Supporting Gender and ICTs: Opportunities for Women in Bangladesh

Women workers at an electronic plant in the Export Processing Zone port city of Chittagong, Bangladesh. Photo courtesy of http://www.bdpressinform.org

Supporting Gender and ICTs: Opportunities for Women in Bangladesh

Greater Access to Trade Expansion (GATE) Project
Development & Training Services, Inc. (dTS)
4301 N. Fairfax Drive, Suite 215
Arlington, VA 22203

Contract # GEW-I-00-02-00018-00, Task Order No. 02
Office of Women in Development
U.S. Agency for International Development

Acknowledgements

Table of Contents

Glossary of Terminology

Term	Definition
Applied ICT skills	The ability to use and apply generic ICT tools in workplace settings and to upgrade these skills. These skills include all aspects of information working such as web design, call center consultants, analyst programmers, information technology managers, software project managers, desktop publishers, librarians, computerized sewing and multimedia products, and services.
Call Center	A physical location equipped to handle a large volume of telephone calls (especially for taking orders or serving customers). Call centers are generally set up as large rooms, with workstations that include a computer and telephone headset hooked into a large telecom switch, and one or more supervisor stations. It may be linked to a corporate computer network such as mainframes or microcomputers. Increasingly, the voice and data pathways into the center are linked through a set of new technologies called computer telephone integration.
Convergence	A term applied to the way in which computing, telecommunications and, more recently, television are moving towards a common technological basis characterized by the use of digital systems.
Digital Divide	A social/political issue referring to the socio-economic gap between communities that have access to computers and the Internet, and those who do not. The term also refers to gaps that exist between groups regarding their ability to use ICTs effectively, due to differing levels of literacy and technical skills, as well as the gap between those groups that have access to quality, useful digital content, and those that do not.
Digital literacy	Basic learning and communication skills needed for workplace tasks. These skills include familiarity with basic computer use and word processing, such as the ability of the user to establish an email account, communicate via email, navigate and understand the basic etiquette of using the Internet, download information, use CDROMs and other interactive materials, and the ability to use electronic forms of communication for distance education.
Disintermediation	The process of one company removing another company from an industry value chain.
Electronic commerce (e-commerce)	Selling, buying, or organizational management activities conducted via the Internet.
Electronic data interchange (EDI)	An exchange system for trading information in standard form by computer systems through the use of electronic messaging systems, for instance, examination entries, personnel records and transactions between trading partners.
Electronic funds transfers (EFT)	The process of exchanging account information electronically over private communications networks. Also known as wire transfers.
End-user	An individual or organization that accesses digital information for their own use.
Information and Communication Technologies (ICTs)	The application of modern computing technology to process information, in particular, the use of electronic and computer software to convert store, protect, process, transmit, and retrieve information from anywhere at anytime. For the purposes of this study, ICTs are defined as "new information and communication technologies", which include the developing technologies of telecommunications, computing and microelectronics.[1]
Intermediaries	Companies in an industry value chain that occupy an intermediate step between the manufacturer and the final consumer (the middleman).
Internet	Also known as the net or web, the inter-communicating computer networks

	which host and provide access to the world wide web, file transfers, e-mail, and other services.
Internet Service Provider (ISP)	An organization with a direct connection to the Internet acting as an intermediary for other users, providing them with an e-mail address and software, access to the world wide web, and often space on web servers for home pages, etc.
Information Technology (IT)	An older term since replaced by ICT and having the same meaning. The use of electronic and computer software to convert store, protect, process, transmit, and retrieve information from anywhere at anytime.
Knowledge Economy	An economy characterized by the recognition of knowledge as a source of competitiveness, the increasing importance of science, research, technology and innovation in knowledge creation, and the use of ICTs to generate, share and apply knowledge.
Professional ICT skills	Specific, technical skills required to design, develop, implement and repair ICT tools, including hardware and software manufacturing, electronic manufacturing, network operating systems, cabling, and router programming.
Re-intermediation	The process of reintroducing intermediaries into a business, bringing buyers and sellers together.
Tele-work	A service concept that will allow customers to work productively and effectively using the same business tool environment from either their work place or home.
Value chain	A connected series of organizations, resources, and knowledge streams involved in the creation and delivery of services or products to end customers. Also referred to as supply chain.
Virtual community	A gathering place for people and businesses, not having a physical existence, but helps companies, their customers, and their suppliers to plan, collaborate, transact business, and interact in ways that benefit them all. Also known as a web community or an online community.
Web portal	A search engine, directory, e-mail site, chat room, or other site that includes free features designed to attract a large number of visitors and that seeks to be the doorway to the Internet for its visitors.
Wire-line/fixed-line	A physical land line, the opposite of a wireless or cellular network.

Executive Summary

Migration from a resource-driven economy to a knowledge-based one demands technological advancements which use new and existing knowledge and know-how to improve productivity, services and overall welfare in an economy. The introduction of Information and Communication Technologies (ICTs) into the daily lives and activities of women in Bangladesh represents an unprecedented opportunity to improve the lives of poor women. As social attitudes about women change, more women are able to take advantage of new opportunities for economic and social development, with far-reaching impacts on household, community, and market relations.

ICTs have the potential to enable women to become equal stakeholders in the growing knowledge economy. Low income women have successfully used ICTs for their own interests by forming peer networks through employment interest groups such as the Self-Employed Women's Association (SEWA) in India, the umbrella of micro-credit activities like the Grameen's Village Phone Program in Bangladesh, and through business collectives like the Tortas bakers in Peru. Bangladesh can capitalize on these lessons and explore new approaches based on the positive experiences of women working in and with ICT sectors elsewhere.

Public policy has a defining role to play in building up a country's human capital by promoting quality education, life-long learning, and creativity in its workforce. To promote women's full participation and involvement with ICTs, national and sectoral policies need to support women's contribution to economic growth.

To ensure ICT development programs promote gender equity and create opportunities for economic growth in Bangladesh, the United States Agency for International Development (USAID)/Bangladesh commissioned this study looking at ways to integrate gender and poverty concerns into its program and to recommend pro-poor, gender-sensitive ICT interventions for review. The study was carried out by the Greater Access to Trade Expansion (GATE) Project, funded by USAID's Office of Women in Development, as one task under its Country Action Plan with USAID/Bangladesh.

Outline

The study begins by providing an introduction to ICTs, their implications for the poor, and their impact on women's work in developing countries. ICTs can complement and enhance productive activities and livelihood strategies, but depending on where women are employed, they are not always exposed to their benefits.

The next section outlines the knowledge economy as it exists in Bangladesh, mapping out the national ICT Policy, the telecommunications infrastructure, ICT trends, and selective ICT training initiatives currently taking place across the country.

Men and women's roles and access to resources within Bangladesh affects their ability to use ICTs or gain employment in the sector. This report identifies specific gender-based constraints to ICT use and suggests points of intervention to better engage Bangladeshi women in ICTs. Drawing on case examples from South Asia and elsewhere, points of intervention range from sectoral initiatives and access and control issues, to inclusion efforts and government services.

The final section provides a summary of the study and list of recommendations for integrating gender into future ICT programs and projects, organized by the USAID/Bangladesh Mission Strategic Objectives. Some key recommendations include:

Private Sector Growth
- Train women entrepreneurs on ways to use ICT and web portals for gaining information on markets and pricing.
- Conduct training on the use of search engines, business management software, online manuals and other tools for micro, small and medium enterprise (MSME) owners.
- Establish women-only training sessions and consider the timing and location of training to respond to women's specific needs (e.g. security concerns, need to balance training with domestic responsibilities, etc.).
- Conduct a training of trainers for women to form a network of women ICT trainers.
- Work with business development service providers to add ICT applications and platforms to their existing services.
- Conduct an ICT needs assessment with MSME owners, disaggregated by sex.
- Integrate ICT trainings into job placement and counseling centers, and discuss prospects for ICT employment with displaced workers as well as ways to use ICTs to assist with a job search.
- Introduce ICT management, savings, and credit tools into microfinance and rural development programs.
- Introduce ICT platforms into a variety of sectors including agro-industry, medical and health, rural markets, and export processing zones (EPZs) to improve overall productivity, upgrade skills and generate employment.
- Build capacity for the establishment of enterprises that service ICTs (computer repair, computer supplies, computer manufacturing, as well as programmers).

Economic and Social Infrastructure
- Establish ICT terminals in places women congregate (e.g. women-owned stores or market stalls, hair salons, health clinics, or women's sections of mosques).
- Support development of rural databases to assist farmers in tracking changes in markets, goods, prices, soil, seed, etc.
- Work with local Chambers of Commerce to develop data and content on business development services and ICTs.
- Launch a pilot project to create Internet kiosks run by women entrepreneurs who finance the development of the business via microfinance programs, increasing

access of rural people to computers and generating new businesses for rural women.

- Pilot the use of ICT tools to "bank the unbanked" and assist the poor and illiterate in increasing their ability to save and manage their money.
- Use low-tech knowledge management systems to allow women (who are usually responsible for procuring water) to record data from water quality monitoring to allow participatory monitoring and evaluation.
- Use ICTs to provide information on fair market value and market linkages for fuelwood, fodder or other forest products.
- Develop community based websites to track community decisions made on resource allocation and preservation.

Education and Workforce Development
- Train manufacturing and EPZ workers on basic digital literacy to upgrade skills and production.
- Offer trainings that demystify technology and tools.
- Introduce nationwide ICT training for teachers (course content and teaching methods) at non-traditional, primary, secondary and tertiary levels, to build a portfolio of ICT trainers in the country.
- Promote broad awareness of the requirements for and benefits of literacy, knowledge, and an ICT-literate society through the use of traditional media and public service announcements.
- Improve the image of ICTs, particularly among girls, through school programs, career fairs for girls, and public media images and outreach.
- Use ICTs (Internet, CDROM, spreadsheets, and other tools) to increase educational management.
- Use CDROMs and other materials to reduce the costs of textbooks and increase access to new information and materials for learners.
- Promote alternative learning opportunities such as radio learning.

E-governance and Local Government
- Facilitate stakeholder dialogue between national government officials, local government leaders, community leaders and community members on ICT needs.
- Put customs forms, procurement forms, and other business-related forms and regulations online to increase transparency and reduce opportunity costs and travel time required to access the documents in person.
- Track the use of online forms, disaggregated by sex.
- Support the establishment of a telecom development fund to reduce ICT costs for the underserved (financed by a portion of carrier fees).
- Promote policies such as the development of incentive programs to increase ICT access and stimulate expansion.
- Consider ICT use to improve management and administrative capacity of local government.

Scope and Methodology

This study focuses on poor women's access to and use of ICTs in Bangladesh. The core study draws on policy papers, case studies, secondary research publications and correspondence with organizations in Bangladesh. Case studies from South Asia are used as much as possible to provide regional best practices where women share similar gender-specific roles and constraints. Policy and program recommendations are included in the final section of the study, and are drawn from anecdotal and qualitative analysis.

There is little relevant ICT data available to support this study in its entirety. Even though the International Telecommunication Union (ITU) compiles ICT statistics, those gathered to date are not comprehensively disaggregated by sex.[2] Therefore, the garment industry is used as a point of reference throughout the study.

Although not exhaustive, this desk study contributes to the growing discourse among decision makers in Bangladesh and the region on the shift from natural, resource-based economies to knowledge-based ones.

Introduction

ICTs have become a potent force in transforming social, economic, and political life globally. Knowledge of how to use the tools and products of ICTs for productivity, and accessing information about prices, markets and regulations are key drivers of economic growth. Using ICTs can help level the playing field for small producers and entrepreneurs by providing access to information and knowledge that otherwise may only remain in the hands of elite individuals and institutions.

ICTs can enable women to become equal stakeholders in the growing knowledge economy. As a tool of production, ICTs can be used by women in their workplace for data entry or other office work. As a tool of communication, ICTs can be used to enhance women's experience as end-users by increasing their ability to network with others for advocacy purposes or business information. When given the tools and support of ICTs, women develop new domestic and export businesses, start new associations to represent their interests, and use e-governance to communicate more effectively and efficiently with their local government officials. Technology can help people lift themselves out of poverty (UNDP 2001; see Annex I).

Introducing and integrating ICT applications into agriculture, industries, and services can present opportunities to improve working conditions for those employed, particularly women. These applications have immediate and direct implications for the poor:

- Managing, sharing and storing agricultural-related information and data;
- Access to time-sensitive information and public (government) information;
- Links and networks that support participatory information sharing; and,
- Access to market information across sectors.

ICTs fundamentally change modes of organization, management, production, distribution, and employment. They have three main impacts on women's work in the context of increased global competition:

- A shift from automation to computerization, particularly in the manufacturing sector;
- Disintermediary and intermediary[3] trends; and,
- Computerization of back office functions by providing options for alternative working environments.

Given that access to and use of ICTs is linked to social and economic development, these changes can have an overall positive impact on women's work, livelihoods and opportunities, depending on where women are located within the sector. They can also have a negative impact on women when they are not aligned strategically, oftentimes displacing or hindering their potential for economic opportunity.

Decentralization of ICTs through the supply chain has intensified competition in an unpredictable manner. The disintermediation and intermediation of processes, combined with cheap, mobile capital, has had an enormous impact on specialization in the supply chain. "The presence of new supply alternatives with radically different economics now take the traditional '*supplier squeeze*' to a new level" (Huyett and Viguerie 2005). Where one is located within the supply chain is directly linked to demand, skill set, and ability to negotiate. As in other sectors in ICT, women are often traditionally clustered at the lower end of the value chain with a lower chance for upward mobility due to a more limited skill set and ability to negotiate. Even as ICTs are routinely introduced into e-commerce activities, women are not always exposed to the benefits.

The International Labour Organization (ILO) 2001 report on *Work in the New Economy* makes the following observations about the ICT sector:

> Patterns of gender segregation are being reproduced in the information economy where men hold the majority of high-skilled, high value-added jobs, whereas women are concentrated in the low skilled, lower value-added jobs. As traditional manufacturing industries that previously employed women gradually disappear, the women finding jobs in the new, often ICT-related industries are rarely the same ones as those who lost their jobs in the traditional sectors. New inequalities are therefore emerging between women with ICT-related jobs skills versus those without (ILO 2001a).

A study of women working in European call centers found that, contrary to notions about skill development and flexible career advancement, women's data-processing work is often routinized, de-skilled, and devalued (Alteri, Bertin and Huws 2002). Women in these centers rarely advance beyond team leader roles into more professional managerial positions. Targeted programs have the potential to mitigate this impact.

According to the World Bank's *Global Economic Prospects 2002,* the average poor person selling in global markets confronts trade barriers that are roughly twice as high as those facing the typical worker in developed countries. ICTs can help small enterprises become more competitive by providing options to improve customer service, procurement processes, and by using the Internet to access information, such as financing or market opportunities. However, more is needed to help small businesses participate in international trade. With more in-depth ICT training, these establishments could access adequate trade-supporting services, such as finance terms for small businesses, insurance and transport.

To address some of these constraints and to support women and ICTs, the remainder of this study looks at Bangladeshi women in the knowledge economy, identifies points of intervention in a variety of sectors, and provides a set of specific recommendations for consideration.

Gender and the Knowledge Economy in Bangladesh

Gender Constraints in Bangladesh

Women in Bangladesh face enormous challenges on a regular basis, and many of the gender-specific challenges women face affect their ability to benefit from ICTs. They must conform to highly regulated roles within public and private settings, which are derived from cultural and societal norms and perceptions. In a population of over 138 million, nearly half are women, a third of the population is under 15, and 63 percent are between the ages of 15–64, with women making up the lesser proportion in relation to men for both age groups. (See Annex II for further statistics on the gender profile of Bangladesh).

Changes in population growth have affected employment rates and labor force participation. As a result of restrictions on mobility, few women enter the formal labor market (11 percent), one of the lowest rates in South Asia. Only 4.5 percent of working women are employed in the formal sector, compared to 13.1 percent of men. Nearly 1 in 5 women with a university degree are unemployed, compared to only 1 in 50 men (World Bank 2003).

