ICT adoption and use. In this country of almost 90 million inhabitants, mobile telephony is widespread. The Philippines calls itself the capital of the world in short messaging system use, with some 12 million daily text-message transmissions. But about 42% (as of 2001) of the country is judged to be underserved in terms of access to personal computers and the Internet, with rural communities being especially disadvantaged.

Over the past decade, many projects in ICTs for development have aimed to improve access to ICTs. But little effort has been invested in capturing the results and knowledge gained from these projects, an investment that could be invaluable for policy development. A better understanding of ICT4D projects and the knowledge they have generated is

essential if policymakers are to know which areas need greater attention and to formulate appropriate ICT policies.

Since 2004, PAN has supported the Philippines Department of Science and Technology (DOST) in a small grants program for ICT4D research, particularly to address the learning acquired from past and ongoing projects. An eminent committee reviews the proposals and emphasis is placed on studies that address themes in ICT access, social services, participation, governance, empowerment, economic development, and gender. Selection criteria are weighted toward initiatives that would lead to empowerment of communities and marginalized groups or sectors. One of the first steps has been to create an inventory, or database, of ICT4D projects undertaken in the country. Then the project team (led by Professor Fortunato de la Peña, undersecretary for science and technology services at DOST) will analyze the lessons learned from these projects to articulate recommendations — supported by research evidence — to ICT policymakers and, thereby, help in ICT policymaking that benefits the underserved.

The project team's definition of ICTs included not only digital technologies but also radio, television, and telephone since there has been a convergence of technologies, where radio can be played in computers and TV shows on cable are digitally delivered. The inventory of ICT4D projects has been completed and is available in a database on the project's web site (www.ict4d.ph). Criteria for inclusion in the database included a requirement that the project have a direct impact on empowering people in poor communities, helping alleviate poverty, or addressing key millennium development goals. As of February 2005, the database contained 490 ICT projects, over half of

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Professor Swaminathan invested the money from his awards into the M.S. Swaminathan Research Foundation (MSSRF), launched in 1988. It describes as its mandate “to impart a pro-nature, pro-poor and pro-women orientation to a job-led economic growth strategy in rural areas through harnessing science and technology for environmentally sustainable and socially equitable development.”

In the early 1990s, Professor Swaminathan became ever more aware of the increasing technological divide between rich and poor. His concern was to find ways to bring the advances of scientific knowledge to the unreached, the large masses of people in rural villages. This led to the creation of the hub-and-spokes model for building VKCs, which had great success in Pondicherry (see chapters 2 and 3 for details on this innovation). In fact, the model has proved so successful that it inspired the creation of a national alliance known as Mission 2007, which aims to bring knowledge centres to every village in India (see this chapter above).

which are in the category of government and governance. Projects in this category include local government websites that provide information on services to residents and applications of geographic information systems to local governance. Other significant project categories are education and learning, science, business, and environment. Smaller numbers of projects were found in agriculture, health, and employment.

The results of the project's inventory component were presented at a series of ICT4D conferences in Northern Luzon, Southern Luzon, Visayas, and Mindanao that brought together stakeholders, practitioners, and advocates of ICT4D initiatives from government, the private sector, academia, and civil society. Participants provided feedback on research themes for the formulation of a Philippine ICT4D research and policy agenda.

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Chapter 6

Distance education and health services: helping communities realize their dreams

“In a country as large as Mongolia, the Internet helps to close distances and helps people communicate and realize their dreams.”

— President Ts. Lkhagvasuren, MD, Health Sciences University of Mongolia (project leader, ICTs for Health Services in Rural Mongolia)





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Teachers accessing distance education at the NIE in Samtse, Bhutan

Distance technologies using ICTs have long been an important method for reaching remote populations with educational and other services that would otherwise be inaccessible and unaffordable. This is true of both developed countries like Canada and developing countries in Asia. Distance education reaches people who cannot attend conventional educational institutions owing to their distance from the institution, poverty, family obligations, job, gender discrimination, farming requirements, and other reasons. The advent of the Internet and other ICTs has so changed the paradigm for delivering distance education and health services, that PAN has been focusing on providing support to institutions across Asia to re-examine new ICT-based ways to deliver these services. PAN's innovative projects are reaching disadvantaged populations, influencing policy, and building a base for progressing from development to research in this critical sector.

