INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTS) FOR WOMEN IN AGRICULTURE

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ABSTRACT

There has been world-wide recognition of the importance of ICTs as tools to promote women's empowerment, rights and dignity and full participation in the information society by providing immense possibilities for enhancing women's participation in socio-economic and political development for poverty reduction, improve quality of life and achieve gender equality. There had been many successful applications of ICTs which included the internet and/or the gamut of technologies such as community radios, tele-centres, information kiosks, internet radio, mobile phones, Local Area Network and WAP applications for rural women all over the world and in the developing countries such as India (MSSRF's rural knowledge center in Pondicherry, the women SHGs in AndhraPradesh), Bangladesh (Grameen cell phones) Srilanka (the Kotmale internet-radio project) and Philippines (TESDA women center, Cyberbarangayan, WINNER projects). India, being an agrarian country, engages more than 70 percent of its population, and, 80 percent of the economically active women in agriculture. Of late there has been increased involvement of women in farm management owing to the migration of male family members to urban areas for employment. Therefore, the agriculture progress of the country largely depends upon providing timely and need based information to the women and men farmers spread across the various agro-ecological regions of the country. This can be achieved through the ICTs as they have tremendous potential and spatial advantage for sharing information sources and knowledge. Even in the professional front, there has been increased women participation in the National Agricultural Research, Education and Extension system. This human capital can gainfully employ ICTs to strengthen the professional and farm woman interface. One of the major recommendations of action as emerged from the nation wide research study and the national workshop held at NAARM, Hyderabad on 'Professional Women in Agriculture' is the knowledge networking among women in agriculture to satisfy information needs for efficient functioning. The present paper deals with the potential of ICTs and knowledge networking for gender mainstreaming in agriculture citing examples from India and abroad, the barriers for women and means to overcome the barriers in realizing the potential of the ICTs by building partnerships among the strategic stake holders.

INTRODUCTION

The importance of information and of technologies to transmit and disseminate information for development is well recognized. However, there has been little research done on women's information needs and access to appropriate information in developing countries. Information and Communication Technologies (ICT) are a diverse set of technological tools and resources to create, disseminate, store, bring value-addition and manage information. ICT does not include only the Internet but a gamut of other tools which could be used individually or in convergence with each other to catalyze the process of change in a manner which reduces the skew in knowledge distribution between rich and poor, educated and uneducated, rural and urban, and men and women. The convergence technologies include community radios, Internet radio, local area networks, tele-centres, information kiosks, mobile

phones, WAP applications etc. They often enhance the reach and penetration of the ICT.

Interestingly, ICT, when used as a broad tool for amalgamating local knowledge incubated by the communities with information existing in remote databases and in public domain, heralds the formation of a new class of society - the **Knowledge Society**. The one resource that liberates people from poverty and empowers them is knowledge. Knowledge thereby becomes the fundamental resource for all economic and developmental activities in the knowledge society of which women form an equal part. Possessing knowledge is empowering, while the lack of knowledge is debilitating. Knowledge and its widespread dissemination in an absorbable and usable form is therefore quintessence to initiate the change process for women's development. Viewed in this light, access to information can be seen as a central empowerment issue for women. It is now a well-understood fact that without progress towards the empowerment of women, any attempt to raise the quality of lives of people in developing countries would be incomplete. Women's needs with respect to ICTs, then, do not concern only access to education and training that will support their participation, but the social and policy acknowledgement that what women already do is technology, appropriate and worthy of recognition, and, further, an important resource for development. But, the 'information highway' is still predominantly male-oriented, and often a forum for gender discrimination, intimidation and even harassment. The profound, gendered implications of ICTs for both men and women in employment, education, training, and other productive and personal development areas of life mean that women need encouragement and support to take their place in the information revolution.

