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Networking for success

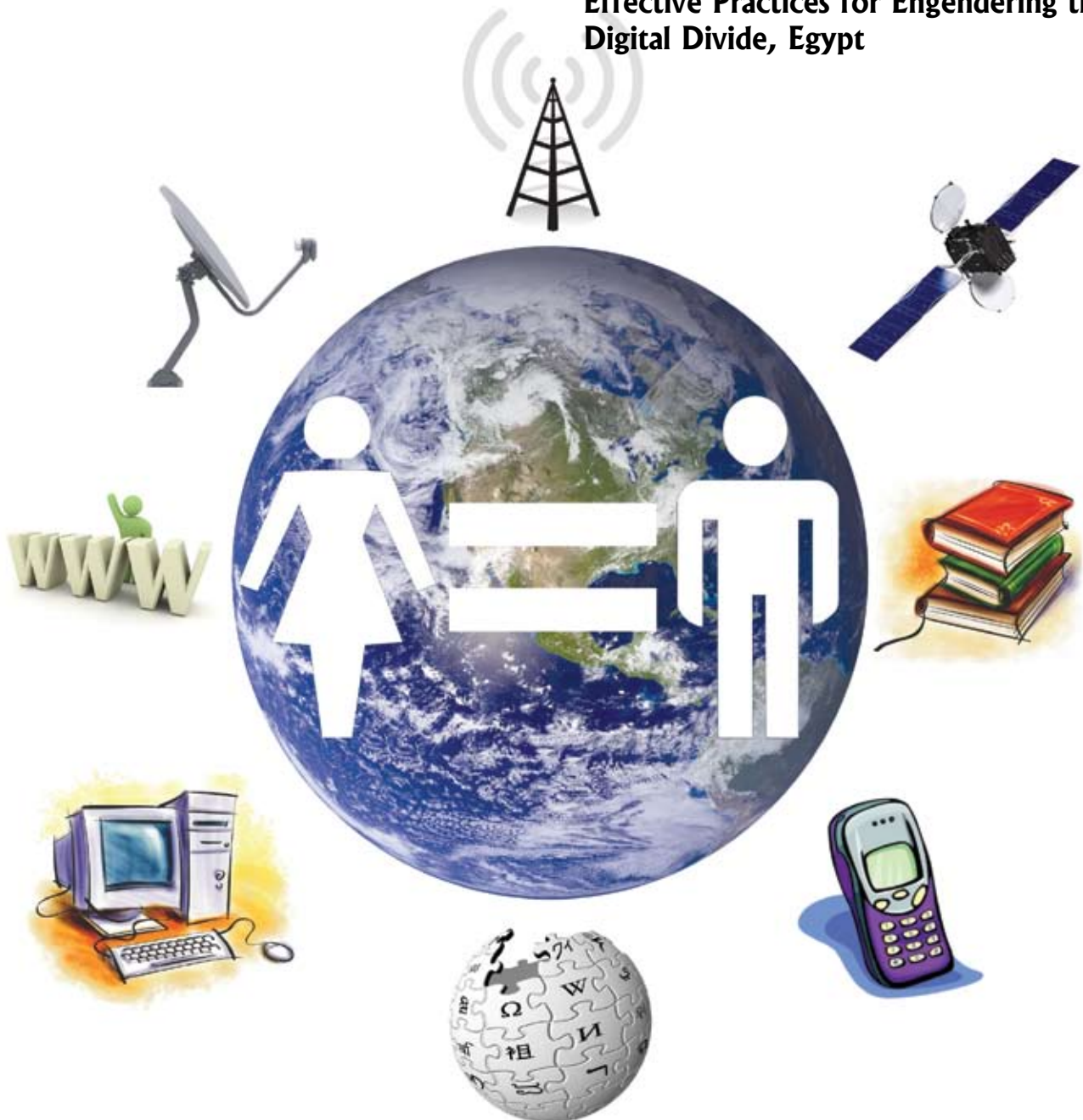
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iREACHing the unreached

Gender Empowerment through ICTs, iREACH, Cambodia

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I would like to acknowledge with thanks the regular receipt of your excellent publication. I would be grateful to continue to receive it. Let me congratulate all the staff on the high quality and relevance of the articles featured therein.

Mariana Patru
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I have been reading i4d magazine from the last two years. The content, layout and designing of the magazine is quite impressive.

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Thank you for the i4d monthly publications which have been regularly mailed to us. They are very informative.

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I have been reading i4d for three years. I find the magazine very useful. Please focus on the Telecentre Talks column as well by covering stories/case studies from rural area, so that the successful models can be replicated in unserved areas.