This chapter describes PAN's recent projects to deliver distance education and health services in Bhutan, Indonesia, Mongolia, the Philippines, and Viet Nam. We also discuss the network's current approach to funding distance-education projects via a unique, collaborative approach known as PANDora.

Distance education in the Kingdom of Bhutan

The mountainous country of Bhutan is one of Asia's remotest nations. Enclosed by the Himalayan foothills, Bhutan faces a double challenge in the field of education: a rapidly growing student population and a shortage of trained teachers. The current ratio of teachers to students — 1 to 150 — is unacceptable if a high-quality education system is to be achieved. ICTs could be used to train more teachers through distance education in a cost-effective way.

In 2003, PAN teamed up with Bhutan's National Institute of Education (NIE) in a project on ICT-supported distance teacher education. The project, currently in its early stages, will develop and test an appropriate ICT-based learning support system and assess whether ICTs improve the quality of, and access to, learning support. Other components will examine student satisfaction and access to ICT-supported teacher education from gender perspectives, and make recommendations for a national teacher education policy based on the research findings. By the end of the project, the aim is to have developed and implemented up to 16 distance-education courses, along with online tutorials, support and counselling services, and other multimedia materials.

In addition to online materials, the project is planning to broadcast a wide range of radio and TV segments. Broadcast media may prove to be more viable for distance delivery than web-based materials in many parts of Asia — at least until speedier Internet connections become available throughout the region. The development of educational broadcasting skills in Bhutan may become a distinctive contribution to PAN's future distance-education work. The NIE project is also emphasizing the development of key performance indicators for distance educators, another speciality that may prove valuable to distance-education researchers across the PAN region.

Distance education in the world's largest archipelago

Another country with an urgent need for distance education is Indonesia. Stretching across the Malay Archipelago, the world's largest, its 6 000 inhabited islands are home to some 238 million people. The distance from Aceh in the west to Irian Jaya (on the

island of New Guinea) in the east is over 5000 kilometres, equivalent to the distance between Vancouver and Quebec City.

PAN's partner in distance-education research and applications in Indonesia is the Universitas Terbuka (UT), the Open University of Indonesia. UT is the only university in Indonesia to deliver education entirely at a distance. UT has about 250 000 students in 30 provinces, and provides a selection of 900 courses. It has a headquarters in Jakarta and 36 regional offices. UT's clientele are students who cannot attend traditional institutions of higher education owing to lack of financial resources, isolation in rural areas, or full-time employment.

UT's history of using ICTs for distance education shows that it was an evolutionary process, as education professionals compared notes and realized the potential of various technologies to deliver course materials and teaching assistance and as the technologies themselves became more powerful. It also demonstrates the role that outside agencies such as IDRC's PAN can play in supporting this evolution.

Until the early 1990s, UT had been providing course materials to students in printed form via postal services, as well as offering some tutorials through radio and television. With the arrival of the Internet in the mid-1990s, course delivery methods were about to change, recalls Tian Belawati, academic vice-rector of UT and PAN project leader. At that time, Belawati had just returned home to Indonesia from doctoral studies at the University of British Columbia and was heading UT's Centre for Indonesian Studies. With her Media Research Centre colleague, A.P. Hardhono, who had also returned from doctoral studies — at the University of Victoria — she began exploring how to use other

media in ways that would suit the Indonesian situation. The Media Research Centre was already developing the university's website and mailing-list based tutorials for some courses. "I then enriched the website by developing an online database for research abstracts and an online journal. The response as shown by the 'hits' visiting the website was very encouraging," says Belawati.