In the context of knowledge sphere, the issues of gender equality, equity and empowerment of women become even more significant as women have a strategic role in incubation and transfer of critical knowledge that often forms the blue print of survival for communities to adapt and minimize their risk in adverse circumstances. Therefore, it is essential that any knowledge sharing mechanism recognizes the value of knowledge possessed by women and provides space for value-addition and the amalgamation of women's knowledge in the global knowledge pool. This condition forms the basis of evolution of women as equal contributors and end-users of knowledge in a knowledge society that passes this knowledge through information and communication technology.

Empowerment of women through ICTs

Empowerment of women is understood as building the ability and skills of women to gain insight of actions and issues in the external environment which influence them, and to build their capacity to get involved and voice their concerns in external processes in order to make informed decisions. It entails building up capacities of women to overcome social and institutional barriers and strengthening

their participation in the economic and political processes for an overall improvement in the quality of their lives.

The need to use information and communication technology in empowering women can be understood in two ways. Access to information is the key for economic, social and political empowerment of women. ICT poses new forms of learning, education, and health services, livelihood options that would lead to the ultimate goal of women's empowerment. The second reason why ICT should be used for women's empowerment is because ICT have the potential to digitally link each and every woman in the world in a network, which opens up endless possibilities for information exchange. This mechanism could be used by women in creative ways, both to communicate with other people who are on-line, and also to disseminate information to people in the outside world who are not on-line through the use of convergence and hybrid technologies such as community e-mails, community radio broadcast, tele-centres, newsletters, videos etc. This mechanism forms the skeletal process through which women communities could overcome the constraints of marginalization and seclusion, mobilize resources and support, reach out new markets, and open up avenues for life-long learning.

Concept of Knowledge networking

The process of synthesis of knowledge possessed across communities, by men and women, with the global pool of knowledge with the scope for further enrichment lays the genesis for knowledge networking. Knowledge networking opens up a new way of interactive communication between government bodies, NGOs, academic and research institutions, and the civil society. It helps communities, both men and women, to take appropriate steps to recognize and document the knowledge they possess and in reflecting this knowledge in a wider social domain for directed change through the use of information and communication technologies.

Gender mainstreaming becomes a crosscutting theme in all these issues. There is an underlying need to shape the knowledge networks to deliver benefits to all segments of the population so that they are responsive to the poorest and the most disadvantaged communities, which include the women folk. It is significant to note that engendering of knowledge networks rests on an operational framework that values the contextual knowledge possessed by women and recognizes their capacity to take judicious action based on a given knowledge set. Surveys of women innovators in Kenya and the Philippines show that women's inventions tend to have direct application to improving family and community well being or increasing efficiency. Examples include a power tiller built to women's physical specifications and their agricultural practices, and a fireless cooker. Support of women's existing technology activities, recognition of their role as possessors of most of the indigenous knowledge in developing countries, and support of their potential for

contributions to community development therefore becomes one of the critical requirements for engendering knowledge networks.

Engendering of knowledge networks opens up avenues for women to freely articulate and share their experiences, concerns and knowledge with the possibilities of their further enrichment as the same pass through a gamut of network users. They are instrumental in helping women break from the stereotypical structures and narrow outlooks of the society and from the hegemony of male dominated societal structures. Other benefits include objective and targeted information flows, low communication costs, sharing of best practices and solutions, and opening up of alternate communication channels with women, hitherto unreached or under-serviced, and accomplish a deeper geographic penetration.

Through improved use of information and communication technologies, women can broaden the scope of their actions and address issues which were previously beyond their capacity. Engendering knowledge networks therefore bridges the knowledge gap existing between men and women, builds up awareness among the women communities and their representative leaders, and encourages their informed and active participation in areas which influence them. Knowledge networking models however need not be confined within the closed boundaries of information flows but have the potential to evolve as alternate institutional models for developmental promotion. A range of ICT- models have been used to support the empowerment of women all around the world. In Africa, groups such as the Africa Women's Network of the Association for Progressive Communications (APC) have conducted training workshop to support electronic networking among women's group. In Uganda, the Forum for Women in Democracy uses the Internet and e-mail to research issues for the country's female MPs, and Women's Net is a similar initiative in South Africa. Knowledge networking catalyses the process of women's empowerment as it is based on the mechanism of knowledge sharing and provides avenues for women to come together, build up consensus on issues that affect them and act strategically to maximize benefits through different approaches.