Domestic service is a main occupation for many poor women. In the slum areas around Dhaka, a survey of employment patterns among married women revealed that domestic service employed about 31 percent of all working wives, followed by garment factory work at 22 percent, and brick breaking at 14 percent. Less than a fifth of all working women were self-employed or working for the family business (Salway, Jesmin and Rahman 2005).

Single or young women workers often work in low-paying jobs for long hours. Forty-two percent of women workers are paid less than minimum wage and most are also unaware of their legal rights related to employment, many not claiming labor rights such as maternity leave.

These figures and the impeding socio-cultural norms women face indicate that both educated and poor women are unable to secure equal access to paying jobs (World Bank 2003). ICTs could help break down some of these gender barriers as the sex of business owners may not be an important variable in conducting e-commerce business, so this sector may be open to women business operators.

Gender disparities within the labor market limit the extent of women's economic opportunities and segregation is apparent within all sectors where both men and women work. Surveys reveal gender differences in every job category within each industry, including the transport sectors, most skilled craftwork, and the majority of service or retail sector jobs. One study underscores this fact:

> Women's employment is also concentrated in sectors with low returns on labor and is often temporary due to low skill levels and discriminatory attitudes regarding 'suitable' work for women. These trends mean that in 1999-2000, according to the labor force survey (LFS) of the Bangladesh Bureau of Statistics, 41.7 percent of women drew salaries of less than Tk 750 per month compared to 7.3 percent of men, and 71.5 percent of women were earning less than Tk 1,500 per month compared to only 26.4 percent of men. Women are also concentrated in low or unpaid agricultural work in rural areas with almost 75 percent reporting underemployment (working less than 35 hours per week) (Salway, Jesmin and Rahman 2005).

Industry, comprised of manufacturing, construction, ICTs and energy, is currently 26 percent of gross domestic product (GDP). This sector is expected to reach 35-40 percent of GDP by 2020, and to outperform the agriculture sector.[4] Much of the increase in industrial production is expected to come from labor-intensive export-oriented production, from the global integration of products, and from new leadership within private enterprise (World Bank and Bangladesh Centre for Advanced Studies 1998).

Bangladesh's abundant labor force is recognized as a potential advantage to the country becoming an important player within the ICT industry. However, with changes in technology, enterprises must invest in worker training to be or remain competitive since improvements in the quality of the labor force are important contributors to economic growth and human development (Ranis, Steward and Ramirez 2000). Investments made to improve human capital hold implications for women particularly, since the likelihood of investments being channeled to working women is less than that of men. This discrepancy must be recognized from the start.

Recent interventions by the state and by many non-governmental organizations (NGO) in the areas of micro-credit, health, and political empowerment, have positively affected women's bargaining power and their ability to challenge certain social norms, both in and out of the household. Due to these measures, women are better able to assert their needs and demands. For instance:

- Women are increasingly visible in the cash economy, which has traditionally been largely male-dominated;
- Women's increased mobility means more presence in traditionally male-dominated public domains;
- Increased mobility also means that more women are migrating to urban areas; and,
- Micro-credit programs for women have initiated new economic opportunities.

Looking across sectors there is increasing evidence to support the argument that opening employment opportunities to women has an impact on their social status through:

- Fostering new social networks on the factory floor (particularly in the garment industry);
- Giving women a greater voice in household decision making; and,
- Enhancing women's self esteem and self-reliance (Kabeer 2003).

Despite this progress, gender disparities in education, access to training and access to resources remain.

Illiteracy: The literacy rate in Bangladesh is about 35 percent among the rural female population, and 57 percent among the urban female population. Low levels of literacy are an obstacle to women's participation in the knowledge economy. In addition, women tend to have more fears and pre-conceptions about technology in general compared to men. Basic literacy and overcoming fears are integral to future skilling and re-skilling of women in the ICT labor force.

Restricted access to and control over resources: There are distinct differences between men and women in their access to resources, information and support structures. Women usually face higher barriers than men in accessing the kinds of applied training or resources that can equip them with digital literacy or applied ICT skills for engagement in ICT-related employment. In addition, compared to men, women have less time to balance out the tension between earning an income and household and childcare activities. Improved access to and control over resources is essential to augmented ICT use.

Training and education imbalances: Training and education opportunities are typically held with mixed-sex groups. However, the Bangladesh social system is male-oriented, and Bangladeshi women face even more challenging circumstances where both the school system and social structure reinforce each other and work against women's equal access to training and education, from the primary level to higher education. Without training and education initiatives targeted to women, ICTs cannot function as an equal resource.

Economic imbalances: Women are often dependent on men because they do not have their own economic base. To build such a base, skills, credit, and land are needed and these are largely inaccessible to women. Less access to collateral and subsequently less access to money means they are less likely to invest in or to pay for ICT use, hindering their ability to access public and government information and services.

Inequality in working conditions and remuneration: As jobs become more technologically advanced and, in turn, better remunerated, female workers often remain clustered in low-skilled occupations with lower pay and less likelihood for training or skill upgrading.

Although Bangladesh has challenges when it comes to enabling women's access to ICTs, ICTs can become a part of the solution in addressing the disadvantages that many women face.

Bangladesh's ICT-related Policy and the Implications for Women

In addition to the daily constraints Bangladeshi women face, there is also a lack of coherent policy with respect to gender and ICT.

Bangladesh's National Information and Communications Technology Policy (2002) outlines a number of measures to introduce ICT education to public and private universities, provide teacher training programs in ICTs, deploy virtual ICT teachers, develop web-based coursework, and encourage the growth of an export-oriented software industry. The Policy also mentions setting up cyber kiosks in post offices and local government centers throughout the country to enable Internet access. However, the Policy fails to address gender specific considerations throughout. It also fails to recognize that many public spaces are not frequented by women due to pre-existing cultural and social restrictions which prevent them from entering public spaces.

The interface between education and ICTs is also noticeably absent from Bangladesh's Education Poverty Reduction Strategy Paper. There is one ICT reference related to distance learning:

> *4.41. Investing resources in new technologies*. A high priority should be given and resources invested for taking advantage of new information and communication technologies for making learning resources available, improving quality of instruction, and increasing flexibility of academic offerings in higher education institutions. Bangladesh Open University, providing an avenue for higher education to the less well off, should adapt to methods and programs to realize the potential of the new technologies. The Internet, e-mail, teleconferencing and videodiscs should be put to use in distance education programs of the Open University to offer diversified opportunities to learners and to bring the world of learning to Bangladesh. The Open University and other institutions should use on-line course materials from international sources. Easy Internet access for faculty and students should be standard provision for higher education institutions (JBIC 2002).

Women's lobby groups worked with a gender caucus to integrate gender concerns into the World Summit on the Information Society (WSIS)[5], which took place in November 2005. In documents prepared for the summit, the only reference to women in the Bangladesh WSIS plan of action[6] fell under item 10, Declaration of Principles: "Ethical dimensions of the Information Society—the Information Society should respect peace and uphold the fundamental values of freedom, equality, solidarity, tolerance, shared responsibility and respect for nature." Specifically,

> Gender equity: steps are taken to bridge the ICT gender divide within the country by eradicating factors that restrict equal access to ICTs through greater use of both new and traditional ICTs as tools for development and for greater voice and empowerment of women. Bangladesh believes in equal rights where applicable for disabled/disadvantaged groups to access the ICT facility.

Despite this goal, the policy sections on capacity building, ICT applications, local content, and access to information and knowledge in the Bangladesh WSIS plan did not mention gender considerations for women.

There are a number of pilot initiatives implemented which address the specific information, communication, resource and employment needs of women, but work still needs to be done to integrate gender considerations into Bangladesh's national ICT policies. In Malaysia and Mongolia, for example, pro-active policies on gender and ICT have proven beneficial to the women targeted (see Case Example 1).

Case Example 1: Pro-active Policies on Gender and ICTs

Teleworking and Development Policy, Malaysia
http://www.mohr.gov.my/mygoveg/untuk/project.htm
Research studies conducted in telecommunications, banking, finance, airlines, software, printing and publishing sectors, found ways in which tele-work could improve women's career opportunities and quality of life. The results of this analysis strengthened the gender focus in policy-making of the Ministry of Human Resources, the Economic Planning Unit and the National Information Technology Council of Malaysia. As a direct result of the study, tele-work and its influence on women's employment were used in Malaysia's development policy. This is one of the few studies that examines opportunities for women, almost half of whom have secondary and tertiary education.

Mongolia Telecom: Employment of Women, Mongolia http://www.worldbank.org, Gender and ICT Toolkit
Mongolia Telecom started in 1992 as a public sector enterprise and privatized in 1995. Of its 4,500 employees, 54 percent are women. In 1996, Mongolia Telecom adopted a human resource development plan to reduce the crowding of women at lower levels and help at least 20 percent of them move up to managerial positions. The two-pronged strategy included measures to help women cope with the work-family dynamic, and measures to enable professional development and career growth. A large number of training and management programs were organized and drew extensive participation from women employees. To help women employees cope with the work-family dynamic, the company gave assistance to single mothers and financial aid for children's education. As a result of these proactive steps, women now constitute over 20 percent of senior managers, compared with just 9 percent when the plan was introduced. In 2000, 37 training programs were conducted, 735 participants attended the courses, and more than 65 percent of the participants were women.

Telecommunications Infrastructure in Bangladesh

The Internet was introduced to Bangladesh in 1996. Since that time, usage rates have increased considerably and are expected to reach about a half a million users by the end of 2005. Bangladesh topped the list of Least Developed Countries (LDCs) in personal computer and Internet subscriber trends between 1997 and 2002. In 2002, personal computer usage in Bangladesh was estimated at 450,000.[7] (See Annex III for additional statistics on the ICT profile in Bangladesh.)

Even with Internet usage on the rise, the current technology of choice in Bangladesh is the mobile telephone. Overall, mobile subscriptions are increasing at high rates, due in part, to the many benefits provided to their users (Pralahad 2005). For example, mobile telephones pose no barriers for the uneducated as the content is available in local dialects and instantly shared. Moreover, prepaid calling plans reduce the need for a bank account or a credit check. Mobile technology also has a positive impact in rural areas; fishermen and farmers can check prices in different markets before selling their produce, making it easier for people to price products competitively. Even as barriers

such as increased taxes and import duties increase[8], it is expected that the use of wireless technologies will continue to outpace fixed-line connections.

GrameenPhone was the first operator in Bangladesh to adopt a mass-market, low-tariff strategy. At the end of 2003, the company's telephone subscriber base reached one million (IFC 2004a). The availability of an affordable, reliable service increased cellular penetration for the company from 0.1 percent in 1999 to 1.25 percent in 2004, more than double the rate of fixed-line use. This growth also spurred reforms in the country's telecommunications sector, including the establishment of an independent regulator. The company significantly increased rural connectivity through its village phone program, in which local individuals, often supported by a microfinance loan from Grameen Bank, operate a pay telephone in their communities. About two million people benefit from cellular services provided through this program, and micro-entrepreneurs operate more than 125,000 of these businesses, bringing phone service to at least that many rural villages in Bangladesh.[9]

ICT Education and Training Initiatives

The knowledge economy is underpinned by literacy, basic education and communication skills. Increased literacy creates the demand for information, news and content. Beyond these fundamentals, a digital workforce requires training at all levels—from data entry to network-management to entrepreneurial-management.

At the national level, Bangladesh is ahead of most South Asian countries in primary school enrollment and in the ratio of female to male primary pupils. However, nearly three out of five students drop out of primary school. This weakness threatens to undercut the nation's growth prospects in the 21st century by leaving it short-handed and in need of a large, literate workforce capable of competing in technically-demanding sectors with other developing countries.

Education and training opportunities through distance and open learning are one of the few educational areas in which women in the developing world are well-represented. Distance and open learning help women and girls overcome some of the challenges they face in traditional education, such as mixed classrooms. However, this trend may be reversed if women lack access to and control over the technologies themselves, or are not supported in overcoming their wariness of technology in general.

Bangladesh Open University, the only university that offers distance and open learning programs, provides eighteen formal and nineteen non-formal courses ranging from secondary to postgraduate levels within six academic schools, including a diploma in computer applications programs. The courses have been designed particularly for rural disadvantaged groups including women, agricultural workers, unemployed youth, uneducated adults, and health and family planning workers. However, enrollment and the financial viability of the university have been shaky due to a number of management and standards problems. And while ICTs are the natural channel for dissemination of

distance learning, an appropriate infrastructure to facilitate this learning has not been established.

Nonetheless, there are a number of independent community-based ICT training initiatives across the country that engage women and children. These pilot-programs are established by public/private partnerships between NGOs, private sector interests, educational institutions, government and donors. A few examples are summarized in Table 1 to demonstrate the types of trainings that have taken place to date. As women become familiar with digital communications, inter-active audio-visual tools can be used to provide technical and vocational training at the workplace, support small enterprise management for business development agencies, as well as offer other skills training related to food processing and agriculture. Over time, these training programs will need to be assessed to gauge their usefulness and the publics' readiness for these kinds of trainings.[10] It should be noted that there were no training initiatives found that focus on poor women. GrameenPhone, while it does strategically work with women, is generally available only to literate, low-income women, and not to the poorest of the poor.

Table 1: Selective list of Current ICT Training Initiatives in Bangladesh

Training Initiative Details	Gender-sensitive Interventions
Microsoft Unlimited Potential (UP) is a community initiative of the world's largest software company that aims to help underserved people across the globe overcome the digital divide by teaching them technology skills. Microsoft is partnering with the LEARN Foundation, a registered non-profit trust based in rural Sylhet, to provide skills training through a network of ICT training centers in the Sylhet and Sunamganj districts. Learn Foundation will convert five of the existing 1,000 rural public telephone centers and three Learn ICT training centers in the Sunamganj District into community-based technology learning centers (CTLCs). The foundation provides Microsoft UP curriculum and trainers, as well as Internet connectivity from its own satellite connection. The program will impart technology training ranging from basic computer literacy skills to use of advanced business productivity applications. Microsoft wishes to focus its investments on publicly accessible community-based centers where ICT skills training are a primary focus and where rural community members can share the learning experience.[11]	A network was established that encompasses a district of about 3,000 villages with three million people over a period of three to five years. No sex-disaggregated data available.
Commonwealth Science Council and the Association for Advancement of Information Technology (AAIT) initiated a project to build skills among highly educated women scientists, researchers and technologist. A survey was conducted to identify the actual training needs. Out of 515 applications, the surveys revealed that despite their education, women had not been able to acquire ICT skills due to social and cultural norms, lack of opportunities and lack of initiative by the women and their employers. Three training courses were offered between July 1997 and May 1998.	Further courses were designed for women in the medical profession and related sciences, nutrition, physiology and microbiology. Fifty-two women in the northern region participated in the year 2000.
Grameen Bank established a Village Computer and Internet Program in Tangail district,[12] which provides low-cost computer training to villagers, including email and word processing which enable locals to stay in touch with family members who have moved away.	Most of the users and trainees are village women, a deliberate project objective. No specific data is available.
Cisco Networking Academy Program established a scholarship program offering quality technology education to men and women through established university settings such as the Bangladesh University of Engineering Technology (BUET) and the Chittagong University of Engineering Technology (CUET).	In 2005, of the 685 graduates, 178 were female, comprising 26 percent of the total figure. The program also had five female instructors in contrast to none the year before (see Annex IV).
REACH BANGLADESH is a non-profit organization that runs an ICT training center in Dhaka with a staff of 15, four of whom are female. The center provides training in office computing applications, data management and basic programming. The minimum requirement for admission into training is Grade 12 (HSC) passed. Most of the students are interested in MS Office.	In 2005, out of a total number of 60 students, 18 were women. In the last six months, 100 trainees completed their courses—30 in data management and the rest in office computing packages. No sex-disaggregated figures are available for this group.
The Government of Bangladesh is implementing the "Conducting Standard Computer Training Courses in the Divisional Headquarters" project with the Ministry of Science and ICT in cooperation with the public/private sector. They are offering courses for professional and skilled ICT labor and an ICT Award Program.	Between 1997 and 2001, fellowships were granted to 32 percent of the women. Of the 66 fellowships for research and senior research positions, only 6 percent and 9 percent were offered to women.[13]

ICT Trends in Business Sourcing

With the variety of ICT-related services, a range of competitive small business opportunities in sub-contracting, joint ventures, partnerships, franchising, licensing and network-marketing have been created. ICTs involved in computing have also spun the creation of small businesses that develop applications for electronic mail, Electronic Data Interchange[14] (EDI) for procurement and logistics management, as well as demand-driven manufacturing, retailing, and groupware.