Based on this initial positive experience, Belawati and her colleagues wanted to improve the online-based learning support service, but were hindered by limited resources. She proposed a PAN study of the availability of the Internet to potential students and of its acceptability for educational purposes. The results of the survey were encouraging to the UT team, whose next goal was to improve their mailing-list based tutorials using more recent web-based technology. Their research showed that about 60% of UT students (mainly male) were accessing the online materials from their workplace and about 40% from Internet cafés. The major challenges addressed by the project were the difficulty students had in finding qualified tutors in rural areas and students' inability to meet with tutors when they had full-time jobs. Therefore, the project's main objective was to determine how Internet-based training materials, tutorials, counseling, and academic information would affect student satisfaction and course completion rates. At the same time, the project would examine gender differences in access to the Internet and acceptance of ICTs as an educational tool.

In 2001, PAN granted CA\$ 250 000 to Belawati and her colleagues, Hardhono and M. Toha Anggoro, to assist in developing more comprehensive online services for the UT system, and in examining its ICT-based delivery policy. The project involved 200 other academic staff, who were trained as online

Digital pioneer Tian Belawati, vice-rector, Universitas Terbuka (Indonesia)

One of the leaders of the ICT revolution in Asian distance education is Tian Belawati. Dr Belawati holds a degree in agricultural economics from the Bogor Agricultural Institute, Indonesia, a master's in Education (Simon Fraser University), and a PhD in educational



Dr. Tian Belawati

studies (University of British Columbia). She is now academic vice-rector at Universitas Terbuka (UT), an Indonesian university whose mandate is distance education across that huge country. For almost a decade, she has been leading research and applications in ICTs for distance education to develop a higher-quality interface for Indonesian students and to improve learning outcomes. She says that her only motivation is to be able to serve students better using whatever media are available. The dedication and commitment of her colleagues also serve as inspiration in her work.

Belawati regards the rapid development of open-source software for education in the past decade as one of the most significant changes in the field of ICTs for development. "This has enabled us to explore, experiment, and apply ICT-based learning environments without too much need for financial investment. For institutions such as UT, this is very helpful." In her view, the most important impact from the PAN-supported tests of online tutorial delivery is that now everyone accepts UT's online tutorial service as an integral part of the university's formal system. "In addition, of course, I am happy that the project revealed that students who took advantage of the online services did have higher course completion rates and learning satisfaction. Those findings encourage other students to also take advantage of the UT online. Currently, we provide online tutorials for about 300 courses. At the time of the project [start-up], it was only for about 60 courses."

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Students at UT Jakarta use the online system to check their grades

tutors and web-based materials developers. The team found that student participation rate in the online tutorials was relatively low — only about 3.5% of registered students — although it was in line with Indonesia's national Internet access rate. Further analysis showed that those who did participate had higher achievement and course completion rates than those who did not. This modestly positive feedback was enough for UT to continue providing online tutorials in combination with other methods (in-person tutorials, radio and television tutorials).

The project contributed greatly to UT's capacity building in faculty resource development, communication infrastructure and facilities, networking and partnerships, making UT an ICT-smart institution in a short period. Overall, the project has influenced a change in UT's institutional policy, enabling advancement in the university's online services.

PAN is also helping UT to rebuild and recover resources and Internet access points that were destroyed in Aceh during the December 2004 tsunami.

Ambitious goals for distance education in Mongolia

Mongolia is a large country with a relatively small population. Its 2.8 million people are spread out over 1.56 million square kilometres, giving it a population density of about 1.8 people per square kilometre. (By comparison, Canada looks crowded with its population density of 3 people per square kilometre.) Mongolia has a comparatively well-developed Internet infrastructure and more and more Internet users. It has also been able to achieve one of the highest literacy rates in the world, with almost 98% of the adult population literate.

Nonetheless, there is need for far greater access to technology and educational services in the underprivileged rural areas of the country. To address this need, PAN supports the Government of Mongolia in its mission to deliver distance education to 75% of the population by 2010. In 2001, PAN supported a project led by the English for Special Purposes Foundation (ESPF) to introduce Internet-based education to the country. The project required setting up four interdisciplinary teams composed of IT personnel, educational planners, subject matter specialists, and teachers. The project teams created instructional materials in the Mongolian language on subjects including mathematics, English, information technology, gender issues, and legal rights.