Knowledge networking in agriculture

It is the field of agriculture that knowledge networking through ICT is going to make a big difference in the life of women of the developing world. In India, 80% of the economically active women are engaged in agriculture. Although women play an important role in agriculture, they have little access to information to help them improve their productivity and increase their economic contribution. ICTs could provide women farmers, farm related information such as best package of practices, weather forecasting, access to credit, prices and availability of farm inputs, market information etc. Access to such information by women will facilitate participation of women farmers in decision-making process. In the recent past UNDP has started a

telecentre project in Ukraine, which helped women farmers to access vital information. This project applies information and communications technologies (ICTs) to agriculture and farm management in support of women farmers who identified lack of information and networking tools as the major obstacle in order to become successful entrepreneurs in a new market economy. In this project, women farmers will be provided with computers and Internet access in eight telecentres managed by the Council and will be trained in computer usage, which will help them, build capacity to achieve their business goals. In Philippines, the Techno Gabay programme run by the Philippine Council for Agriculture, Forestry and Natural Resources (PCARRD) under the Department of Science and Technology aims to develop modalities for delivering appropriate information and technologies for farmers in agriculture, forestry and natural resources sectors thru up-to-date information data bases installed in various Techno Pinoy centers.

In India too, Warna Wired Village Project in Maharashtra and Gyandoot Project in Madhya Pradesh are notable ones. Gyandoot is an intranet project in Dhar district of Madhya Pradesh in India, which connects 21 rural cyber cafes called Soochanalayas. Each Soochanalaya provides services to about 10 to 15 Gram Panchayats, 20 to 30 villages, 20 000 to 30 000 in population. The net covers five out of 13 Blocks in the district and three out of seven tahsils in the district. The Soochanalayas are located where people normally travel - on the roadside or the central villages. They together serve a population of over half a million. The services provided by it include stating farm gate prices of agricultural commodities, providing copies of land records, providing facilities to file applications for caste, income and domicile certificates, and landholder's passbook of land records and loans through e-mails. Women benefit from such interventions as now they have a greater understanding and control over the local processes. They may file complaints regarding common public grievances through the net and an e-mail reply is assured within seven days. These complaints include hand pump disorder, teacher absence, mid day meal sanction/disbursement, poor seed/fertilizer, etc. However, extent of women's participation in these projects needs to be reviewed. In contrast, Adakkal Project of Andhra Pradesh is involved with the women self-help groups wherein the capacity building of women is targeted by knowledge sharing on drought management through internet connectivity with ICRISAT and posting local agri-markets information on their website designed with local language interface.

Knowledge Networks in Employment of Women

As a result of the ICT, a high proportion of jobs outsourced by big firms are going to women. Women can now work as information intermediaries between internet and rural folk, who may be agricultural extension agents, or community workers to pass on useful information from internet to local people from anywhere and at anytime and raise that extra income to become more financially independent and

empowered. Recently, companies like Ford and General Electric have moved their back-end operations to Asia and employ a large number of women workers having basic information technology and data management skills. New areas of employment such as tele-marketing, medical transcription etc. have also opened up tremendous job opportunities for women. Interestingly, knowledge networking itself requires skilled and trained knowledge workers for disseminating value added information. Jobs such as kiosk operators in information kiosks also have started to go to women.

Knowledge Networking in Creating Entrepreneurship for Women

One of the most powerful applications of ICT is electronic commerce. This e-commerce in the context of women's empowerment refers not just to business transactions online but to the promotion of new class of IT savvy women entrepreneurs with adequate technical training. ICT is capable of influencing the entrepreneurial behavior of women by improving their innovativeness, decision making ability, access to various services and ability to co-ordinate various activities and people. In Mexico, two thirds of small scale women entrepreneurs use computers. In Guyana, a woman run organization, Rupumuni Weavers Society sold large hammocks from locally grown cotton over the Internet to people all over the world very successfully. The best known of the ICT enabled business story is perhaps that of Village Phone Programme in Bangladesh by Grameen Bank. The Bank promoted micro enterprises among women through a wholly owned subsidiary called Grameen Telecom, which enabled women to retail phone calls on their cellular phones, which could be bought with the help of loans from the bank itself. As of October, 2003,a total of 39,000 number of village phones are in operation in nearly 28, 000 villages of 58 districts in Bangladesh.