To take advantage of these growing services, many large corporations are increasingly producing, sourcing or distributing products from developing countries, which involves working with local partners and MSMEs as integral components of the value chain. With the increase in subcontracting and local sourcing opportunities, ICTs enable the growth of ancillary small-scale units and home-based manufacturing production, which is effectively at the bottom of a complex production chain. In today's competitive market, it is to the distinct advantage of large corporations to outsource production to a range of entrepreneurs who can deliver quality at a low, competitive cost.

Women comprise a critical section of the productive labor force and women-led MSMEs are growing rapidly. A 1994 survey of SMEs in Asian Pacific Economic Community (APEC) economies found that small businesses account for 90 percent of all enterprises. Between 1995 and 1997, women business operators increased by 9 percent while male business operators increased by 2.6 percent. These businesses typically specialized in the small farming, retail, and craftwork sectors (UNIFEM and CIDA-SEAGEP 1998). Another study suggests that women head 35 percent of SMEs in the region (UNCTAD 2002).

With women entrepreneurs playing such a significant role in the MSME environment, ICTs can be effective learning and networking tools, as well as play a significant role for outsourcing opportunities along the value chain. Business transactions consisting of many successive processes such as information gathering, comparisons, and negotiations, can be carried out more efficiently over the Internet (UNCTAD 2001). Training on the potential benefits of search engines, virtual international telephone directories, sources of business management models and software, and the use of on-line training manuals are effective mechanisms to increase the potential of women-led MSMEs within the ICT sector. However, most of MSME services are provided in male oriented settings and are not adapted to the specific constraints faced by women, particularly in cultures which discourage male/female interaction.

SMEs that service the ICT Sector differ from SMEs that introduce ICT platforms to their routine activities. SMEs servicing the ICT Sector comprise a rapidly changing market, where initiatives can sprout and fail quickly, reflecting a climate of experimentation. This is a direct result of the re-intermediary and disintermediary processes in the production chain.

Outsourcing and Export Trends

Outsourcing and off-shoring, a common phenomenon of the ICT industry, is the contracting of core business functions to an outside supplier. The first ICT skill-intensive industries outsourced were consumer electronics, followed by skill-intensive industries such as auto components, pharmaceuticals and telecom equipment (Balasubramaniam and Padhi 2005). Increasingly, ICT outsourcing has grown to include the management of call centers, payroll processing, software engineering, and research and development. According to the McKinsey Global Institute study on the Emerging Global Labor Market, 1.5 million service jobs were outsourced from developed to developing countries in 2003. The study predicts the figure to increase to 4.1 million by 2008.[15]

Declared an emerging sector by the Government, Bangladesh has an ICT industry estimated at USD 150 million, growing at an estimated 20 percent per year. ICT businesses are set to grow with this increase, but a supportive business environment is still needed (IRIS Center 2005a). At present, there are over 50 software and ICT service companies in Bangladesh, employing 4,000 technical professionals and exporting services to about 30 countries worldwide. Exports for FY 2003-2004 amounted to USD 7.2 million, an increase of more than 70 percent from the previous year[16] (see Table 2).

Table 2: Exports of Computer and Information Services and Other Business Services, 2003

Percent increase on a year earlier

	10	15	20	25	30	35	40	45	50	55	60	65	70
Estonia	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪
China	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	
Morocco	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪		
Ethiopia	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪		
Macedonia	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪			
Columbia	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪			
Luxembourg	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪			
Bangladesh	▪	▪	▪	▪	▪	▪	▪	▪	▪				
Russia	▪	▪	▪	▪	▪	▪	▪	▪	▪				

Source: 2004 OECD Information Technology Outlook (Chapter 2), based on IMF Balance of Payments Database, November 2003

Bangladesh has valuable experience meeting outsource demands, particularly in the readymade garment (RMG) sector. Outsourcing of computer software development is an emerging service industry for the country, while medical transcription and data warehousing are in their infancy. Through technology transfer, the Government plans to establish EPZs for the ICT sector, called High Tech Zones, and a Software Technology Park with dedicated and advanced data communication facilities. In addition, the Government intends to set up an ICT-incubator which will provide training, Internet connection, personal computers, and networking in order to encourage the development

of ICT-based businesses. The Government also plans to provide start-up finance for the local software industry.

Software development and data entry are recognized as potential future export opportunities, but Bangladesh faces intense global competition in this market. The country's ranking on the competitiveness index in software development is equal to that of Myanmar, and is far behind the leading ICT outsourcers India and Sri Lanka.[17]

Engaging Women in the Knowledge Economy: Points of Intervention

Drawing from the current ICT trends in Bangladesh, this section identifies and addresses nine points of intervention that have the potential to improve women's participation in the knowledge economy and use of ICTs:

- Agriculture and natural resource-based activities;
- Manufacturing;
- Small and Medium Enterprises (SMEs);
- The ICT Services sector;
- Literacy, education, and training;
- Access, mobility and control;
- Inclusion of and outreach to women;
- Service delivery to women; and,
- Government services.

Agriculture and natural resource-based activities

Most Bangladeshi's derive some portion of their economic livelihoods from agricultural, fisheries, and livestock. By integrating ICTs into agriculture and natural resource-based activities, the sector can be supported by product differentiation, infrastructure improvements, and enhanced skill sets. ICT applications can also be integrated into the range of processes in agribusiness, planning, and management, and the agro-industry cluster.[18]

While ICTs in agro-business are generic to other business needs, there are certain aspects that have immediate and direct implications for the rural poor, including:

- Managing, sharing and storing agricultural-related information and data.
- Access to time-sensitive and public (government) information.
- Links and networks that support participatory information sharing.
- Access to market information across sectors.

Eighty percent of Bangladesh's population lives in rural areas, often accessible only by unpaved, poorly maintained roads or by river transport. As a result, sending agricultural produce to markets, seeds and fertilizers to farms, children to school, and family members to health clinics, is time consuming, expensive, and oftentimes impossible during the rainy season. With access to information via ICT applications, farmers, fishermen and herders can make informed decisions around supplies, prices, markets, and rural services which directly affect their livelihood.

The importance of gathering, storing and disseminating agricultural experiences and indigenous knowledge cannot be overstated, particularly those practices dominated by

women, as men and women may possess different information. For example, farming practices which use indigenous, drought-resistant grains and rice as well as traditional preservation methods that rely on dissemination of knowledge by word of mouth are at risk of being lost to mono-crop cultures. Introducing a comprehensive software database that records and maintains information on local biodiversity, gender disaggregated demographics, land holding patterns and income profiles have long-term implications for sustained agricultural development. Geographic information systems (GIS) can be utilized to record and monitor water fall, soil quality, and other environmental systems in a local area, and then disseminated to local farmers to increase their crop production as in the case of village farmers in India, fish workers in Senegal, and dairy producers in India (see Case Example 2).

Traditional methods of disseminating information in rural areas have been through Rural Community Based Organizations (RCBOs). However, RCBOs are becoming increasingly information poor as they tend to lack technical information compared to organizations operating from major district towns or urban cities. There is also a paucity of relevant information available, particularly accessible content, since many village members are illiterate or have low literacy. Furthermore, RCBOs are increasingly excluded from information published on websites by institutions, donors and the government. In response to this knowledge gap, the Intermediate Technology Development Group (ITDG) in Bangladesh has been working since 1995 to strengthen the capacity of over twenty selected RCBOs to manage and support the enterprise initiatives of their beneficiaries.[19] Through the introduction of ICT applications, RCBOs have gained considerable knowledge in operating information enquiry services, developing micro-enterprise information, and disseminating relevant business information to rural communities.

Points of intervention: Agriculture and natural based resource-based activities can gain from the introduction of ICT applications and use. For example, developing a software database of natural farming techniques, seed usage, and local/native flora and fauna can centralize and codify knowledge on local practices such as crop production, rotation and seed saving rates. By creating web-portals or "virtual" groups/coops in rural areas, or by augmenting the ICT capacity of RCBOs, ICTs can be also be used by agriculture and natural handicraft producers to negotiate prices, disseminate information, develop marketing linkages, or interact with different producers/suppliers.

Case Example 2: ICT Applications in Rural Contexts

The National Institute of Agricultural Extension Management (MANAGE), India
http://www.manage.gov.in
The Ministry of Agriculture set up Village Information kiosks in eleven villages in the Rangareddy district of Andhra Pradesh. As an agricultural extension initiative, this project seeks to provide quick dissemination of technological information from the agricultural research system to farmers in the field and inputs feedback into the system. The kiosks are managed by local Mutually Aided Cooperative Thrift and Credit Societies dominated by women and provide price information at the farmers' markets. Villagers use the Internet to find information on a range of entitlements, link up with schemes and check their eligibility for housing and crop loans.

MS Swaminathan Foundation (MSSRF) e-villages in Tamil Nadu, India http://mssrf.org/
MSSRF has been experimenting with using ICTs as a way of facilitating development in poor rural communities. MSSRF's e-villages empower people through increased access to computer terminals, which are loaded with an informational database of government services. In community centers where computers have been installed, women are encouraged to run the center, provide information services to the village and offer training courses for other women. A central hub located in a nearby town provides support and daily information bulletins. The daily information bulletins are sent by e-mail to the networked villages, which includes a summary of the local main news stories, local weather report, and daily prices from local markets. Trained ICT personnel staff the hub and are on hand to respond to requests from the villages. ICT training courses of up to 25 people can be held at each hub and larger courses, for handicraft production entrepreneurs making incense sticks or small scale paper production from banana leaves, have been developed to facilitate livelihood diversification through small business activities.

Inter-village connectivity and empowering the members of rural communities, Thailand
http://unescobkk.org/index.php?id=269
This project focuses on villagers, particularly youth, who want to use ICT as a tool for community development, especially in the areas of family accounting, community savings and store accounting. The project tries to extend the learning experiences in one village to the other three connected villages by means of ICT laboratories in those villages. Project staff also organizes and coordinates the sharing of learning among all residents of the targeted villages.

Women fish workers use ICT for marketing, Senegal (Hafkin and Taggart 2001)
Many women entrepreneurs in Africa are in need of market information and are beginning to use ICTs to access it. The Grand Coast Fishing Operators Union, a women's organization which markets fish and fish producers, use ICTs to exchange supply and demand information between their different locations. The women feel this has improved their competitiveness in the local market and are planning a website to enable nearly 7,500 members to promote their produce, monitor export markets and negotiate prices.

Increased productivity and competitiveness for informal women producers, India (Jhabvala and Kanbur 2002)
ICTs can be used by informal producers to increase productivity and competitiveness. The National Development Dairy Cooperative introduced a computerized system to measure and evaluate milk received from small producers, to track and transmit milk fat content, to access the milk's value, and to record farmer's participation. With the new system, transactions average 30 seconds from delivery to payment. Farmers are able to receive payment immediately, obtain information on the quality of their milk, and save time.

Water mapping, India http://www.sarai.net/journal/03pdf/292_296_vvyas.pdf
In Jaipur, the Ajit Foundation created an interactive water-map of a village, which records water amounts available from each source, water quality, maintenance, demand and harvesting systems. This map helps farmers make informed decisions about their local water resources.

Manufacturing

With 1.5 million women currently working in the RMG industry, this sector has expanded employment opportunities for a large number of young women entering male-dominated workspaces (Salway, Jesmin and Rahman 2005). Today, the garment industry accounts for 75 percent of total export earnings in Bangladesh.[20] Ninety percent of garment workers are women, with 88 percent of them working in the production process, sewing and finishing. A few women have post-production or supervisory jobs, and no women are employed as cutters or quality control operators.[21] Moreover, there are very few women in departments dealing with computerized machinery.

With increasing competition from countries like China on the rise, and the ending of the Multi-Fiber Agreement (MFA), there are signs that the RMG sector is upgrading its production since low labor costs alone are not sufficient to remain competitive (IFC 2004a). Production platforms like those in Bangladesh may still be able to supply certain commodity items (bulk, standard garments, etc.), yet there is a demand to improve the productivity and quality of small, family-run factories through ICT investments and training of both direct labor and management. Within Bangladesh, 80 percent of accessories used are sourced locally. By introducing ICTs, upgrading the infrastructure and providing training and skill enhancement opportunities, the RMG industry could have the potential to offer a wider range of services, enabling a move from assembly to full package production (ILO 2001b). ICTs could also be used to track production and shipment, and streamline the production process to meet market demand.

With a workforce of 6,000, 95 percent of whom are women, a garment factory in Sri Lanka uses computerized machines for design, sewing and embroidery, producing 700,000 pieces per month. The high rate of women workers using computerized machines suggests that women in the workforce are literate and trainable in ICT applications. The computerization process also supports the steady supply of products, ensuring timelines, pricing, and quality standards meet the requirements of the international market.[22] As this example suggests, women in Bangladesh could also be trained in computerized machines since they share similar skill sets as Sri Lankan manufacturers.

Points of intervention: Introducing ICTs and computerized machines to the manufacturing sector, particularly the RMG industry, has the potential to increase factory productivity and quality, as well as track production orders to meet increased demand. Training programs and awareness workshops for women factory workers on ICT usage are also necessary to instill the needed skill sets to operate new machines.

Small and Medium Enterprises (SMEs)

Traditionally, rural women have been involved in different kinds of self-employment activities within a variety of sectors, yet cannot always take advantage of technology. According to one study, 37 percent of women in Bangladesh used purely manual

production methods compared to 22 percent of men (Nichols Marcucci 2001). On the other hand, 17 percent of men used modern technology compared to only 9 percent of women. This same pattern may be repeated in the ICT sector and in the use of ICTs.

Women entrepreneurs and producers can benefit from e-commerce opportunities if organizational support for efficient enterprise management is available. In some instances, ICTs are introduced to existing production and retail units. For instance, both PEOPlink and SEWA integrate ICTs into their production and training activities for more efficient, economic marketing, and also provide on-going training and business support programs to their producers and employees. Tortas Peru went a step further and introduced a new business concept to women: email. A national network of public computer booths and simple training sessions for women home-workers enabled Tortas Peru to become successful (see Case Example 3).

Case Example 3: Women's E-Commerce Initiatives

Self Employed Women Association's (SEWA) Trade Facilitation Centre, India
http://www.sewa.org
SEWA has had success in its e-commerce endeavors supported by its websites www.banascraft.org and www.kutchcraft.org. An innovative approach to reach producers and artisans under-served by connectivity involves putting women producers in touch with a cadre of computer operators who perform a variety of supportive functions that enable on-line selling.

Hipknit, Nepal http://www.hipknit.com
This project, initiated by the Society for Health Environment and Women's Development (SHEWD), sells a wide range of custom-designed wool, Nepalese hand-knitted clothing over the Internet. By marketing without the middle agent, the Hipknit project gives some of the poorest women in Thaiba a chance to work for a fair wage and gain economic independence. In the process, they learn profitable handicraft and business skills. Part of the profits are reinvested by SHEWD into other community projects in the areas of health, environmental awareness and education.