The project succeeded in generating awareness of distance education and online methods in a wide range of Mongolian organizations, including the following project stakeholder groups:

- English for Special Purposes Foundation (ESPF), a leading NGO in the field of education
- InfoCon Ltd, a leading source of distance learning programming and services in Mongolia
- Datacom Ltd, Mongolia's leading data communication service provider
- The Mongolia Women NGO Coalition.

ESPF has implemented IDRC's Enhanced Vocalization Engine (EVE) software for language modeling — a unique, interactive web-based product that teaches correct English pronunciation. The project's achievements have the potential to be sustained through curriculum development with the National University of Mongolia (NUM), which is interested in developing online courses that may include British and American studies, Mongolian

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Doctors in Mongolia use ICT equipment to provide distance medical diagnosis to rural areas. In addition, the equipment is used to deliver distance learning via Internet applications to rural medical doctors

studies, computing, and gender issues. These pioneer researchers in Mongolia are currently continuing work at a new level as collaborating partners in PAN's regional distance-education research network (PANdora), described below.

Health services in rural Mongolia

With a per capita GDP of only US\$ 1 918, Mongolia struggles to bring essential services such as health care to a scattered population over its vast territory. However, the country has good potential to apply ICTs in making health care more accessible, especially in rural areas. Mongolia has already proved itself willing and capable of embracing ICTs and undertaking experiments for ICT-supported service delivery. The PAN-supported project, "ICTs for Health Services in Rural Mongolia," addresses distance diagnosis of illness in rural areas and continuous distance education for rural doctors.

The project has set up distance diagnosis centres at the Health Sciences University of Mongolia in the capital, Ulaanbaatar, and at medical centres in Arkhangai, Sain-shand (Dornogobi), and Erdenet. It experiments with delivering Internet-based diagnosis and consultation for patients in certain areas of health care and has set up a research and practitioner network that links specialists, family doctors, and front-line health care workers. Distance diagnosis technologies that use the Internet are being assessed and adapted taking into account the country's low bandwidth capacity. This project component also includes training doctors in distance diagnosis. The project collaborator, InfoCon Ltd, has developed a diagnostic database, "Doctor," designed to reflect national medical priorities, including breast cancer and other women's issues. Under its former director, Nara Baljin, InfoCon has become a major force in the development of Mongolia's ICT infrastructure.

Tragically, Ms Baljin died in 2004 at an early age, and is sorely missed in her own country and in the international distance-education community.

In the broader area of distance education, the PAN project has trained educational personnel to use web-based teaching technologies and methods, including design of course materials and conversion of existing materials for delivery over the Internet. Initial results show that the telemedicine application can save time and money. The distance diagnosis system is up and running and physicians have consulted over 80 patients by Internet. The project team has conducted training sessions for physicians, lecturers, other medical professional, and students.

An evaluation team looking at the project found that the software developed for Internet-based diagnosis had been tailored to Mongolia's difficult phone-line conditions and is effective in minimizing the burden on traffic flow. It uses text-based information, rather than graphics-based material, and is designed to "resume" if there is a phone-line disconnect — not an uncommon occurrence. The evaluators observed that the application could be adapted to provide similar services in other countries with poor telephone infrastructure and unmet diagnostic needs in remote areas, such as the mountain regions of Pakistan.

Delivering informal training in water and sanitation in the Philippines

In the Philippines, PAN supports efforts to use ICTs in distance delivery of non-formal education. This project is directed at increasing awareness and knowledge of poor rural and urban Filipinos about water, sanitation and hygiene issues. It assists the Molave Development Foundation (MDF), a small NGO in Makati City, to build on its national research

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Belawati's experience at UT is a demonstration of the multidisciplinary nature of applying ICTs for development, whereby strong technical capacity must be combined with an understanding of how best to use the technologies to serve disadvantaged communities. As Belawati recalls, "For us, it was not only developing the technical capacity but also (and even more difficult) raising the commitment of everyone within the university to start using ICT-based instruction as our official academic system. However, by involving everyone since the very initial phase of the experiment, we built the system together and gradually combined our interests in the development of the system. We had a Media Research Centre (now integrated with UT's Computer Centre) with staff who had technical capacities and passions for ICTs. I would say that they are really the pioneers for us. Without their technical support, I would have never been able to do what I wanted to do. I work with them very closely, share my ideas, and then they translate them into technical language."