Significantly, a number of non-profit organizations have diversified their services to provide support to entrepreneur women. PEOPLink (http://www.peoplink.org/) is one such non-profit organization that has been helping women communities traditionally involved with handicrafts to put their products on-line in the world market. It is building up a global network of Trading Partners (TPs) that, in turn, will provide services to several community-based artisan producer groups. It equips the TPs with digital cameras and trains them to capture images and edit them in a compressed format suitable for transmission via the Internet. The images of the crafts are placed on the PEOPLink web-page and efforts are made to promote them to retail and wholesale buyers in the industrialized countries. Another project led by Technology Livelihood Development Centre (TLDC) in partnership with Technology Learning Resource center (TLRC) has been assisting women group in Nueva Vizcaya in Philippines integrating with Farmers Information Technology Services (FITS) for marketing their products and exporting to foreign countries like Australia.

Knowledge Networks and value-added services to Women

Knowledge networks open up alternate channels of communication, which have the potential to deliver the right information to the right person in the least possible time. This attribute of knowledge networks could be harnessed in a number of innovative ways in areas such as sustainable agriculture, tele-medicines, distance-education etc. for the benefit of women communities. SEWA Bank in India uses the development communication wing of Indian Space Research Organization (ISRO) to reach remote villages. Discussions on topics like Panchayati Raj (village governance institutions), women in development, nursery raising of animals and forestry management, savings and credit are beamed to different villages through the use of satellite cable. The viewers can phone in their enquiries that are answered promptly by a panel of experts. Further, village Villianur of Pondicherry in India has become the hub of an information revolution. People in the village, are connected through an on-line database which helps them access required information in their vernacular language. This novel experiment organized by the M.S. Swaminathan Research Foundation (MSSRF) as part of its Bio-Information Village Experiment begun in December 1998 has transformed Villianur into the centre of a local area network. The villagers congregate around the centre to get connected with the latest local news. Women get all sorts of information starting from price of vegetables to health services. Distance education is yet another one of those significant areas where women stand to gain tremendously. Internet and television broadcasts open up avenues for women to continue with their education at their own pace and from the confines of their homes even after having discontinued it due to family or social responsibilities. Cyberbarangayan is another NGO led programme in Philippines that aimed at promoting computer literacy and providing livelihood and employment opportunities among the villagers, wherein 60 percent of trainees included women who availed micro credit services.

The Kotmale Internet- radio project in Srilanka funded by COL is aimed at discussing current issues concerning the rural community through recording community discussions and broadcasting from Community Broadcasting stations. This effort is strengthened by the Open University Rural Research Unit by undertaking adaptive research in collaboration with rural communities to identify the areas of concern and to facilitate capacity building for addressing the problems faced by them. There are several such innovative models that need to be tried out and replicated on a much larger scale through the involvement of public and private agencies to provide better and value-added services to women with the help of ICTs.

The unrestricted flow of information through ICT processes opens up avenues for men and women to view each other from a different perspective. The sharing of views between communities living in different geographical and cultural sphere will-

lead to broadening of views and changing of mindsets over time. It is a fact that horizontal level of communication has a greater impact than the vertical communication structures and knowledge networking promotes horizontal flow of information. Men may learn more about the productive roles of women in the wider economy in different cultures and regions, and may become more willing to provide equal spaces to women. The removal of this stereotypical mindset would certainly be a big step towards the empowerment of women.