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We would like to express our deep appreciation to Claudia Morrell, founder and CEO, Multinational Development of Women in Technology (MDWIT), for her enthusiastic leadership for the special issue of i4d focusing on Gender and ICTs. She has once again joined us as Guest Editor for September 2009 i4d issue. She also volunteered as Co-Editor of the July 2008 Gender and ICTs special issue of i4d. Her enthusiasm and energy has enabled us to bring out another issue highlighting the achievements made in this domain. Her relentless pursuit to bring forth new developments and target new authors has made this issue another collectable volume. Our sincere thanks to Claudia for her all her support and guidance in bringing out this issue.

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Month	Theme
January	Rural BPOs
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March	ICT in Climate Change
April	ePanchayat
May	ICTs in Elections
June	ICTs and Microfinance
July - September	Gender and ICTs

Revisiting Gender for 2010



In 2005, I began work with a group of colleagues to address the under-representation of women in the access, use, literacy, development, and leadership of ICTs. We began with a Declaration of Agreement that built upon the work of many women and men and strong organisations that had been in existence and doing this work for years. At that time, I stated that I wanted to work on this for five years, not because I assumed all the problems of women's under-representation would be completed, but because I knew then that the natural order of things is to build infrastructure and hierarchy to achieve goals. Once the necessary hierarchy is completed, it is valuable for achieving goals, but we need to stop and ask periodically if over time the organisation is still serving the goals or the goals have now been adopted to serve the organisation and support the very hierarchy it created. Perhaps more importantly, are there better organisational forms to achieve the goals. Even asking the question can appear treasonous!

The concern here is that ICTs move quickly and create change; organisations and individuals resist change. This is particularly challenging today when one considers issues of generational learning, which has been strongly influenced by ICTs. The reality is that the power of ICTs has already changed the world in ways I am sure those of us fifty and over do not yet comprehend. In a recent meeting at the World Bank, a panel of gender experts brought up the issue of women's access to telecentres. A few years ago data was provided that suggested women were severely under-represented in these centres. Is that still true? Anecdotal evidence suggests this may no longer be an issue in some parts of the world. If cell phones are replacing computers as the technology of choice and women have growing access to this technology, what does this mean? Finally, is there a new way to think about the gender divide and how to address it through ICTs? Is it time to move away from arguments about them and us and look only at us? Research in 1986 by Bernice Sandler suggested that microinequities created through small everyday messages is the cause for much of the beliefs we hold about gender and affects both our education and our careers. If this is true, then the best place to create positive change is in us. What messages do mothers and fathers, teachers and counselors provide to their girls and boys? What role do these individuals and groups have in changing their own behaviour? How can ICTs enhance our communication and help create the individual change we need?

My concern in 2010 as a reviewer for proposals across many disciplines and as an editor across multiple international journals is that we focus too much of our programmatic efforts on changing the girls and boys and not enough on changing ourselves – the one thing we truly do control. We are the old guard and often without realizing it perpetuate the stereotypes and maintain the boundaries. Perhaps the real question for organisations and individuals today, is how do we simply get out of the way of the young people coming behind? The articles provided here are a mixture of traditional work and some new ideas. This is a great collection, but we need more. We need men and women, faculty and business leaders, government and Civil Society to enter the debate and challenge thinking and continue to contribute in the months and years ahead.

I want to thank the i4d team for continuing to keep these issues front and centre and for being the trailblazer for asking the questions, even when it is uncomfortable. i4d, keep asking!

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i4d is a monthly publication. It is intended for those interested and involved in the use of Information and Communication Technologies for development of underserved communities. It is hoped that it will serve to foster a growing network by keeping the community up to date on many activities in this wide and exciting field.

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Networking for success

This article explores the experiences of the Networking for Success project, initiated to train Nigerian women activists to use web 2.0 tools to advocate, network and share information on women's rights.



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Introduction

For most of this century, technology has been regarded as an engine for economic growth and social development. As socio-economic models evolve, there is increased awareness that the technology is not the most important part, but the information and knowledge that it enables us acquire and use towards human development and economic growth (Hafkin, 2008). Information and communication technologies (ICTs) provide tools with which to find, create, share and manage this knowledge.

Hafkin argues that “the foremost use of this knowledge is to empower and develop all sectors of society to increase the quality of people’s lives and to promote social development” (Hafkin, 2008).

Exclusion from these new technologies often mean that women are denied the chance to access information and participate in local and global debates (Radloff, Primo, and Munyua, 2004).

This is why it is critical that all members of society are empowered “to create, receive, share and use information and knowledge for their economic, social, cultural and political development” (Hafkin, N, 2008). Unfortunately, research shows that women’s participation in the knowledge-based society, particularly in developing countries, lags behind men’s (Huyer et al, 2005).

Our objectives at the Women’s Technology Empowerment Centre (W.TEC) are to assist Nigerian women develop financial independence – by learning skills that can be used to earn income – and to develop capacity and confidence in using ICTs towards learning and activism for a better quality of life. It was with especially this second goal in mind that W.TEC organised the Networking for Success (NFS) project. The

NFS project sought to teach women how to find relevant information, share their stories with the world and build knowledge networks using web 2.0 technology, with the ultimate goal of supporting gender equality and women’s empowerment.