PEOPlink, Bangladesh http://www.peoplink.org
A non-profit organization, PEOPlink helps artisans in developing countries to sell their products over the Internet. The PEOPlink website features many artisans' products, permitting remotely located customers to browse and purchase them online. Business is conducted directly between producers and consumers which avoids the expense of a middleman. Email enables consumers' requests to be relayed directly to the artisans, thus allowing them to better know their distant and culturally distinct market, and to adapt their products accordingly. Ekota Forum in Bangladesh is an NGO with 14 organization members representing 100,000 women. Their website (http://www.catgen.com/ecota/EN/) showcases many of their products, all of which were made by poor people in rural Bangladesh. Peoplink's work stands out because it provides customized website training to its members and 24/7online software support to all its artisans around the world.

Cottage Industry Global Market (CIGM), India http://www.k2crafts.com
CIGM is a network with horizontal and vertical linkages, comprised of women's weaving cooperatives in rural northern India whose main products are handmade woolen shawls and other woolen attire. CIGM fosters links between the individual cooperatives as well as links with other players, including local NGOs, local government, Georgetown University (U.S.) and the World Bank's Development Marketplace (the funder). Three women are responsible for co-coordinating material supply, marketing and record keeping out of a center that also provides training to the cooperative members. Government policies support cooperatives in the form of loans, training programs and marketing opportunities.

Tortas, Peru http://www.tortasperu.com.pe
Tortas, a woman-owned enterprise, uses ICTs to reach and service a wide market for its cakes and desserts. A network of rural housewives uses the Internet to take orders and provide baking tips in Spanish and English. The company covers the major cities in Peru and over 2 million Peruvians living outside the country through their website. Customers can order a cake from a catalogue and pay using credit cards, checks, money orders or electronic payments to the bank. The order is sent by e-mail and a networked member bakes and delivers the order. The company is based on the Internet to maintain low prices, making it necessary for members to be familiar with computers. Prior to joining in the Tortas business network, the housewives participate in a basic course on marketing, cake-baking, and how to use Internet and e-commerce tools. With just three hours of instruction, the women learned how to use e-mail, find websites and interact with clients.

Points of intervention: Provide ICT training and literacy improvement programs to women SME owners and operators, and introduce ICTs into their routine business activities. Augmenting the capacity of women SME associations through ICT training may also enable associations to share technological knowledge with its members. In turn, associations may then provide skills training sessions on marketing, business support programs, email usage, or others areas in an on-going capacity to support e-commerce transactions. Develop an online network of women SME associations for dialogue, networking, and business opportunities.

The ICT Services Sector

Industries which service the ICT sector comprise trade, transport, financial, technical and professional services, as well as jobs in information processing, data entry, publishing, call centers, GIS and software development. Presently, the general services sector makes up half of Bangladesh's GDP, and is considered a major source of employment creation by the Government. Although India and Malaysia have captured the bulk of ICT service jobs, as the market expands, China and Bangladesh are positioned to take advantage of these growth opportunities.

Although ICT services are a comparatively new industry, a division of labor between women and men is already evident. Men dominate higher value-added jobs, such as software programming and system analysis, and women are primarily in lower value-added jobs such as call centers and customer service. In the banking sector, for example, women in Bangladesh are excluded from most jobs due to the high degree of technical skills required to perform programming and systems analysis functions. Women who are employed within this sector are relegated to the lower value-added jobs.

Information Technology Enabled Services (ITES), a term referencing the lower value ICT service jobs, does require proficiency in written and spoken English, familiarity with the culture of the client countries, and adequate social skills.

> These skills do not need training of elite and expensive institutions; hence can be acquired by those, who, because of their class or gender, do not have access to elite technical institutions. In call centers in India, the proportion of women in total employment could be anywhere between 38 to 68 percent. The rapid growth in the ITES jobs has given women a new confidence and social empowerment, as has not been experienced ever before. Two hundred dollars to $400 per month, although small by the standard of the richer countries, is a high salary in India or the Philippines and assures a woman, in her twenties, a quality of working life that is much better than what she could have had in traditional feminized occupations (Nichols Marcucci 2001).

With proper training, investment and infrastructure improvements, ITES in Bangladesh could potentially support augmented employment opportunities for women.[23]

Points of Intervention: With the ICT services sector growing, targeted ICT training and technical skill enhancement is essential. Separate training sessions should be provided

for women on the ICT applications specific to each service sector to include banking software, programming systems, and data entry processing, etc.

Literacy, Education and Training

Literacy and education: The sharing of knowledge requires a foundation of basic literacy (see Box I). Efforts to introduce ICTs to women's activities must offer parallel training in the fundamentals of literacy or women will not be able to contribute to the knowledge base that the next generation of girls might access electronically. "Literacy instruction is most effective when it involves content that speaks to the needs and social conditions of the learners. And, as with ICT-related material, this content is often best developed by the learners themselves" (Warschauer 2003).

Box 1: Measuring Educational Achievements

Gauging educational achievement has changed dramatically in recent years. Old measures such as literacy rates and scores on standardized tests are being updated with new, comprehensive testing methods that test not only the ability to perform in narrowly defined academic assessments, but also an individual's ability to solve problems encountered in every day life. The Organization for Economic Co-operation and Development (OECD) developed two such testing systems in recent years: the International Adult Literary Survey (IALS) and the Programs for International Student Assessment (PISA).

The IALS defines literacy as "the ability to understand and employ printed information in daily activities, at home, at work, and in the community—to achieve ones' goals and to develop one's knowledge and potential." The three domains of literacy skills include:
- Prose literacy—functional command of common texts.
- Document literacy—understanding and using data in contexts such as maps, tables, forms and charts.
- Quantitative literacy—manipulates numbers in circumstances that might be encountered in occupational or private life.

The IALS emphasizes general skills such as communication, adaptability, flexibility, problem solving and the use of information technologies. Broadly adaptable, it could be used to assess the strengths and weaknesses of any country's education system.

The PISA also tests the knowledge and skills that individuals will need to function as an adult, assessing proficiency in three major areas:
- Reading literacy—functional command of common texts.
- Mathematical literacy—abilities in using math and developing skills in everyday situations.
- Scientific literacy—identifying evidence, evaluating and communicating conclusions.

Source: OECD, Literacy in the Information Age: Final report of the IALS, Paris 2000

In countries with already high female literacy rates, women are able to secure jobs higher up the value chain. For example, in Malaysia, while the number of women programmers, designers and system repair technicians is still low mostly due to socio-cultural and economic reasons including household responsibilities and level of

education, 30 percent of ICT professionals are women. In India, 20 percent of software industry employees are women.[24]

The Government of Bangladesh has taken a number of measures to institute programs to enhance the quality and infrastructure of educational institutions. Twelve new science and technology universities are planned, and sixteen Polytechnic institutes, including three for women, are being established. Ten thousand computers have been distributed to female secondary schools in rural areas across the country. Progress is being made in increasing girls' attendance at primary level school and national policies have identified the engendering of secondary education as a priority. Yet, as dropout rates increase, more needs to be done.

Training: Teaching methodologies in Bangladesh are teacher-centered and rote learning is the standard. Such a system does not encourage the building of self-confidence and self-expression among students, particularly for girls, who are allowed less self-expression than boys. There are generally more male teachers at the secondary level, which may be a contributing factor to female student participation levels. For example, in a Cisco community impact assessment of the Networking Academy Program's gender initiative in Bangladesh, while 14 out of 17 women students in co-ed classes responded that they were comfortable with men in the class, the majority expressed their preference for women-only classes (IRIS Center 2005b). Additionally, women will more likely invest the time required to explore ICTs in an applied group dynamics workshop or community based trainings (see Box 2).

Box 2: Dissection of a Participatory ICT Training Workshop

An ICT training workshop is most effective when it brings together participants who share common objectives. Women farmers or small business owners who are likely to work together or to benefit from sharing information with each other, will have an added incentive to use ICTs to communicate with each other long after the training workshop has ended. By bringing together the widest spectrum of knowledge economy stakeholders, the workshop can provide the physical and intellectual (learning) space for dialogue that will enable enterprising participants to form alliances with ISPs, business support services, financial intermediaries, employment agencies, career counselors and other institutions.

To be effective, trainers must first conduct a simple needs assessment prior to the workshop that asks women what is important to them. This provides the trainer with a good sense of the knowledge gaps that need to be included in the workshop, and places ICT use within contexts relevant to women's lives.

The trainer then designs a training program in collaboration with participants, resource persons and local mediator organizations wherever possible. This ensures full and active participation on an ongoing basis between participants and local resource persons, and maximizes the learning process.

Third, the trainer uses on-line 'laboratory' conditions for participants to experience web navigation and software packages. This method of training encourages confidence building, skills in problem solving and self-empowerment. It is a particularly effective mode of training for women, who value the creation of networks and peer groups to build future alliances.

Lastly, trainers must find a local computer training center that is open to the public to ensure that women will return to a familiar space to try out new skills.

If possible, trainings for women should be led by women. In addition to augmenting skills, women-only trainings are also effective in increasing confidence and self-esteem by providing safe spaces, role models and networks to encourage and support learning about ICT, and provide one-on-one support so participants can learn at their own pace.

Tandon, Nidhi Networked Intelligence for Development: www.networkedintelligence.com, September 2005

Points of intervention: Issues around language should be considered since it is generally assumed that Internet users need to speak English in order to gainfully use the Internet.[25] Once women understand that not only is web-based information available in their national language (or local dialect), it only requires a further step to encourage women to contribute information in their own language.[26]

While the outcomes may be gradual and long term, women-run workshops for women and peer-group learning, designing sessions based on local content, determining what kinds of information gaps exist and how these gaps might be best addressed, should be established across the country. Applied training manuals have been developed and successfully applied in Taiwan with the support of Microsoft, and can be easily modified and translated to fit within the Bangladeshi context (see Case Example 4).

Case Example 4: Taiwan Association for Educational Communications and Technology (TAECT) http://www.microsoft.com/citizenship/giving/overview/UPrecipients/apac2005.asp

This grant funded by Microsoft aims to empower women and enhance their lives by improving women's computer literacy skills. With recent changes in technology, it is almost impossible for women to get an interview opportunity without ICT skills. Working with key partners throughout Taiwan, TAECT provides ICT skills to women's group members who want to enter the job market (total 1.32 million). TAECT creates peer groups and networks via the Internet. This strategy of volunteer "seed trainers" requires each participant to attract 10 or more additional women to participate in the e-learning program. This increases enrollment rates and membership in interest community groups, and enables women to learn ICTs in a comfortable environment from other women. Job placements are also part of the program and provide a metric for measuring the program's success.

A parallel set of initiatives and investments is needed to establish viable and appropriate ICT components in basic literacy, education and training for girls and women at different levels. The immediate objectives behind ICT training and public awareness campaigns for women needs to focus on breaking myths, fears, and pre-conceptions about new technologies as women will more readily use ICTs once its value to them is known. This goes hand-in-hand with the promotion of local content in local languages in order to engage the interests of women. By involving women in the deliberation and composition of their own knowledge and information, this provides them an opportunity to become equal stakeholders in the knowledge economy. Resource barriers to digital inclusion are real and can be overcome through affordable access to and training in ICT, as well as a provision for affordable child care (Faulkner 2004).

Access, Mobility, and Control

Access: One of the more effective ways to encourage women's engagement in ICTs is to introduce it to their routine activities and in places they frequent. This is especially true for a country like Bangladesh where cultural and social restrictions on physical mobility may prevent women from entering or using public tele-centers, post offices or their equivalent. While public tele-centers are still a new phenomenon, women tend to use tele-centers much less than men. Preliminary evaluation studies show that women are not keen to try out equipment without technical support, nor do they have the disposable income to pay the usual fees charged by tele-centers unless they have the prior knowledge to use technical equipment. Oftentimes, women in poor households cannot afford to use public facilities. Community libraries and public spaces established for women in Nepal, Cambodia and Bangladesh have provided women access to ICTs in a comfortable setting (see Case Example 5).

Case Example 5: Community Libraries and Women Public Spaces

Jhuwani Community Library, Nepal http://www.readnepal.org/
For more than a decade, Rural Education and Development (READ) has been building community libraries. These libraries are run with the active participation of the community and have their own income-generating scheme for meeting operating costs and financial sustainability. The Jhuwani Library at Chitwan formed a separate women's group to further the empowerment of women in the community. "Even when we want to sit together and discuss our problems, we do not have any space, and tea shops are not a place that our society accepts for women. Libraries being a place of education, offer a neutral and safe space for us to meet, and enables acceptance from our husband and families." The formation of women's groups helped women gain self-confidence through increased interaction, encouraged their journey into the public sphere and honed them for participation in decision-making roles. Jhuwani Community Library organizes frequent awareness raising programs for women, and organizes interaction programs promoting dialogue and discussion around women's rights. This platform has helped provide a forum to identify problems within their areas and to seek solutions through dialogues with concerned parties. Discussions on issues such as violence against women, trafficking, and women's legal rights, have resulted in greater awareness amongst members of the community library. These groups have also been able to take action against social injustice at the local level.

Community Information Centers, Cambodia http://www.cambodiaCIC.org
In 2003, the Asia Foundation partnered with USAID and Microsoft to establish a network of Community Information Centers in 22 provinces and municipalities across Cambodia, reaching every major population center in the country. The goal is to create a communication network that allows NGOs, political parties, government officials, and development organizations to increase information sharing, communication, and collaboration between provincial and headquarters offices, and between organizations. The project is also providing greater access to news and information for people and organizations in the provinces outside Phnom Penh on topics including women's rights, elections, economic development, small business development, education and health. Today the centers are regularly used by NGO workers, local government officials, political party members, teachers, small business owners, students, monks and election monitors. A key element was to develop a local-language web portal that provides user-friendly access to a variety of news and development-related information, such as Mekong River flood levels, human rights contacts, prices of goods and services, job listings and tourism figures.

Community Learning Centers (*Ganokendras*), Bangladesh
http://www.accu.or.jp/litdbase/break/pdf/BGDf910A.PDF
Aidlink's relationship with the Dhaka Ahsania Mission (DAM) began in 1995, and has focused on literacy programs aimed at women and children, and the rehabilitation of women who have been victims of commercial sexual exploitation. Over the past eight years, Aidlink has secured funding for six projects facilitated by DAM, and DAM has set up *Ganokendras* all over Bangladesh. The *Ganokendras* supply educational resources as well as training in literacy, gender development, primary healthcare, environmental preservation, and skills development. They also provide a focal point for social and cultural activities. All of DAM's initiatives involve the full participation of local communities, as beneficiaries, and as part of the decision-making process.

The value of physical access is gained only if women are provided with basic knowledge of computer literacy. In case studies recording women's successful use of e-commerce or e-education tools, basic training took place first. Instruction held in the local language and preferably for women-by-women in peer-group applied workshop settings, proved most effective. In India, a women's association organized computer awareness programs and offered basic computer skills to its team leaders and association members (see Case Example 6).

> **Case Example 6: Self-Employed Women's Association (SEWA) Applied ICTs Model, India**
> http://www.sewatfc.org
>
> India's self-employed women's organization, has been organizing women in the informal sector since 1972, and has a membership of over 215,000. It is one of the first organizations in India to realize the potential of harnessing ICTs for the productive growth of the informal sector. By organizing computer awareness programs and offering basic computer skills to its team leaders and association members, SEWA is implementing a well-considered strategic plan for integrating ICTs into some of its main activities. The organization uses software applications developed for its embroidery, watershed development, salt production, and savings and credit projects. The software used can generate customized reports on members, products, market activities, and keep accurate, up-to-date information for production planning.

ICTs content builds upon existing information channels that women already have access to, including community information centers, radio broadcasts, television and other local forms of popular media, print and theatre. Pilot initiatives around the world demonstrate that women, when given the opportunity, have successfully adapted technology, such as audio-visual and interactive media, to tell their stories or to record their experiences.

Mobility: Women tend to be less mobile due to spouse dependency, domestic responsibilities to the extended family, or other socio-cultural norms. A recent survey in India notes that mobility is directly linked to better productivity and increased transfer of knowledge. The study further reported that despite 45 percent of technical institutional enrollments being women, ICT employment still favors men, who comprise 70–75 percent of the labor force. In South Asia, 75 percent of the ICT workers are from India followed by Malaysia, Singapore, Sri Lanka and other countries. The predominant age group is 21-30, with men accounting for over 87 percent of mobile ICT professionals (Pichappan 2003).