Barriers in achieving/ realizing the potential of ICTs for women

Keeping in mind that there are indeed potential positive effects of technology on women's lives and a woman's learning, it is important that the barriers to achieving these positive effects be explored and analyzed. Outlining the barriers to women's use of technology and how current practices serve to exclude and/or negatively affect women has drawn the interest of many researchers. Some of the obstacles that must be overcome in order to use technology to best benefit women have been focused on two principal themes that emerge as barriers for women: '*economics*' and '*awareness*'.

Economic barriers

Economic barriers to women's use of technology are very common and well documented (O'Rourke and Schachter 1997). The cost of buying and using a computer, or other communication technology, remains high and prevents many women from having access to computers as a tool to help them in their lives. Purchasing hardware and software is often only the beginning in terms of cost, with Internet access and email often increasing the costs to individuals. Not only is the initial cost of purchasing a computer high but the constant need to upgrade and buy new tools in order to keep up with the technological aspects of computer software and web sites adds more cost. As the cost of purchasing and using computers and other communication technologies increases with the need for more tools, software, and services, more women, and more people in general, are excluded from participating. The cost of access to communication technologies remains a barrier to women's participation, and without access for all women, the potential for technology to positively affect women's lives will only be felt by those who are already privileged enough to be able to afford the cost.

Economics also present an obstacle to women's participation in the use of communication technologies in terms of time. Learning to use new communication technologies requires time commitments from individuals that only the more privileged are able to make. Women who work and take care of family often do not have the time to invest in learning about new communication technologies and their possibilities, let alone having the time to learn how to use them and integrate them into their lives.

Many of these economic issues are exacerbated by the lack of funding available to women and women's groups to help them incorporate and use communication technologies. Increased funding to women and groups that serve them and their families would greatly alleviate some of the economic difficulties and would help to provide more equal services to women in all developing countries like India. Without funding for individual women and women-supportive groups to help them to purchase communication technologies and train themselves and other women, economic issues will remain a significant barrier to women's participation in educational activities provided by these technologies.

Access to communication technologies is often reserved for those who are already privileged in society. Those with money, education, time, and support are often able to participate in ways that others cannot. Women who are institutionally affiliated (whether academic, corporate, or private sector) are more likely to have access to technology than those women who are not. In the context of education, literacy is an important determinant. New communication technologies such as the Internet and e-mail use text very heavily. For those with lower levels of education or those who have difficulty reading large amounts of text, these technologies do not appear very useful. The current problem is that underprivileged groups such as those with low socio-economic status and low levels of education are not likely to get the opportunity to participate in the discussion and use of these technologies. The economic barriers pose an increased problem for those groups in society that are already underprivileged. If concerted efforts are not made in order to improve the abilities of underprivileged sectors of society to use new communication technologies, a widening digital divide and the resulting increase in social stratification should be expected.

Awareness barriers

In addition to the lack of economic resources to support women and women's groups integrating new communication technologies in their everyday lives and activities, there is also an awareness barrier that must be overcome before the full, positive potential of communication technologies in women's lives can be realized. There are three types of awareness issues that act as obstacles to women's use of communication technologies: awareness of personal ability, awareness of the utility of communication technologies, and awareness of available resources.

One of the most fundamental barriers that must be encountered and overcome before new communication technologies have the ability to positively affect women's lives, is the lack of personal awareness many women have of their skills and abilities in relation to technology. Many women express fear and anxiety when introduced to new communication technologies because of a perceived lack of knowledge and awareness (McDonald and Spencer 2000). Without the realization that they have many skills suitable for use with technology, women will have

difficulty getting beyond their fear and understanding the possibilities that communication technologies hold for their lives.

A second awareness barrier faced by many women is the lack of knowledge about what communication technologies are useful for and possibilities they hold. Women approach communication technologies as tools and need to understand their utility before they invest their hard-earned time and money in them. There needs to be increased awareness created through trainings, meetings, and campaigns about the possibilities communication technologies hold for women and their lives, before those possibilities will be embraced and fought for by women.