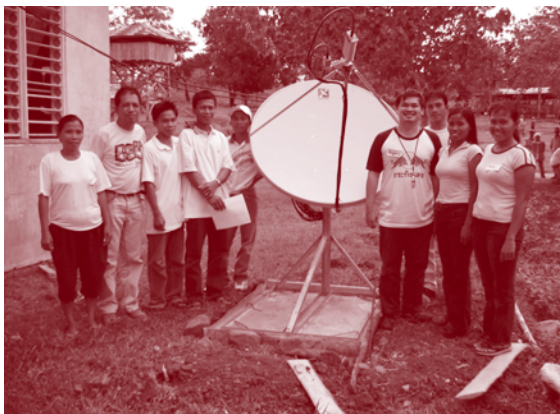
At this time, Belawati does not see significant progress in Indonesia in empowering marginalized communities through ICTs. "There is no strong political will from the top officials of the government," she says. She believes that the country's economic and political crises provide government leaders with "a legitimate excuse for not having enough funding to do all at once. Right now, their priorities are still with more basic issues such as stabilizing the economy and politics and the furthest priority is rebuilding schools."

When Belawati is not busy promoting ICTs for distance education or campaigning on the power of the Internet for building a knowledge-based society, she does find some time to relax. "I enjoy watching movies, drama and comedy. I can totally involve myself in the story line and forget about my own problems. That's why I enjoy it so much. It's like getting away without physically going anywhere. It's very efficient."

Tian Belawati's reflections on the PAN projects' impact at UT provide valuable insights into the way in which distance education can develop across Asia. With the continued assistance of PAN and the PANdora network, the prospects for unified research and development in this field are good.

“I am just a farmer. I used to be shy and afraid of talking to people. Regardless of my limited education, Molave trained me and now I lead the Maguinda MCT volunteers in teaching our community members how to use and learn from the WASH ICT Module. I also learned how to use the computer and I can even teach others how to use it.”

— *Danny Majait, Multipurpose Community Telecentre volunteer, Barangay Maguinda, Butuan City*



A satellite connection provides ICT-based health information to rural community members in the Philippines

and development work in public hygiene education. The Water, Sanitation and Hygiene project (WASH) is a public information project for urban Filipino communities, using creative communication media such as magazines, comic books, and posters. The project examines the effectiveness and sustainability of using digital and electronic media for teaching and learning WASH issues. The studies are taking place in one rural and one urban area, both of which have existing community-based organizations and ICT infrastructure. MDF has succeeded in establishing partnerships with government and private agencies and has created links with other groups interested in distance education.

Through focus-group discussion, the research team has discovered that women tend to be more uncomfortable with computers than men. On the other hand, women recognize the potential of computers in communication and in helping to improve the lives of their families and communities. Men tend to perceive computers as a device for business, education, and entertainment.

Although the project is not yet complete, there have been encouraging developments. Public response to the WASH online modules is generally positive, especially among youth. Participants report that the learning process is more enjoyable because the modules incorporate sight, hearing, and touch. The community regards the use of computers for distance education on WASH and other topics as promising. They see computers as tools for empowerment and advocacy that can bring employment opportunities. According to project leader, Dr Angelo Juan Ramos, “They see the potential of distance learning technologies in non-formal education, in livelihood generation, health education and in uplifting the status of their communities as a whole.”

The response from the Department of Education, other government officials, and project partners has also been positive, says Dr Ramos. “The results have made them eager to look more closely at ICTs as tools for distance learning and sustainable development, despite apprehensions regarding infrastructure and access. The WASH modules are being well received by educators in the non-formal education sector, and communities appreciate that they are intimately involved in the content development and design process in coming up with the modules.”