Control: The decision over who has access to ICTs and how ICTs are used is a critical issue for women. Control issues determine what and where ICT access and information might be made available to women. In women-only spaces, these issues can be easier set and determined by women than within a mixed-sex space. If women are systematically excluded from decision making within the household, in places of worship, and in the community, then it is highly unlikely that they will have any decision-making authority on where and how ICTs can be best made available to them. ICT training workshops can facilitate this as a point of discussion and resolution.

Points of intervention: Solutions for women's access to and control of ICTs require a holistic regard for women's status and mobility in the community. For example, the Cisco Networking Academy Program in Bangladesh includes this concern in its recommendations:

> A significant factor hindering women's better utilization of the course is the tenuous law and order situation that make any after-dark travel for women a very real danger. While evening meetings for the Academy Program are generally preferred so that students can pursue work or other study during the day, this automatically limits the options for women students and the amount of time they are able to stay on campus to use the equipment or access study materials…since

transportation and safety issues are a significant barrier to women's greater participation in the Academy Program, one solution is to integrate the Academy Program into the normal academic curriculum of each institution (IRIS Center 2005b).

Similarly, Bangladesh's National ICT Policy states that the goal to establish cyber kiosks in all post offices and union complexes will not reach women.[27] Rather, an alternate physical location should be found where women feel more comfortable. For example, in rural areas, women-only stalls and shops could have a connected computer terminal with a dedicated trainer available to provide basic computer use skills that will enable women to explore information. Primary health care centers and maternity clinics can, over time, become a convenient location for digital communications. Bringing applied and basic computer training to women working in the garment industry, or encouraging women's access to computer training in the banking sector are other possibilities. There have also been successful examples of involving the local Muslim clergy *moulvi*, by the Datamation Foundation in India for instance, in providing ICT access within the mosque where women have a separate space.[28] Providing women-only hours in public facilities is also a possibility.

It cannot be assumed that community-based ICT initiatives will necessarily include women. For example in Sri Lanka, one pilot project was located to an adjoining vehicle repair garage whose patrons were all men (Wanasundera 2005). Careful planning and the collection of benchmark data for monitoring progress are necessary.

Inclusion of and Outreach to Women

Compared to other countries in the region, Bangladesh has not used ICTs for networking among women organizations to its full potential. Women who work within ICT need to build networks, skills and confidence in order to overcome isolation and progress (Faulkner 2004). Although illiteracy levels are an obstacle to women's participation in the knowledge economy, there are successful applications developed in the field to include illiterate users in accessing information important to their socio-economic welfare. For example in Bolivia, innovative ICT software enables illiterate users' access to computerized banking systems (see Case Example 7). Research studies and experiences show that strengthening the knowledge and information systems of the poor need to incorporate traditional, inter-active media to promote two-way knowledge sharing. Furthermore, finding ICT applications or content which is relevant to people's lives is also important.

Case Example 7:   Prodem Fondo Financiero Privado, Bolivia http://www.prodemffp.com

One microfinance institution is providing ATM banking services to Bolivians that do not have access to the traditional banking system. ACCION International established PRODEM FFP as an NGO in 1986. Since 1999, it has been a regulated, privately held financial fund focused on bringing microfinance services to underserved communities, both rural and urban. In a country where 70 percent of the general population and 94 percent of the rural population are classified as poor, PRODEM has designed its own ATM tailored to meet the needs of its rural customers.

The company provides customers with a smart card, so that the ATMs are able to verify the customer's identity and complete transactions without being electronically connected to the central office, thereby allowing PRODEM to expand its reach into remote areas. The ATMs also serve customers who cannot come to their branches during normal business hours. Moreover, the ATMs are capable of "speaking" to their users in their local language, thus enabling illiterate customers to access services. Combined with a touch screen interface, customers are able to deposit and withdraw funds without filling out a deposit slip or withdrawal form. Additionally, the ATMs facilitate money transfers, and provide access to government programs that offer work to low-skill workers and make payments to senior citizens.

PRODEM's ATM software was developed by a subsidiary of PRODEM, Innova Empresarial, which specializes in technology and consulting services. Its features an easy-to-use administrative interface, as well as a number of reporting options, including daily, weekly, and monthly reporting. In addition, Innova is in the process of developing palm technology that would enable PRODEM to take their financial services, via a handheld, into local homes and businesses of their customers.

Building on the success of PRODEM, ICTs are also being used by another organization (VOXIVA) to allow microfinance institutions to expand their reach to Peru. The company uses a phone-based system with voice prompts to expand microfinance networks into rural areas that have high numbers of illiterate people. The service reduces operating and transaction costs, resulting in savings that can be passed on to the borrower.

When ICTs are used for networking in local contexts, the impact is considerable. In Kenya, for example, trained women's groups in Nairobi's slum areas used video to communicate directly to policymakers about their situation and development priorities. The videos were viewed by government ministers, housing directors, donors and NGOs (the videos later won the Betinho Award for Technology and Social Justice). The women gained self-confidence, made contacts regionally, and established a local resource center with information on health, training, tenure and employment opportunities.[29]

Points of Intervention: Support the introduction of innovative software applications which are relevant and easily applicable to women's lives and needs. Support networking and association linkages, especially for business and advocacy purposes. Link low-literacy ICT banking software to microfinance programs as a new job creation scheme for women, and as a means to expand banking services to the unbanked.

Service Delivery to Women

It is only a matter of time before ICTs become an integral part, if not *the* underlying platform, in the delivery, pricing, monitoring and planning of a wide array of critical

services, including water, sanitation, energy, transport, financial services, health care, education, and entertainment and government services. Innovative ICT solutions have the potential to streamline service delivery and thereby benefit a greater number of women. In Bangladesh, for instance, boats travel the rivers, anchor at public places, and provide free public access to computers and the Internet, as well as provide training on a range of issues relevant to their daily lives (see Case Example 8).

Case Example 8: Boats deliver ICT, Bangladesh
http://www.gatesfoundation.org/nr/downloads/libraries/InternationalLibraries/ATLA05_CaseStudy.pdf

Shidhulai Swanirvar Sangstha (SSS), a Bangladesh NGO, has adopted a pioneering approach to bridging the digital divide and its commitment to providing free public access to computers and the Internet. Through the use of indigenous boats converted into mobile libraries, schools, and the Mobile Internet Educational Units on Boats program, SSS provides educational services, access to technology, and computer training to poor communities in a Northern Bangladesh watershed. The boats, which anchor at public places within remote villages, rely on generators or solar energy and mobile phones for Internet access.

Skilled volunteers educate men, women, and children on issues ranging from agricultural practices to micro enterprise and literacy. Farmers learn about strategies for productive and sustainable farming and bio-diversity conservation, as well as environmental hazards of pesticides. Throughout the year, they are able to connect with educators via onboard e-mail and check current farm prices online to remain competitive in the local market.

Students who would otherwise be unable to attend school during the monsoon season continue their education through the year using the libraries' onboard field staff. With literacy rates in Bangladesh at only 42 percent, SSS is making a significant impact on educating young people, especially girls. In fact, over 70 percent of the program's beneficiaries are women. In a highly competitive job market coupled with pervasive poverty, student participants are eager to learn technological skills they hope will translate to a career later on.

One of the most urgent applications for ICTs is in the micro-credit and financial services industry (e.g. insurance, banking, loans, etc.), especially for women. The shortage of affordable capital (loans) is a significant factor constraining the sustainability of micro-enterprises, a large number owned by women.[30] Grameen Bank, other major microfinance institutions (MFIs), community development funds, NGOs, government agencies, as well as commercial and specialized banks all provide small-scale loans and microcredit to rural and urban borrowers.

Although the barter system continues to work in rural community economies, the formal cash economy is pushing further into household economies, and the need for savings and borrowing is gradually increasing. The financial intermediary sector that services small businesses is beginning to extend its reach to poorer members of the community and providing services to clients who might not otherwise have access.

There are a number of ways in which ICTs can service the credit and savings needs of the poor, for instance:
- Adapting and simplifying accounting and loan tracking software to facilitate record-keeping and repayment;[31]

- Computerizing financial reporting and performance measures so they are cost-effective, secure, and accessible to both borrowers and lenders; and,
- Providing borrowers with secure, user-friendly account access through location points in local banks, post offices, and other community centers. Activities through mobile banking, smart cards, handhelds, or modified Automatic Teller Machines (ATM) can also facilitate access and bypass traditional methods of banking services (see Case Example 9).

Case Example 9: ATMs for Rural Masses, India

ICICI Bank, India's largest private commercial bank, uses traditional ATMs to deliver its financial services to the rich and middle class, mostly in urban areas. However, these ATMs are not suitable for servicing poor and low-income people in remote rural areas as they have high capital and maintenance costs and are unable to process the small denominations and worn bank notes that are the main currency in Indian villages.

With the help of the Indian Institute of Technology in Chennai and others, ICICI Bank has built user-friendly, low-cost village ATMs from homemade parts which use fingerprint scanning to identify savers who are illiterate and often unable to use a personal identification number. The machine is also capable of surviving extreme weather conditions and power outages. The rural ATM is currently being pilot-tested and, depending upon results, ICICI Bank expects to use these to encourage savings, formal banking services, and provide deposit facilities to millions of poor families.

Source: ICICI Bank; Bellman, E. 2004. Cashing in on the Masses. Far Eastern Economic Review, 8 July 2004.

As prices of relevant technology, such as ATMs, biometric authentication[32], voice recognition, smart cards, and PDAs continue to fall in price, more MFIs will be able to take advantage of the benefits they offer. New technologies and applications are constantly being developed to increase the reach and efficiency of microfinance organizations. Improvements will make operations more secure, increase transparency and scalability, reduce repetitive tasks, and provide data-mining capabilities that will allow MFIs to better manage their operations.[33]

Women workers, such as RMG workers, are unlikely to be able to visit the bank after work. Introducing the electronic factor to credit and saving services for women has immense implications in enabling women to track their own accounts, conduct their own financial planning, and maintain transparency of accounts at the individual and institutional level. Establishing bank offices in places of work or having bank representatives available on payday means that women can make a payment towards a loan, add to her savings, and as a result, deepen her financial literacy.

As this kind of information becomes available over the Internet, the same ICT devices that bring credit and savings management to women can also be used to record and monitor women's use of e-governance.

Points of Intervention: Adapt and simplify accounting and loan tracking software to facilitate record-keeping and repayment. Computerize financial reporting and performance measures to ensure cost-effectiveness, security, and accessibility to both

borrowers and lenders. Provide borrowers with user-friendly account access through location points in local banks, post offices, and other community centers frequented by women. Activities through mobile banking, smart cards, handhelds, or modified ATMs can also facilitate access to services for women. Use skilled trainers or volunteers to introduce and train women on e-service delivery opportunities as they become available.

Government Services

As ICT tools, computerization, and information management systems are applied to government activities and services, the efficiency and efficacy of government is expected to improve—with direct benefits to the poorer citizens. ICT and e-governance[34] applications will reduce personal interactions between government and citizen, increasing the transparency of government operations, saving both time and travel expenses.

Under current models of government information dissemination, it is difficult for the poor to access information on their entitlements, let alone act on them. Oftentimes information is not well publicized or accessible on the web in local languages, therefore, the poor must travel to the city or regional center to access their entitlement information. This is both time consuming and costs money, two main constraints poor families face. It is important, then, that social education content (e.g. HIV/AIDS prevention, health, etc.) be designed so citizens can easily access the information. In addition, some entrepreneurs lack information on the process or procedures to obtain necessary government services. Small local associations of businesses, known as *samities,* attract mainly SME members and have the potential, with capacity building support, to advocate for business rights in cooperation with policy advocacy associations. Similarly, ICT applications that can be applied to land ownership/title databases, procurement documents and registration procedures will ensure accountability and transparency.

The current National ICT Policy (see Box 3) identifies the importance of providing the public with a broad spectrum of information and related support services. Yet it is unclear how the government will initially gauge what kinds of information gaps exist or how its citizens will be involved in determining the content of these services.

Points of Intervention: To enable accessibility to government processes and procedures, necessary forms can be put online for easy access, cutting down the time and cost of visiting the government office. Information accessed online can also be tracked and disaggregated by sex in order to determine demand and improve services provided. Disseminate government service information, such as health and education services, through low literacy ICT devices like CDROMs.

Box 3: Extract from Bangladesh National ICT Policy, 2002

3.10 Social Welfare

3.10.1 Nation-wide ICT systems will be implemented for rural development activities, agricultural, horticulture, fisheries and livestock extension for farmers, career guidance for youth, technology guidance for rural enterprises, micro level planning etc. Communities and user groups or beneficiaries would be actively encouraged to participate in all such activities.

3.10.2 Public grievance redressal will be incorporated in the ICT-based system to facilitate access to citizens through any of the kiosks, public facilitation centers or Government offices. It would be made email based and strengthened to facilitate monitoring and on-line responses.

3.10.3 Non-government organizations will be encouraged to establish centers at the village level for providing hardware/software or other support services. At the same time the Government will use both the formal and non-formal channels to disseminate information about the application, advantages to communities of the use of ICT.

Summary and Recommendations

This study has provided an overview of ICTs trends and opportunities for women in Bangladesh. Recognizing that many opportunities currently exist, stakeholders have the opportunity to capitalize on the ICT industry as a means towards more equitable economic development, for both men and women, throughout Bangladesh.

The introduction of ICTs into the daily lives and activities of women in Bangladesh represents an unprecedented opportunity to meet their evolving needs and interests. Policies and programs developed and implemented must ensure women understand the full economic and social implications of working with ICTs, and how they can adopt ICTs as a launch-pad for their education, skills development and economic empowerment. Bangladesh has the opportunity to capitalize on the experiences of other countries and explore approaches based on the positive experiences of women ICT workers elsewhere.

Policy Recommendations

Currently there are no gender specific ICT programs in Bangladesh. Overarching policy recommendations need to be secured and enacted to underpin all program and project activities that promote ICT access and use by women. Measures which policy makers should consider incorporating into existing and future policy frameworks include:

1) Collect and analyze sex-disaggregated data by government ministries, private sector, NGOs, and donors regarding ICT use; and,

2) Hold stakeholder meetings to review and revise Bangladesh's National ICT Policy to include a gender analysis and gender specific recommendations throughout the document.

Recommendations by USAID Strategic Objective (SO)

As this study was commissioned by the USAID/Bangladesh Mission to support its current program activities, following is a list of recommendations arranged by specific SO and program component (PC) categories. (See Annex V for detailed list of recommendations).

SO11: More effective and responsive democratic institutions and practices

PC 1: Promote and Support Anti-Corruption Reforms
- Establish e-governance for government business forms and access to entitlements.
- Develop tracking system e-governance use.
- Develop ICT-based tracking system to assess the time it took for a constituent to receive a response, and monitor and train staff and departments based on this information.

PC 2: Promote and Support Free and Fair Elections
- Promote use of ICT (camera phones/videos) to monitor elections and reporting of problems.
- Use radio/mobile telephones to disseminate election results.
- Use computers to track results in real-time, alleviating possibility of delayed ballot-tampering.

PC 3: Reduce Trafficking in Persons
- Develop ICT database to track trafficked persons, where they were sent, what assistance they received upon their return, and their outcome.
- Train victims of commercial sexual exploitation on ICT platforms and usage to upgrade their skills for job-seeking as part of a victim assistance program.
- Use ICTs to post information about trafficking and create a communications campaign on trafficking.
- Establish a website for former victims of sexual exploitation to exchange information, support, and other needs.

PC 4: Protect Human Rights and Equal Access to Justice
- Use ICT to monitor labor standards as well as track and disseminate information on violations.
- Use ICT to track human rights violations (e.g. camera phones and video).
- Establish web portals and email groups to facilitate rights-based group information exchanges.
- Establish websites for rights groups and web-based political action (email alerts and web-linked action alerts).