The third awareness barrier that needs to be addressed is the lack of knowledge about available resources to help women to learn more about and use communication technologies. For those women who have overcome the previous two awareness barriers and wish to learn more about communication technologies and benefit from the possibilities they can offer, there is little information available to help them. While both government and community-based programs for funding and training exist in India, many of these are not widely advertised and remain unknown to the vast majority of women. Moreover, there are other opportunities that surface regularly, but no efficient and useful way for women to be kept aware of them. This lack of information concerning resources available to help women learn about and use technology prevents many women and women's groups from accessing those resources. Given that women's economic and time constraints are often barriers to their participation in using communication technologies, increased awareness of these resources would greatly benefit many women.

Overcoming the barriers

The barriers to women's use of new communication technologies, as discussed above and in other reports, are complex and interrelated. This results in difficulties when attempting to provide solutions to the problems. There are numerous possible ways to overcome the barriers as there are many different ways to approach the issues.

In terms of overcoming the economic barriers leading to a lack of access to communication technologies, efforts must be made to reach marginalized groups and encourage and support their engagement with technology. One of the best ways to reach marginalized groups is to gain access to existing and well-established networks. These could include community and resource centers, support groups, rural community groups, and strong 'virtual' communities (such as Senior Net). Projects could use these groups' information dissemination channels to keep individuals well informed of different types of opportunities that can help them further their skills and knowledge in regards to technology.

Supporting and training the people that sustain community-based networks and centers is, to a certain extent, more practical than trying to help each individual

member. Providing resources, up-to-date information, and training for the community centre staff and volunteers can make them better equipped to help their members learn basic or more advanced technological skills, gain access to training programs, and more generally, motivate them to learn more by keeping them informed of the many opportunities that already exist. Other forms of support are also necessary to ensure that all women can participate and benefit from the information disseminated through community centers and networks: child care arrangements for women attending workshops and training, training sessions and other types of activities to help women further their education and working skills and resources (access to a computer) so that women are able to successfully complete distance education courses, etc.

By partnering with private industry and government, the access barrier related to a lack of hardware and software resources available to women and women's groups may be alleviated. This would entail lobbying, promoting, and creating campaigns to help community centers, women's groups, and other equity-seeking groups have more material resources (such as computers, current software, printers, and paper) and funds so that a sustainable model of learning and training activities could be established.

In order to overcome some of the awareness barriers discussed above, a database of resources and opportunities for women in relation to new communication technologies should be established. The development of a large resource centre that lists all learning, training, and funding opportunities from educational institutions (including formal, non-formal, experienced-based, etc), government programs (such as Canada's Community Access Program, VolNet, and School Net), and co-operative style programs would help to make more women aware of the resources and opportunities available to them and help to increase general awareness of the possibilities that exist in relation to new technologies and women's learning.

In order to make this database useful for a wide spectrum of women, information would need to be disseminated in non-electronic formats as well as electronic ones so that people without access to the necessary technology will also be aware of existing opportunities. Up-to-date information regarding funding opportunities, especially under-publicized and under-utilized government programs should also be disseminated through as many means possible. This will help to raise awareness and make these programs more visible.

As women become aware of the possibilities and opportunities new communication technologies offer them, established networks may be used to create virtual ones. By connecting existing networks through technology, people will become more aware of what other networks and support and information systems exist. The more women can identify with others and develop a "network consciousness," the easier information sharing will be. In other words, solidifying links between community

learning and other types of centers and the various groups that work toward social justice and equity will strengthen the community-based sector by creating a strong network identity.

The problem of a lack of awareness of personal skills relating to communication technologies may be overcome through the approach taken in introducing women to technology and in training them to use it. By avoiding top-down, non-interactive, centralized information and knowledge, it will be possible to foster a horizontal-type culture of information dissemination which should allow women to participate equally and feel that their skills and knowledge are valued.