Reaching Viet Nam’s aquaculture workers

In Viet Nam, the fisheries sector employs millions of people and contributes 4–5% of GDP annually and 9–10% of national exports. Aquaculture is a rural economic activity, in which women make up 45% of the workforce. The government regards the sector as one that could help improve the role of women in rural and mountainous areas. Its goal is to increase the number of fishery technicians by 20% by 2010, creating two million aquaculture jobs. By 2003, only 30% of the required graduates had been trained.

The Fishery College No. 4 (FC4) at Bac Ninh (near Hanoi) has been running since 1994, with start-up funding from the Canadian International Development Agency. It addresses the need for college-level and continuing education courses of students and workers in the country’s northern provinces. Initially, the college relied on a system of face-to-face course delivery, whereby college instructors helped local staff deliver a 1-week aquaculture course to farmers. But college instructors had to travel to rural areas and be away from the college for up to a month at a time.

PAN began to support FC4 in 2003, in collaboration with Newfoundland's College of the North Atlantic, an institution that specializes in the development and delivery of distance education in rural and remote areas. The project has been pilot-testing the use of ICT-supported distance education for delivering courses to farmers in a rural area of Viet Nam. The approach blends traditional classroom instruction with online distance education. The theory and certain other course components are delivered by distance methods using ICTs, taking into account the local low-bandwidth conditions. The practical course components are taught in face-to-face classes. Vietnamese IT consultants are working with Canadian team members in distance-education capacity building for FC4 staff and farmer students. By mid-2005, a core group of instructors had been trained in network administration, Internet and web design, and in how to deliver online courses. Course materials have been developed, and open-source software, Moodle, has been translated into Vietnamese and tested in an aquaculture course. The project team is hoping to obtain funding to develop and sustain its work in remote rural areas across northern Viet Nam, and may multiply its impact through collaboration with rural colleges, which would use the project's online materials.

Combining Asian project resources via PANDora

In 2004, PAN decided to build on its previous distance-education projects by developing a unique research and development network: PANDora (PAN Asia Networking Distance and Open Resource Access). The strengths and interests of the various PAN project teams were assessed, as well as those of other leading distance-education teams across

South and Southeast Asia. A process of interviews and meetings was conducted in 12 countries (Bhutan, Cambodia, Hong Kong, India, Indonesia, Laos, Mongolia, Pakistan, the Philippines, Sri Lanka, Thailand, and Viet Nam). This overview tour led to a major conference in Siem Reap, Cambodia, attended by 40 researchers, government, and NGO pioneers from across the region. The conference generated proposals for nine new distance-education projects, each involving collaboration between institutions in three or more nations. By early 2005, the nine proposals had been refined and funded from 2005 to 2008 as the next round of PAN's contribution to Asian distance education.

The nine projects cover a comprehensive range of current distance learning technology (DLT) issues:

- Accessibility, acceptance, and effects of DLT in South Asia
- The viability of mobile short messaging system technologies for non-formal distance learning
- Evaluation and adaptation of open-source software for distance learning in Asia
- A platform for virtual research and research training
- Instructional design training for ICT-based distance learning in Asia
- A repository of reusable learning objects for distance learning in Asia
- E-assessment methods and models for student evaluation
- Best practices in DLT for capacity building in Cambodia, Laos, and Viet Nam
- Evaluation of distance learning practices for policy recommendations in Mongolia and Viet Nam.



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A fisherman along the Mekong Delta region



Running simultaneously, the nine projects are designed to complement each other in building a comprehensive approach to distance education, specifically suited to Asia's urban and rural needs. The projects are monitored to prevent overlaps and duplication of effort. An interactive web site has been developed (www.pandora-asia.org), through which the project teams can collaborate in audio and text conferences and in testing new online applications, including messaging techniques and open-source learning management systems.