PC 5: Strengthen Democratic Political Parties
- Create interactive websites for political parties.

PC 6: Support Democratic Local Government and Decentralization
- Consider ICT use to improve management and administrative capacity of local government.
- Establish a pilot program to use ICTs to improve the management and administrative capacity of local governments.

PC 7: Improve Sustainable Management of Natural Resources
- Use ICT (databases, PDAs, GIS) for natural resource management.
- Use low-tech knowledge management systems to allow women (who are usually responsible for procuring water) to record data from water quality monitoring to allow participatory monitoring and evaluation.
- Use ICTs to provide information on fair market value and market linkages for

> fuelwood, fodder or other forest products
> - Develop community based websites to track community decisions made on resource allocation and preservation.

SO 12: Expand economic opportunities created through equitable economic growth

PC 1: Increase Private Sector Growth
- Training
  - Train women entrepreneurs on ways to use ICT for gaining information on markets and pricing.
  - Train women entrepreneurs on the use of web portals and links to markets.
  - Conduct a training on the use of search engines, business management software, online manuals and other tools for MSME owners.
  - Train women to establish MSME businesses that provide services or develop applications such as email, EDI, etc.
  - Establish women-only training sessions and consider the timing and location of training to respond to women's specific needs (e.g. security concerns, need to balance training with domestic responsibilities, etc.).
  - Conduct a training of trainers for women to form a network of women ICT trainers.
  - Conduct a training on creating and using local web content.
- Capacity Building
  - Work with business development service providers to add ICT applications and platforms to their existing services.
  - Conduct an ICT needs assessment with MSME owners, disaggregated by sex.
  - Integrate ICT trainings into job placement and counseling centers, and discuss prospects for ICT employment with displaced workers as well as ways to use ICTs to assist with a job search.
  - Introduce ICT management, savings, and credit tools into microfinance and rural development programs.
  - Introduce ICT platforms into a variety of sectors including agro-industry, medical and health, rural markets, and EPZs to improve overall productivity, upgrade skills and generate employment.
  - Build capacity for the establishment of SMEs that service ICTs (computer repair, computer supplies, computer manufacturing, as well as programmers).
- Policy Advocacy
  - Promote efforts to reduce the costs of ICT licenses for low-income citizens (perhaps by offsets from user fees collected).

PC 2: Improve Access to Economic and Social Infrastructure
- Capacity-Building
  - Establish ICT terminals in places women congregate (e.g. women-owned stores or market stalls, hair salons, health clinics, or women's sections of

mosques).
- Support development of rural databases to assist farmers in tracking changes in markets, goods, prices, soil, seed, etc.
- Work with local Chambers of Commerce to develop data and content on business development services and ICTs.
- Launch a pilot project to create Internet kiosks run by women entrepreneurs who financed the development of the business via microfinance programs, increasing access of rural people to computers and generating new businesses for rural women.
- Pilot the use of ICT tools to "bank the unbanked" and assist the poor and illiterate in increasing their ability to save and manage their money.

PC3: Improve the Quality of the Workforce
- Training
  - Train RMG and EPZ workers on basic digital literacy to upgrade skills and production.
  - Offer trainings that demystify technology and tools.

PC 4: E-governance
- Capacity-building
  - Facilitate stakeholder dialogue between national government officials, local government leaders, community leaders and community members on ICT needs.
  - Put customs forms, procurement forms, and other business-related forms and regulations online to increase transparency and reduce opportunity costs and travel time accessing the documents in person.
  - Track the use of online forms, disaggregated by sex.
- Policy Advocacy
  - Support the establishment of a telecom development fund to defray ICT costs for the underserved (financed by a portion of carrier fees).
  - Promote policies such as the development of incentive programs to increase ICT access and stimulate expansion.

SO 13: A better educated, healthier and more productive population

PC 1: Improve Basic Education
- Training
  - Introduce nationwide ICT training for teachers (course content and teaching methods) at informal, primary, secondary and tertiary levels, to build a portfolio of ICT trainers in the country.
- Communications Campaign
  - Promote broad awareness of the requirement for and benefits of literacy, knowledge, and an ICT-literate society through the use of traditional media and public service announcements.
  - Improve the image of ICTs, particularly amongst girls, through school programs, career fairs for girls, and public media images and outreach.

- Capacity-Building
  - Develop curriculum on experiential application of ICT, which studies show appeal more to girls.
  - Use ICT (Internet, CDROM, spreadsheets, and other tools) to increase educational management.
  - Use CDROMs and other material to reduce the costs of textbooks and increase access to new information and materials for learners.
  - Promote alternative learning opportunities such as radio learning.

PC 2: Decrease Unintended Pregnancies
- Capacity-Building
  - Develop low-literacy CDROMS to inform patients on preventative health measure, reproductive health, maternal and child health, and other conditions/care.
- Training
  - Train women to be health care promoters who could visit other rural women and provide information, advice, and over-the-counter medications. Promoters could use PDAs to enter data and records about the patient on the spot which a doctor or nurse could review and prescribe any additional medication or treatment.

PC 3: Improve child and maternal health
- Capacity-Building
  - Establish outpatient centers in rural areas. Increase use of ICT such as telediagnosis, imagery and treatment. Include these facilities as additions to basic health care infrastructure.
  - Develop ICT tools within village tele-centers to provide medical information/reproductive health information to patients.
  - Distribute PDAs that rural physicians can use to store medical information, email others for advice, etc.
  - Develop patient/medical information for patients to use online.
  - Develop Internet medical centers to provide rural and urban doctors in developing countries with the latest medical developments.

PC 4: Reduce HIV/AIDS Transmission
- Capacity-Building
  - Use ICT to develop web portals for women to connect with one another to form online support groups.
  - Promote the use of radio for educational awareness campaigns.

Endnotes

---

[1] This is not to say that traditional ICT channels, such as radio, are not as important. The role of radio in women's lives cannot be understated and should be included in any work on enabling women to access information, resources and communication channels. Audience research in Bangladesh found that only 23 percent of males and 21percent of females own working radios however, 71 percent of males and 44 percent of females surveyed have regular access to radio broadcasts (WrenMedia 1999).

[2] Gender and ICT statistics: http://www.itu.int/ITU-D/ict/wict02/doc/pdf/Doc07_E.pdf. The availability of ICT statistics showing a breakdown by gender at the country level is quite limited and almost non-existent. Examining the availability of overall ICT statistics helps explain this lack of data. First, not many government organizations collect national ICT statistics in a consistent and regular manner. Of those government agencies that compile statistics, most do not provide a breakdown by gender. Second, traditional ICT statistics are either obtained from telecommunication organizations (e.g. telephone companies) or estimated based on shipment data (e.g. personal computers). These organizations have their own operational or analytical reasons for maintaining the data and gender is not one of them. Third, in some cases, gender disaggregated statistics are not intuitively logical. Where disaggregation is available, it is usually by sector rather than sex (e.g. business, government, home or education). Therefore, until primary ICT data collectors see market value in obtaining gender disaggregated statistics, the data will not be widely collected or available.

[3] Disintermediation is the process of cutting out the middle agent. When companies bypass traditional retail channels and sell directly to the customer, traditional intermediaries (such as retail stores and mail-order houses) are no longer employed.

[4] These shares are based on revised national accounts estimates by BBS. The revised structure of GDP differs significantly from earlier statistics.

[5] http://www.itu.int/wsis/. The conference took place November 16-18, 2005.

[6] http://www.itu.int/wsis/docs2/pc1/contributions/bangladesh.pdf.

[7] ITU statistical Yearbook 2002 Annex.

[8] In Bangladesh, the Government recently imposed a tax of Tk 900 (USD 414) on all new mobile connections, in addition to an import duty of Tk 300 on all imported handsets[0] (annual wage rates start around Tk 2500).

[9] http://www.gfusa.org/technology_center/village_phone/our_heritage/.

[10] Quote from Internet communications with Andrew Garton, 18 July 2005, on the Learn Foundation initiative in Bangladesh–"I can tell you though that the most keen and enthusiastic of responses came mostly from the girls. And yes, at the girl's school I don't recall any parents present. If there were, they would most certainly have been their fathers."

[11] http://www.microsoft.com/unlimitedpotential/ and http://www.microsoft.com/citizenship/giving/overview/UPrecipients/apac2005.asp.

[12] http://www.grameen-info.org/vcip/services.html.

[13] Government of Bangladesh. 2002. National Information and Communication Technology (ICT) Policy. Ministry of Science and Information and Communication Technology.

[14] Refer to glossary of terms.

[15] McKinsey Global Institute. 2005. The Emerging Global Labour Market.

[16] Bangladesh Association of Software and Information Services: http://www.basis.org.bd/it_ind.html.

[17] The index is a composite measure of a number of variables, including institutional capacity, labor skills, and level of education. McKinsey Global Institute. 2005. The Emerging Global Labour Market.

[18] An industry cluster is a group of business enterprises and non-business organizations whose participation in the cluster is an important element of each firm's individual competitiveness–it is the sum 'network' effect for businesses.

[19] http://www.itdg.org/html/itdg_bangladesh/about.htm.

[20] Since the 1970s, the Bangladesh RMG has to become the country's principal export earner in the 1990s. The first exports took place in the mid-1970s and have grown by 20 percent per annum to earn USD 3.4 billion sales within 45 countries in the 1996-97 financial year. This accounts for almost 70 percent of Bangladesh's total exports. The United States is the main market with 50 percent of exports by value, followed by the EU with 40 percent. The International Finance Corporation's South Asia Enterprise Development Facility (SEDF) has helped the country's SME garment manufacturers find new buyers in Canada–which agreed in late 2003 to drop all trade barriers on Bangladeshi apparel imports. SEDF

partnered with the Canadian Manufacturers and Exporters Association to arrange trade fairs in Montreal and Toronto. As a result, industry leaders expect garment exports to Canada to double, reaching USD 300 million in 2005 (IFC 2004b).

[21] http://nation.ittefaq.com/artman/publish/article_20001.shtml.

[22] Asia and Pacific Centre for Transfer of Technology: http://www.apctt.org/.

[23] See study by Carana Corporation, Information Technology Enabled Services (ITES) – Bangladesh for detailed interventions.

[24] http://www.wigsat.org/cswhuyer.pdf.

[25] Nua Internet Survey May 24, 2002: Non-English speakers outnumber native English speakers when it comes to using the Internet, according to new research from Global Reach. Around 59.8 percent of the total world online population is from non-English speaking zones, compared to 40.2 percent from English speaking zones. Spanish is the number one European language for non-English speaking Internet users. Internet users from Asian speaking zones account for 25.8 percent of the total world online population. This is equivalent to 146.2 million Internet users. Chinese is the number one language in the Asian-speaking zone with around 55.5 million Chinese speakers use the Internet, compared to 52.1 million Japanese speakers, and 25.2 million Korean.

[26] In a training program with women in Lithuania, participants were astonished to find several informational and e-commerce websites in Lithuanian (many of them Canadian), and were able to observe first hand the selling price for certain traditional art pieces. This encouraged them to put up their own information and price their own art and crafts to meet the competition. Networked Intelligence for Development training program, 2000.

[27] http://www.bccbd.org/html/itpolicy.htm.

[28] http://www.unifem.org.in/bridging_the_gender/Chapter2.pdf.

[29] http://www.itdg.org/?id=womens_voices2.

[30] According to Women's World Banking, to reach just 10 percent of the low-income entrepreneurs by 2025 requires about USD 12.5 billion. To reach a target population of about 180 million low-income entrepreneurs by 2025 would require about USD 90 billion. http://www.swwb.org/.

[31] The Loan Performer software developed in Uganda, http://www.loanperformer.com, has grown to service some seventy MFI institutions around the world. Various software packages are contributing to the increase in efficiency of many MFIs. HISAAB, for example, is group-level microfinance software designed for illiterate and uneducated users. The software is used to document transactions, and allows for more macro-level analysis of lending patterns, cash flows, and repayments. Other software features include the ability to record meeting attendance and savings/credit account transactions, and to exchange data with the central bank office. Cooptions Technologies has developed a software package, Pax@2000, which will computerize the activities of cooperative lending societies and micro-lending banks. The software features online disbursals, data transfer to managing banks, savings/credit account modules, and financial accounting systems. Another, Microfinancer MATRIX, is designed for large micro-lenders. It links the head office to branch offices, and also has built-in accounting and evaluation capabilities.

[32] This refers to technologies that measure and analyze human physical and behavioral characteristics for authentication purposes. Examples of mostly physical characteristics include fingerprints, eye retinas and irises, facial patterns and hand measurements, while examples of mostly behavioral characteristics include signature, gait and typing patterns.

[33] A new effort to explore such cooperative approaches, and the ICT tools to make them possible, is the Micro-development Finance Group (MFG), an initiative convened by technology giant Hewlett-Packard. The MFG is developing new "end-to-end" technology solutions for microfinance as well as new organizational forms that could increase cooperative efforts such as credit bureaus or pooling loans across many MFIs to access capital markets.

[34] E-government refers to the use by government agencies of information technologies that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions. Traditionally, the interaction between a citizen or business and a government agency took place in a government office. With emerging

information and communication technologies it is possible to locate service centers closer to the clients. Such centers may consist of an unattended kiosk in the government agency, a service kiosk located close to the client, or the use of a personal computer in the home or office.

Selection of Web-Based Resources for Further Information

Asian and Pacific Center for Transfer of Technology
http://www.apctt.org/

ELDIS ICT for Development
http://incommunicado.info/aggregator/sources/22

Women's ICT-Based Enterprise for Development project
http://www.womenictenterprise.org

CEDEFOP: Generic ICT Skills Profiles
http://www.career-space.com/downloads/allprofiles_2205_EN.pdf

Gender Evaluation Methodology for Women and ICTs—A Learning Tool for Change and Empowerment
http://www.apcwomen.org/gem/index.htm

National Institute for Women in Trades, Technology and Science
http://www.iwitts.com

International Telecommunications Task Force on Gender Issues
http://www.itu.int/ITU-D/gender/

Development Gateway
http://topics.developmentgateway.org/ict

USAID ICT projects inventory
http://www.dec.org/partners/ict/ICTsearch.cfm

Bibliography

Alteri, Giovanna, Bertin, Imogen and Huws, Ursula. 2002. Call Center Employment in Europe: Some Interim Results from the TOSCA Project. Brussels. http://www.janus-eu.org/Documents/EBEW/Call%20Centre%20Employment.pdf.

Asian Development Bank. 2004. Bangladesh: Gender, Poverty, and the Millennium Development Goals, Country Gender Strategy. Bangladesh Resident Mission and Regional and Sustainable Development Department.

2004. Asian Development Bank Annual Report. Singapore. http://www.adb.org/Documents/Reports/Annual_Report/2004/default.asp.

Balasubramaniam, Ramnath, and Padhi, Asutosh. 2005. The next wave in US off-shoring. The McKinsey Quarterly 2005, No. 1.

Bridges.org. 2004. The Eight Habits of Highly Effective ICT-Enabled Development Initiatives. South Africa. http://www.bridges.org.our_approach/eight_habits.html.

Brisco, Rosemary. 2000. Turning Analog Women into a Digital Work Force: Plugging Women into the Asia-Pacific Economy. White Paper presented at the World Economic Forum, Asia Pacific Economic Summit, September 11-13, 2000. http://www.totheweb.com/pdfs/Digital_Divide_White_Paper.pdf.

Burjorjee, Deena, Deshpande, Rani and Weidemann, Joan. 2002. Supporting Women's Livelihoods: Micro Finance that Works for the Majority – a Guide to Best Practices. United Nations Capital Development Fund (UNDCF). New York. http://www.uncdf.org/english/microfinance/documents_and_reports/thematic_papers/gender/supporting/supporting.pdf.

Carana Corporation. 2002. Information Technology Enabled Services (ITES) – Bangladesh: Elements of a National Strategy for Development of an Information Technology Enables Services Sector in Bangladesh. Arlington.