Attempts should also be made to sensitize women to the commercial and governmental imperatives that shape technology and its uses, as well as to women's historical role in shaping technologies (such as the telephone and, more recently, email communication for political mobilization) to help them develop a "political consciousness", an ability to act at the local level from a global perspective. In order for these strategies for overcoming the barriers to become realities, more than material and financial resources are needed. If the goal is to create sustainable models that promote women's education and advancement in society, new forms of societal participation and production must be created so that women can become more involved in current and future learning and training opportunities.

Setting up prototype ICT models

Women will not be able to benefit from knowledge networking processes unless specific ICT-models are created which are targeted to the needs of the local women community. This learning could then be disseminated by creation of start-up CD-ROMs or websites that contain information and the necessary software tools for setting up simple ICT models that women can initiate at the community level. For example, prototype models of a web-site which displays e-mail and postal addresses of all the local district level government officials could be created so that women could use e-mail or e-mail-to-fax technologies to influence local area governance. Models may also be created on the lines of setting up virtual shops for marketing of local handicraft and skills or on how to search for information pertinent to the local women community such as on health issues, horticultural information etc. Further, emphasis needs to be given to the creation of gender sensitive local content portals that would encourage local participation and lead to generation of knowledge relevant to local communities.

Building partnerships

In order to build effective and sustained engendered knowledge societies - it is necessary to involve strategic stakeholders from both the public and the private sectors. These include government bodies, corporate firms, financial institutions and the NGOs. Fostering corporate partnership in ICT ventures and raising venture capital funds for social development projects become important lines of thought.

This could be done through a plethora of ways such as ICT based, advertisement, using existing corporate infrastructure for opening of tele-centres, bringing about transfer of technical expertise from corporate to the development sector etc. Through the World Computer Exchange (http://www.worldcomputerexchange.org), for example, brokers donate working, surplus, Internet-accessible computers and monitors from large U.S. companies and ship them to schools in developing countries to facilitate the use of technology and experiential education in education reform. There is a need to explore many more such useful models of participation of the private sector in social development projects.

From a macro-level perspective, there has been very little research done to understand the information needs of women in terms of the strategic information they wish to receive or produce. A knowledge-sharing model that puts women in greater control over the kind of information they need and produce becomes fundamental to the empowerment for women. For an all encompassing knowledge networking which empowers the women, the governmental and international agencies need to follow an innovative approach to ICT based knowledge networking supplemented by start-up and capacity-building support, and making full use of available technologies in the simplest ways. Incubator initiatives therefore need to be launched for the creation of dynamic, result-oriented ICT models that focus on social benefits rather than individual profits. UNDP, for example, in partnership with the Cisco systems have started the NetAid Initiative (http://www.Netaid.org) that uses the Internet to fight extreme poverty. This has resulted in not just flow of funds but technical expertise and skilled human resource power from corporate entities to explore new ways of eradicating poverty. The NetAid recently launched its Mother and Baby Survival Program to provide cleaner and safer environments for childbirth to expectant mothers and newborns in Rwanda. This programme is based on generating funds through individual donors in the North using e-commerce tools. Prospective donors can log on to the web-site and donate on-line which will make it possible to provide "mother and baby survival kits" to mothers in Rwanda at an affordable cost. Needless to say, this innovative ICT- initiative has met with tremendous success.

Conclusion

Knowledge networking through ICT has created high expectations in terms of opportunities for women. However, it needs to be realized that information and communication technologies by itself cannot be an answer to all problems standing in the way of women empowerment but it does bring new information resources and can open new communication channels for the marginalized communities such as women. It offers new approaches for bridging the information gaps through interaction and dialogue, building new alliances, inter-personal networks, and cross-sectoral links between organizations. The benefits include increased efficiency

in allocation of resources for development work, less duplication of activities, reduced communication costs and global access to information and human resources. Last, but not the least, the inception of ICT has opened a window for lifelong learning for women. Learning and training continues throughout women's lives as new skills and competencies gain value, and this ensures that avenues for women to expand their roles from household economy to a wider market economy remain forever open. Therefore, an effective policy towards initiating socially and economically viable ICTs would go a long way towards empowerment of the future generations for a better world.

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