In Greek legend, PANDora's Box was a "mixed bag" of surprises representing the cares and problems of the world. Distance education is one of the ways in which the problems of Asian society, social and economic, are being addressed. However, many of the techniques currently being offered for distance education purposes are being found through evaluation studies to be ineffective, even counter-productive, in the Asian context. As in the myth of Pandora's Box, caution is required in their adoption. At the bottom of Pandora's casket, however, lay hope — the overall objective of PAN's educational work.

Conclusion



Telecommunications has always been considered essential infrastructure to enable the growth of economies. The United States, Canada, and all European countries invested heavily to ensure that most of their citizens had access to telephony. Over the past couple of decades, the convergence of telephony and computing, which was facilitated by the establishment of the Internet protocol, provided stimulus for unprecedented innovation and growth in North America, Europe, and parts of Asia. Indeed, certain countries in Asia were at the heart of innovation in the area of ICTs. However, while rich countries were becoming part of the “knowledge society,” most Asian countries were left out of this exclusive club, owing to their lack of access to the networks.

PAN has been instrumental in helping some of the “unconnected” get access to the networks that would help them emerge from poverty and marginalization. Beginning with establishing e-mail exchanges and the first ISPs in many less-developed countries, PAN often catalyzed the process of building local ICT capacity where none had existed before. Emphasizing the importance of researching appropriate ICT solutions through innovative pilot projects and thorough analysis of the socioeconomic and political environments has allowed PAN to build a healthy foundation of evidence-based ICT4D research.

Given its accomplishments, aided by partners in many countries, PAN can rightly claim to have made a modest contribution to the many positive changes since 1994 in the ICT4D landscape in Asia. With respect to ICTs, Asia is now a very different place than it was 10 years ago. Asia is home to some of the most innovative mobile applications in the world as well as some of the highest broadband

access levels. Teledensity, or the number of telephones per 100 inhabitants, has doubled and sometimes tripled with the introduction of mobile telephone networks. Internet access has steadily increased and is now available throughout most countries. New applications and successful pilot projects in health, education, and livelihoods are showing great potential in ensuring that ICTs can be used as tools for social development. Shared community wireless networks are permitting Internet access to greater numbers of people — even within many poor communities.

Undeniably, there are many success stories in Asia. But if you venture away from the large cities to seek out remote villages or leave the moneyed quarters of Asia's cities to visit their poorest slums, you will likely see failures in providing access to ICTs. Much of the economic growth in Asia today is actually creating larger income and social disparities between countries and between populations within countries. The stunning diversity in Asia applies not only to its languages, cultures, and landscapes, but also to its distribution of income, opportunities, and access to essential tools like ICTs.

In this context of inequality of access to ICTs, PAN's vision and mandate continue to be relevant. PAN's mission entails empowering individuals and communities to address their key development challenges through effective access to ICTs. PAN persists in its belief that each and every member of every community in Asia is entitled to knowledge and to participate in the knowledge society. The changing face of Asia allows PAN the opportunity to look at new ways of helping the poor and the marginalized. PAN will continue to support research to address the new ICT4D questions that beg to be answered in an ever-evolving Asian landscape.

Nothing PAN has been able to accomplish could have been possible without competent and determined partners on the ground across Asia. For this reason, PAN, along with other organizations that share IDRC's philosophy, must seek out the digital pioneers it knows are toiling away with inadequate resources in various corners of Asia. The power of sufficient funding, collaborative research design, and knowledge networks can add real value to the efforts of individuals and organizations struggling to make a difference. Collaboration with respected institutions like IDRC can also provide valuable credibility and prestige to individuals who are often politically vulnerable, as the experience of Onno Purbo attests (see chapter 1).

PAN must find more individuals like the late Nara Baljin, a digital pioneer in Mongolia (see chapter 2) who made such a difference for her compatriots. Building research capacity in digital pioneers such as Nara will be integral to advancing the PAN mission. And more must be done to scale up the models that work, as is happening in India with its village knowledge centres through the Mission 2007 initiative (see chapter 5). PAN will continue to make its contribution and collaborate with like-minded individuals, donors, and organizations throughout Asia to realize the potential of ICTs for poverty reduction and community empowerment.

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