Cecchini, Simone and Scott, Christopher. 2003. Can Information and Communication Technology Applications Contribute to Poverty Reduction? Lessons from Rural India. United Nations. http://www.developmentgateway.org/download/181634/cecchini_scott_ICT.pdf.

Chen, Derek H. 2004. Gender Equality and Economic Development: the Role for Information and Communication Technologies. World Bank Policy Research Paper 3285. Washington, D.C. http://info.worldbank.org/etools/docs/library/117321/35079_wps3285.pdf

Economic and Social Commission for Asia and the Pacific. 2000. Improving the Status of Women in Poverty. A Comparative Study on Women's Status in Poverty in Bangladesh, Malaysia, India and the Philippines. New York: United Nations.

2002. Issues, Policies and Outcomes: Are ICT Policies Addressing Gender Equality? New York: United Nations.

Faulkner, Wendy. 2004. Strategies of Inclusion: Gender and the Information Society. Final Report. SIGIS Project. Edinburgh. http:///www.sigis-ist.org.

Food and Agriculture Organization of the United Nations (FAO). 2000. The Role of Information and Communication Technologies in Rural Development and Food Security. Rome. http://www.fao.org/sd/Cddirect/Cdre0055.htm.

Garton, Andrew and Morrison, Bruce. 2004. Network Learning in Bangladesh, Consultancy Report. Community Communications Online. Australia. http://www.c2o.org/reports/Report_Network_Learning_Bangladesh.pdf.

Government of Bangladesh. 2004. IMF Country Report No. 04/279, Poverty Reduction Strategy Paper (PRSP). Development of ICT for Growth and Poverty Reduction. http://www.imf.org/external/pubs/ft/scr/2004/cr04279.pdf.

2002. PRSP. Bangladesh: A National Strategy for Economic Growth and Poverty Reduction (Annex 7). Economic Relations Division, Ministry of Finance. http://www.bangladesh-bank.org.

2002. National Information and Communication Technology (ICT) Policy. Ministry of Science and Information and Communication Technology. http://www.bccbd.org/html/itpolicy.htm.

Gurumuthy, Anita. 2004. Gender and ICTs: Overview Report. BRIDGE, Institute for Development Studies. Brighton: University of Sussex.

Hafkin, Nancy and Taggart, Nancy. 2001. Gender, Information Technology, and Developing Countries: An Analytic Study. Academy for Educational Development. Washington, D.C. http://www.aed.org/learnlink.

Hofstede, Gerry. 2002. Gender Best Practices and Quality of Business Development Services. ILO/SEED Third Annual Seminar on Business Development Services. September 9-13, 2002. Turin.

Huyett, William and Viguerie, S. Patrick. 2005. Extreme Competition. The McKinsey Quarterly 2005, No. 1. http://www.mckinsey.com/ideas/mck_quarterly/.

International Finance Corporation (IFC). 2004a. International Finance Corporation Annual Report: Adding Value to Private Sector Investment. Washington, D.C.

2004b. Regional Report for South Asia, Annual Report. Washington, D.C.

International Labour Organization (ILO). 2001a. Life at Work in the Information Economy. Geneva. http://www.ilo.org/public/english/support/publ/wer/overview.htm.

2001b. Labor Practices in the Footwear, Leather, Textiles and Clothing Industries. Report for Discussion at the Tripartite Meeting on Labor Practices in the Footwear, Leather, Textiles and Clothing Industries. October 16-20 2000. Geneva.

2004. Global Employment Trends for Women. Geneva. http://www.ilo.org/public/english/employment/strat/stratprod.htm.

International Telecommunication Union (ITU). 2004a. The Application of Information and Communication Technologies in the Least Developed Countries for Sustained Economic Growth. Geneva. http://www.itu.int/ITU-D/ldc/mauritius/publication.html.

2004b. Trend and Status of Gender Perspectives in the ICT Sector: Case Studies in Asia-Pacific Countries. Geneva. http://www.itu.int/ITU-D/asp/Publications/GenderPerspectives_in_ICTASP-Region.pdf.

IRIS Center at the University of Maryland. 2005a. ICT Sub Sector Study in Bangladesh. College Park.

2005b. Community Impact Assessment of CISCO Networking Academy Program's Gender Initiative in Bangladesh. Bangladesh.

Islamic Development Bank. 2004. Guideline for a National IT Strategy. Dubai.

IT Research Cell (ITRC). 2000. Research Brief, E-commerce in Bangladesh: A Readiness Assessment. Bangladesh. http://www.itrc.techbangla.org/report1/economy.htm.

Japan Bank for International Cooperation (JBIC). 2002. Bangladesh Education Sector Overview Final Report. JBIC Sector Study. Tokyo.

Jhabvala, R. and Tate, J. 2002. "Globalization and Economic Reform as Seen from the Ground: SEWA's Experiences in India". Paper presented to the Indian Economy Conference, Cornell University, 19-20 April. Cited in Chen, M.A., Vanek, J. and Carr, M. 2004. Mainstreaming Informal Employment and Gender in Poverty Reduction: A handbook for policy-makers and other stakeholders. London.

Kabeer, Naila. 2003. Gender Mainstreaming in Poverty Eradication and the Millennium Development Goals. The Commonwealth Secretariat, the International Development Research Center, and the Canadian International Development Agency. London.

McKinsey Global Institute. 2005. The Emerging Global Labour Market. http://www.mckinsey.com/mgi/publications/emerginggloballabormarket/index.asp.

Mitter, Swasti. 2002. Offshore Outsourcing of Information Technology Services. The World Bank. Washington, D.C. http://www.developmentgateway.org.

Navas-Sabater, Juan, Dymond, Andrew and Juntunen, Niina. 2002. Telecommunications and Information Services for the Poor: Toward a strategy for Universal Access, World Bank Discussion Paper No. 432. Washington, D.C.

Nazneen, Sohela. 2004. Gender Relations in Bangladesh: The Household and Beyond Dowry, Women's Property Rights and *Salish* - A Literature Review. CARE Bangladesh. http://www.carebd.org/Gender%20Relations%20in%20Bangladesh.pdf.

Nichols Marcucci, Pamela. 2001. Series on Women's Entrepreneurship Development and Gender in Enterprises: WEDGE Jobs, Gender and Small Enterprises in Africa and Asia: Lessons Drawn from Bangladesh, the Philippines, Tunisia and Zimbabwe. SEED Working Paper No. 18, International Labour Organization. Geneva. http://www.ilo.org/dyn/empent/docs/F2087744639/WP18-2001.pdf.

One World South Asia. March-April 2005. Mainstreaming ICTs: Rural Livelihoods – the Key to Development. New Delhi. http://www.dgroups.org/groups/oneworld/OneWorldSA/docs/mict_march_april_2005.pdf

Pichappan, P. 2003. Toward Optimizing Mobility in ICT Sector to Create International Paradox and Gender Balance. Chennai.

Ranis, Gustav, Stewart, Frances and Ramirez, Alejandro. 2000. Economic Growth and Human Development. *World Development* Vol. 28, No. 2. Great Britain.

Salway, Sarah, Jesmin, Sonia, and Rahman, Shahana. 2005. *Women's Employment in Urban Bangladesh: A Challenge to Gender Identity?* Development and Change. Vol. 36 Issue 2 Page 317 March 2005. The Hague.

Schilderman, Theo. 2002. Strengthening the Knowledge and Information Systems of the Urban Poor. Intermediate Technology Development Group (ITDG). http://www.itdg.org/docs/shelter/kis_urban_poor_report_march2002.doc.

Slater, Don, and Tacchi, Jo. 2004. Profiles and Experiences in ICT Innovation for Poverty Reduction. United Nations Educational, Scientific and Cultural Organization (UNESCO): New Delhi.

Tandon, Nidhi. 1998. Barriers to Information and Communication Technologies Encountered by Women in Asia, Consultancy Report. The Commonwealth of Learning. Vancouver.

Tandon, Nidhi. 2005. Information and Communication Technologies in Bangladesh – Trends, Opportunities and Future Options for Women Workers: Support for a Gender Strategy. Networked Intelligence for Development. Toronto.

United Nations Capital Development Fund (UNCDF). 2002. Supporting Women's Livelihoods: Micro Finance that Works for the Majority – a Guide to Best Practices. New York. http://www.uncdf.org/sum/reports/gender/supporting/index.html.

United Nations Conference on Trade and Development (UNCTAD). 2001. E-commerce and Development Report. New York and Geneva.

2002. E-commerce and Development Report. United Nations Conference on Trade and Development. New York and Geneva.

United Nations Development Programme (UNDP). 2001. Human Development Report 2001: Making new technologies work for human development. New York. http://hdr.undp.org/reports/global/2001/en/

United States Agency for International Development (USAID). 2004. Information and Communication Technology for Development: USAID's Worldwide Program. Bureau for Economic Growth, Agriculture and Trade. Washington, D.C.

UNIFEM and CIDA-SEAGEP. 1998. Women in the Global Economy: challenge and opportunity in the current Asian Economic Crisis. Joint effort of the United Nations Development Fund for Women, UNIFEM, and the Canadian International Development Agency-Southeast Asia Gender Equity Program, CIDA-SEAGEP. Bangkok.

Valenzuela, Maria Elena. 2003. The Incorporation of Gender in Employment and Anti-Poverty Policies: Challenges for the Future. GPE Guide Series, Discussion Paper, International Labor Organization. Geneva.

Wanasundera, Leelangi. 2005. Expanding Women's Capacities through Access to ICT: An Overview from Sri Lanka. Paper presented at Gender Perspectives on the Information Society South Asia Pre-WSIS Seminar. Bangalore.

Warschauer, Mark. 2003. Technology and Social Inclusion: Rethinking the Digital Divide. MIT Press. February 2003.

White, Marceline. 2005. Gender Training Handbook: Integrating Gender into Trade and Economic Growth Programs and Analysis. United States Agency for International Development (USAID), Washington, D.C.

World Bank and Bangladesh Centre for Advanced Studies. 1998. Bangladesh 2020: A Long-Run Perspective Study. Washington, D.C.

World Bank. 2002a. Information and Communication Technologies: A World Bank Group Strategy. Washington, D.C.

2002b. Global Economic Prospects, Making Trade Work for the World's Poor. Washington, D.C.

2003. Country Assistance Strategy Progress Report for the People's Republic of Bangladesh. Washington, D.C.

2004. Engendering Information and Communication Technologies: Challenges and Opportunities for Gender-Equitable Development. Washington, D.C.

Yusuf, Shahid, and Evenett, Simon. 2002. Can East Asia Compete? Innovation for Global Markets. Co-publication of the World Bank and Oxford University Press. Washington, D.C.

Annex I: Integrating Gender Concerns into ICT Planning

ICT dimension and factor of change	**Connectivity and Communication** change economic and social organizations: • Access points for connectivity • Networking values • Channels of advocacy • Interest representation to policy makers • Training modes and methods • Mobile telephony	**Computing and Applications Management** change the way business and information management are practiced: • Smart cards • Software support services • Financial and accounting packages • Inventory stock • Revenue forecasting • Simplifying applications • Micro credit applications	**Commerce** changes traditional modes of production and distribution: • Virtual malls /commercial sites • Cooperative producers/retailers • New delivery mechanisms • New economic activities and services
Solutions and points of intervention	• Public and private access points need to be established where women naturally congregate (e.g. health clinics, places of worship, rural libraries, and local markets). • As ICTs become more portable, decentralize their location within local knowledge systems to ensure widespread access among women. • Build upon women's peer group networks to advance virtual or cooperative networks around ICT use. • Support the creation and exchange of local relevant content by and for women. • Using women-specific support groups and networks can promote more effective interest representation to policy makers. • Training methods need to be women-targeted and made	• As women become more familiar with ICT uses for communication, they can facilitate dialogues at training workshops on computing and other application needs. • Women's indigenous knowledge needs to be valued and made accessible to both local and wider communities through ICT applications and databases with appropriate IPR safeguards. • With more connectivity access, simple computing applications, such as micro-credit programs, are better tapped into by women. • Promote the use of ICT applications for personal banking; they can promote accountability, transparency and privacy, which could give women more control over information and resources. • Women want to learn about financial,	• Use e-commerce channels to sell products and services developed and offered by women. • Women can be clustered together as cooperative producers/retailers to produce standardized and high-quantity products for domestic and international market Internet sales. • New income opportunities may arise in ICT service sectors, including local sourcing, providing opportunities for women employees. • Entirely new kinds of economic activities and services to support the ICT sector continue to develop and should be geared to employ women.

	available to women at times convenient to their responsibilities. • Use different modes of distance and interactive learning to supplement formal ICT learning.	inventory, accounting packages, and other small business applications. Training and business support services need to develop their service outreach to clients. • Support women's need to access and compile information on employment opportunities, business information and other comparative data.	

Annex II: Gender Summary Profile in Bangladesh

http://genderstats.worldbank.org/home.asp

	Bangladesh				South Asia		Low income	
	1980	**1990**	**1995**	**2000**	**1980**	**2000**	**1980**	**2000**
GNP per capita (US$)	210	280	330	380	260	440	350	410
Population								
Total (millions)	85.4	110.0	120.1	131.1	901.3	1,354.2	1,561.8	2,406.5
Female (% of total)	47.9	48.2	48.3	49.6	48.2	48.5	49.1	49.3
Life expectancy at birth (years)								
Male	49	55	58	61	54	62	52	58
Female	48	55	59	62	53	63	53	60
Adult illiteracy rate (% of people aged 15+)								
Male	60.0	55.7	53.2	50.6	47.6	34.2	43.7	29.4
Female	82.8	76.3	73.1	69.8	74.8	57.3	67.9	48.5
LABOR FORCE PARTICIPATION								
Total labor force (millions)	40	51	59	69	389	602	683	1,088
Labor force, female (% of total labor force)	42	42	42	42	34	33	37	38
Unemployment								
Total (% of total labor force)	..	1.9	*2.5*	3.3	..	..	..	..
Female (% of female labor force)	..	1.9	*2.3*	3.3	..	..	..	..
EDUCATION ACCESS AND ATTAINMENT								
Net primary school enrollment rate								
Male	..	68	..	87	..	88	..	85
Female	..	60	..	88	..	75	..	74
Progression to grade 5 (% of cohort)								
Male	18	..	..	63	..	*59*	..	*66*
Female	26	..	..	68	..	*61*	..	*68*
Primary completion rates (% of relevant age group)								
Male	..	..	..	*76*	..	*84*	..	*79*
Female	..	..	..	*78*	..	*71*	..	*68*
Youth illiteracy Rate (% of people aged 15-24)								

aged 15-24)								
Male	55.3	49.3	46.4	43.3	36.0	23.7	31.2	19.1
Female	74.1	66.8	63.7	60.3	61.1	40.6	52.4	31.6

Annex III: ICT Profile in Bangladesh

http://www.apdip.net/projects/dig-rev/info/bd

Total population	138.23 million[1]
Rural population as a percentage of total population	76% (estimated)
Literacy in the national language(s)	56%
Computer ownership per 100 inhabitants	0.78[2]
Telephone lines per 100 inhabitants	4.64[3]
Internet hosts per 10,000 inhabitants	0.015 (estimated)
Internet users per 10,000 inhabitants	19.04
Internet cafés/telecentres per 10,000 inhabitants	0.19 (estimated)
Internet users per 10,000 inhabitants	19.04
Cell phone subscribers per 100 inhabitants	3.91[3]
Number of websites in the national language(s)	200 (estimated)
Number of websites in English and other language(s)	600 (estimated) [4]
National bandwidth within the country	68 Mbps (data) (estimated)
National bandwidth to and from the country	112 Mbps (estimated)

Key Facts

- A computer (Pentium 4 or equivalent with > 128 MB of RAM) can be purchased will full accessories in Dhaka and other cities for approximately Tk 28,000 (USD 451) for a clone computer, and about Tk 55,000-70,000 (USD 890 to USD 1,130) for a name brand computer.
- Internet connections can be purchased with the computer and are billed on a per-minute basis. Costs, at the time of writing, are Tk 0.50 per minute (USD 0.008) and normally drop lower during off-peak hours.
- Typical commercial cyber cafes use a dial-up Linux computer with a PPP connection, a wireless connection to a nearby ISP, or a wireless client using nearby transceivers/access points and an internal local area network serving 5-10 computers.
- For "always-on access" the typical rates are Tk 800-1,000 per month (USD 13-16).

Notes:

1. Total Population: 138,226,485. Source: Bangladesh Bureau of Statistics.
2. ITU Estimate, 2003.
3. Number of Telephone: Fixed - 1,007,450, Cell - 5,413,800, Total - 6,421,250 (as on 9 May 2005).
Source: Bangladesh Telecommunication Regulatory Commission.
4. The number of website registered with dot bd authority as on 30 April 2005. In Bangladesh, dot bd is
not popular. Businesses and government agencies tend to use dot com and dot org domains.

Annex IV: USAID Brief—Women In Technology (WIT) Scholarship Program in Bangladesh

http://www.iie.org/wcoast/wit.html

Although Bangladesh has been very successful in the recruitment of new students, it has one of the lowest female student participation rates in the Academy Program. To combat the challenge of low female enrollment, and help academies to realize demand and assist with specific recruitment strategies, Cisco, USAID, and the Institute of International Education (IIE) have partnered in the *Women In Technology Scholarship Program* to include more women in the Cisco Networking Academy Program in Bangladesh. WIT is a comprehensive professional development and capacity building initiative designed to equip women with cutting-edge ICT skills and provide them with the training and support for careers in the ICT sector. Selection is based on financial need as well as each applicant's potential to contribute to the field of ICT, and her interest in serving as a mentor to other women and girls in the field of ICT.

Upon the application deadline in Bangladesh in February 2004, a total of 341 applications were received by interested female applicants, proving demand exists in Bangladesh. In July 2004, WIT, sponsored by USAID and administered by IIE, awarded 125 scholarships to women to attend five Academies in Bangladesh:

- Ahsanullah University of Science and Technology (AUST), Dhaka
- Shahjahal University of Science and Technology (SUST), Sylhet
- Chittagong University of Engineering & Technology (CUET), Chittagong
- Rajshahi University of Engineering & Technology (RUET), Rajshahi
- American International University Bangladesh (AIUB), Dhaka

March 2004 CNAP Bangladesh Statistics (prior to WIT Program)

SUMMARY STATISTICS	As of March 2004				
Academies in Bangladesh:	9	Confirmed number of female:	68	Instructors Trained:	26
Participating Students:	646	Gender Percentage:	10.5%	Female Instructors:	0
CCNA Graduates:	77				

March 2005 CNAP Bangladesh Statistics (during WIT Program)

SUMMARY STATISTICS	As of March 2005				
Academies in Bangladesh:	9	Confirmed number of female:	178	Instructors Trained:	50
Participating Students:	685	Gender Percentage:	26.0%	Female Instructors:	5
CCNA Graduates:	295				

Since the launch of the WIT Program in Bangladesh, the average number of women enrolled in the Academy Program has increased from 10.5 percent to a notable 26 percent. Data shows that over the past year there are on average 100 more women enrolled per semester at Academies in Bangladesh who are receiving valuable ICT skills

training. Also to note, since March 2004, there has been a 10 percent increase in the number of female instructors teaching the CCNA course in the Academy Program in Bangladesh.

SUMMARY STATISTICS—WIT Scholarship Program in Asia
Bangladesh: 5 Academies   125 scholarships
Nepal: 3 Academies   150 scholarships
Mongolia: 1 Academy   25 scholarships
Sri Lanka: 2 Academies   75 scholarships

WIT PARTICIPANT QUOTES

"Ours is a very poor country, here the women are very much neglected. The WIT program brings opportunities to women to change their lives and be independent."
American International University of Bangladesh (AIUB)

"Now I will be able to stand as a role model for the ICT sector as a woman and it will inspire other women to get involved in the ICT sector."
Chittagong University of Engineering and Technology (CUET)

"I think that if I can be trained properly, I will be able to do many things for my community such as open a computer learning academy in my village only for poor women. It's my dream."
Sylhet University of Engineering and Technology (SUST)

WIT students practicing lab exercises at the American International University of Bangladesh Academy

"This is a great way to help expand the benefits for women in the world. As an affluent nation, the US government has done a great job by choosing to provide this scholarship for women in underdeveloped countries."
Ahsanullah University of Science and Technology (AUST)

"Women benefit from the program and are able to build up their professional career which will be effective for the society. Poverty, terrorism and fundamentalism reduce rapidly."
American International University of Bangladesh (AIUB)

"Encouraging women with this scholarship is a blessing for a country like Bangladesh. I hope it continues."
Chittagong University of Engineering and Technology (CUET)

Annex V: Detailed Recommendations by USAID SO

SO: Expanded economic opportunities through equitable growth		
Program Components	**Gender priority for action**	**ICT and ICT-related recommendations**
Increase private sector growth	In order to make recommendations on how to strengthen women's MSME's, an overview of the policy and socio-cultural environment in which women entrepreneurs operate is essential. Support the membership and networking of business organizations and associations to ensure women are equally represented. Studies show[35] that male entrepreneurs are four times more likely to be members of employer's organizations, chambers of commerce and small enterprise associations. Women are frequently more reticent or unable to take the time to seek counseling and business advice. Women entrepreneurs are also less able to express their voice through decision-making bodies or processes, and are generally excluded from representative associations of employers. Creating the space to foster dialogue between women entrepreneurs and representatives from financial intermediary services, ISPs, and local government and ICT policy-makers is critical. This space should complement training activities that specifically cater to women's ICT needs. Support e-government applications for business-government transactions that specifically target women-owned enterprises and associations of women entrepreneurs.	• Conduct ICTs need surveys amongst women-owned MSMEs, support research and analysis of women-led enterprises, their capacity building needs, access to market information and uses of ICTs. • Design and conduct training outreach workshops that enable businesswomen to introduce ICTs into their information and marketing activities. • Identify support services that would help to ensure women participate in literacy activities, ICT skills training and decision-making. • Work with business support providers to introduce web-based ICT platforms which complement their existing services. • Support ICT-related services targeted at women, catering to their needs and strategic interests, by providing women-only training sessions and incentive packages for women-owned MSMEs. • Support new alliances and networks that encourage businesswomen to participate in the decisions around business services and networks. • Support ICT integration with programs that increase women's access to credit and savings instruments. • Encourage and recruit women ICT professionals as trainers who can train and form a

	Women need improved access to technical training and constant skills upgrading to add value to their status in the digital workforce. Women also need updated information on employment opportunities and the skills required to work within the private sector. Support the introduction and training of e-commerce tools for women. Where e-commerce is a viable channel for women to export their products and services, women often do not have direct interaction with ICTs. They produce crafts which are sold over the Net by middle agents. It is more empowering if women learn ICTs themselves. As their confidence in ICT use grows, they are more likely to meet the criteria for job-placement centers in the wider ICT sector.	network of female ICT trainers. • Vocational advisors and counseling institutions should raise women's awareness of possible connections between their work experiences and qualifications with potential ICT employment, and how to integrate ICT into their activities. • Support policy dialogue to extend equal pay to all areas of employment, especially those jobs that have a technical or ICT component • Promote private/public partnerships and incentives that introduce ICT platforms for women in sector-specific situations, e.g. in the medical and health field, in rural markets, in agro-industry, in the garment export industry, and in export processing zones (EPZs). • As women's skills need upgrading, design training content that builds applied computing into cross-disciplinary skills. • Establish ICT access centers in rural areas and in urban areas where women frequent such as women's bookstores, community centers, hair salons, or health clinics. • Policy advocacy to reduce the costs of licenses for low-income business owners, particularly women-owned businesses (could be offset by fees collected). • Conduct training initiatives to assist rural and poor men and women to create their own Internet content, use the computer for networking, advocacy, pricing and market information (e.g. web portals, business information, advocacy networking, etc.).

		- Establish links with other entrepreneurs who can use women's goods for their product (e.g. cashews for cashew butter maker). Help women establish contract for their goods. - Foster linkages with large chains that can contract with women exporters and provide guaranteed market and distribution channels.
Improve access to economic and social infrastructure	Ensure women's access to information. RCBOs are becoming increasingly information poor compared to organizations operated from Dhaka or major district towns. Although RCBOs often have telephone facilities, and sometimes computers, they tend to lack the technical knowledge to maximize their potential. There is also a serious lack of information relevant to their members, especially content that is presented in a format understood by villagers, many of whom are illiterate. Women are increasingly excluded from information published on websites by institutions such as donors and Government. ICT applications that enable the efficient and economic delivery of services, such as tele-medicine, distance learning applications, hand-held technologies for a range of information and data exchange, and micro-credit and loan services, should meet the specific strategic needs and interests of women in both rural and urban contexts.	- Promote the establishment of rural women-only stores which would have a connected computer terminal and a dedicated trainer able to provide basic computer use skills to enable women to explore information. - Bring applied and basic computer training to women working in the garment industry, or encourage women's access to computer training in the banking sector. - Where possible, involve local Muslim clergy *mouvli* in providing Internet access within the mosque where women have a separate space. - Develop basic reliable information systems from the ground up. Begin the development of rural based databases using simple software that will enable farmers to track changes, or to search relevant information, and monitor results through continuous consultation with farmers. - Provide participatory training opportunities that enable farmers and rural communities to bring their traditional communications to applied technologies.

		• Support the development of local information by working with local chambers of commerce and business intermediary agencies to develop current data and content on business development, market information and support services specifically for women. • Provide business development service training on ICT and other avenues for women to gain greater access to market and pricing information. • PRA or other stakeholder analysis on what the needs are in the community for ICT – develop content based on needs assessment.
Improve quality of workforce	Gender disparities continue to work against women's remuneration levels, conditions of work and overall economic empowerment. Women must be able to articulate their information needs and be empowered to access and use information for their current and future employment needs. Job-placement centers should consider the trainability of women workers who have been displaced from other sectors for possible employment opportunities within the ICT sector.	• As the garment industry upgrades and computerizes its manufacturing and marketing processes, position women to take advantage of applied training in computerization. This training will afford women more mobility between jobs as basic ICT functions become applicable in other sectors over time. • Develop participatory and dynamic methods of training that offer women-only courses and use certified ICT training tailored to their needs. • Hold trainings and courses at times and locations that account for women's security concerns and their need to balance paid and domestic responsibilities. • Make basic digital literacy training for workers an investment priority for human resource development in EPZs and in the domestic production sectors. • Promote basic ICT training courses that demystify the technology and tools. These

		kinds of simple courses can be offered by industry, by ISPs, and by other forms of tele-center models as part of vocational training for women. • Hire women to work as ICT trainers for other women. • Develop special ICT initiatives to train women, including those displaced from other sectors. • Include complementary interventions with trainings such as job placement assistance, workforce development skills (hard and soft) and other ancillary services (banking for the poor, small "bridge" loan program, etc.).
Improve economic policy and governance	While digital government services (such as land title provision) or other programs could be extended to incorporate other social services, an outreach infrastructure needs to be in place that women can easily access. This means that physical access, control and mobility issues, and concerns about illiteracy, language and content, must all be considered to ensure that e-governance actually reaches women.	• Facilitate stakeholder workshops between government officials, local government representatives, and community organizations to ensure information flows. Provide women's groups with the space to voice their concerns, information needs, and service interests. • Policy advocacy to establish a telecommunications development fund created from carrier fees to promote greater awareness. • Regulatory reform work to ensure continued affordability and accessibility of services. • Consider adding Internet service to existing telecenters. • Advocate for policy reforms such as the development of incentive programs to increase access, as well as pricing policies to stimulate expansion. • Policy advocacy to reform tax licensing policies, zoning requirements, access to credit, government procurement, etc. • Use ICT to monitor labor standards, disseminate information on violations.

		• Use ICT to track human rights violations (e.g. camera phones and video). • Establish web portals and email groups to facilitate rights-based group information exchanges. • Promote use of ICT (camera phones/videos) to monitor elections and reporting of problems. • Use radio/mobile telephones to disseminate election results. • Consider ICT use to improve management and administrative capacity of local government. • Use ICT (databases, PDAs, GIS) for natural resource management. • Use low-tech knowledge management systems to allow women (who are usually responsible for procuring water) to record data from water quality monitoring to allow participatory monitoring and evaluation. • Use ICTs to provide information on fair market value and market linkages for fuelwood, fodder or other forest products • Develop community based websites to track community decisions made on resource allocation and preservation.

SO: A better educated, healthier and more productive population

Program Components	Gender priority for action	ICT and ICT-related recommendations
Improve quality of basic education	Some rural villages have low educational enrollment rates, often as low as 20%. Repetition and dropout rates remain high, especially for children living in poverty and children from minority families. Teachers are poorly trained and paid. Teaching methods and materials are generally sub-standard.	• Establish systematic and comprehensive collection of sex-disaggregated data on ICT labour force trends, current education and employment/education gaps. • Introduce nation-wide ICT training for teachers (course content and teaching methods) at informal, primary, secondary and tertiary levels, to build a portfolio of ICT trainers in the

		country.
		• Promote broad awareness of the requirement for and benefits of literacy, knowledge, and an ICT-literate society through the use of traditional media and public service announcements.
		• Improve the image of ICTs, particularly amongst girls, through school programs, career fairs for girls, and public media images and outreach.
		• Scale up and support existing community and rural-based initiatives that provide basic ICT skills to children, youth and adults.
		• Launch and education campaign on the benefits of computer education and how women and girls could use the skills for a variety of careers.
		• Develop curriculum on experiential application of ICT, which studies show appeals more to girls.
		• Use ICT (Internet, CDROM, spreadsheets, and other tools) to increase educational management.
		• Use of CDROMs and other material to reduce the costs of textbooks and increase access to new information and materials for learners.
		• Promote alternative learning opportunities such as radio learning.
Reduce unintended pregnancy and improve healthy reproductive behavior		• Launch education campaigns
		• Develop low-literacy CDROMS to inform patients on preventative health measures, health, maternal and child health, and other conditions/care.
		• Train women to be health care promoters who could visit other rural women and provide information, advice, and over-the-counter medications.

		Promoters could use PDAs to enter data and records about the patient on the spot which a doctor or nurse could review and prescribe any additional medication or treatment.
Improve child and maternal health and nutrition	Only one in four women receive three or more antenatal visits during her pregnancy, and a vast majority of women give birth without a trained birth attendant. In recent years, infant mortality has not changed due to stagnation of the neonatal death rate, which now accounts for two-thirds of all infant deaths. Reducing neonatal mortality has become an emerging challenge.	• Establish outpatient centers in rural areas. Increase use of ICT such as telediagnosis, imagery and treatment. Include these facilities as additions to basic health care infrastructure. • Develop ICT tools within village telecenters to provide medical information/reproductive health information to patients. • Distribute personal data assistants (PDAs) that rural physicians can use to store medical information, email others for advice, etc. • Develop patient/medical information for patients to use online. • Develop Internet medical centers to provide rural and urban doctors in developing countries with the latest medical developments.
Reduce transmission and impact of HIV/AIDS and infectious diseases	HIV/AIDS infection rate remains low in the general population, yet for certain high risk groups, the infection rate is rapidly increasing.	• Use ICT to develop web portals for women to connect to others to form online support groups. • Promote the use of radio for educational awareness campaigns.
SO: Improved food security and disaster mitigation, preparedness and relief		
Improve emergency preparedness and disaster mitigation	Seasonal monsoons are an annual event. The landless and near landless are often forced to adapt to limited assets for survival.	• Develop community-based plan for using ICT to meet community's emergency evacuation plan. • Use ICT (radio) to disseminate weather forecasts and flood warnings, and information on flood proofing.
Provide emergency assistance		• Use ICT to track supplies and dissemination of disaster relief supplies and recipients.