However, several issues and impediments to the success of microfinance as an industry have cropped up, the primary of them being: scalability and sustainability of MFIs, and outreach and impact of the microfinance initiatives. Thousands of MFIs around the globe are realising that the solution for the scaling up, and ensuring maximum outreach and sustainability of MFIs lies in leveraging the benefits of technology, more specifically information and communication technologies (ICTs). ICTs have opened new window of opportunities for the MFIs to reach out to more people, controlling the risks making the business sustainable, and bringing down the costs of operation. With new softwares specially designed to cater to the needs of the MFIs, mobile phones, efficient Management Information Systems, among others, technology can and will in the near future bring about a paradigm shift in the domain of microfinance.

Purpose of the networking for success project

The NFS project ran from May to July 2008 and was supported by the International Development Research Centre (IDRC), Canada through the Harambee project; and Laureates College, Lagos, Nigeria, who provided their computer laboratories for the workshops.

The 24 NFS participants were women interested in promoting women’s rights and Nigerian civil society professionals, student activists, entrepreneurs, and stay-at-home mothers. We selected this group because we were interested in exploring how to

leverage web 2.0 tools and other ICTs to promote women's rights; and these women had existing spheres of influence for knowledge transfer (their programme beneficiaries; fellow students; clients; and families).

Web 2.0 refers to a perceived "second generation of web development and design that facilitates information sharing and collaboration on the World Wide Web" (Wikipedia). This includes tools like blogs, wikis, social networking websites, social bookmarking tools, podcasts and video sharing websites, which are built on the principles of information sharing, collaboration, and community.

The centrality of user contributions and feedback means that these tools provide appropriate channels for women activists to expose cases of injustice, solicit for information, share resources, converse and network with other women and groups working on similar issues.

Project Implementation

There were 3 offerings of the NFS programme (in May; June; and July).

The project was implemented in two stages. The first stage was a series of "face to face" workshops during which participants and facilitators met once a week for a month at the computer lab for day-long hands-on sessions to learn about using blogs, wikis, social networking sites, and other web 2.0 tools in collecting and disseminating information for their activism work.

The "online discussion" was the second stage and occurred each week after the workshops. These took place over several days on the project blog and complemented the workshops by providing opportunities for the women to practice the tools and learn from mentors experienced in using web 2.0 tools and other ICTs, for activism and development work.

These mentors included activists, development workers and journalists. The discussions explored topics like how to provide relevant information online for women, how nonprofits can most efficiently use web 2.0 technologies, and how to sustain movements using ICTs. Stipends to pay for Internet time at cybercafés were given to participants.

The NFS project blog now provides documentation of the programme activities and serves as a repository for resources on the use of ICT for development.

Evaluation of the programme

The NFS programme was assessed in several ways, through: pre and post tests; weekly evaluation forms completed by participants following each workshop; an evaluation form administered at the end of the programme; observations of the participants' online activities 6 months after the programme; and phone interviews with the participants 6 months after the end of the programme.

Pre and post tests

Participants completed a short test at the start of the programme to determine what they already knew about web 2.0 and ICTs.



An instructor demonstrates the use of video-sharing websites for activism work to the women

At the end of the programme, the same test was administered to them to gauge what new knowledge they had acquired. These tests showed that all participants had gained a significant amount of knowledge from the programme.

Weekly and overall evaluations

Participants completed written evaluations each week and at the end of the programme. The weekly evaluations helped get immediate feedback on individual workshops, which we could quickly act upon. The overall evaluation helped determine the effectiveness of the entire programme. Questions asked in both included the usefulness of the tools, the quality of the facilitators and areas for improvement.

The weekly evaluations enabled W.TEC make helpful modifications during the programme, such as streamlining the content and creating more practice time during the workshops.

The overall programme evaluations showed that all participants found the programme meaningful and useful. However they suggested that women would benefit more from more basic computer literacy training, such as typing and word processing.

Post 6-month observation of online activity

W.TEC staff visited the participants' blogs and social networking profiles 6 months after the end of the programme to observe the frequency, type and changes in the quality of use. The evaluation criteria included regular and evident use of the web 2.0 tools via blog posts, updates to social networking profiles, groups created, managed or joined, creation or dissemination of video and images via slideshows, blogs, social networking and video-sharing sites.

The results showed that many of the women were not using the tools learnt. 14 out of 24 women were making use of the social networking site weekly mostly to maintain friendships, while only 2 were posting to their blogs.

Post 6-month phone evaluation

The phone interview represented the final evaluation carried out to hear from the participants about what they had been doing with their new skills and what challenges they had experienced.

Tabular Analysis of the Phone Evaluation:

Have you used the tools learnt	Yes (14)	No (9)	No response (1)		
Type of tools in use	Social networking site (14)	Blog (2)	Video- Sharing Site (2)	Mailing list (1)	Image Slideshows(1)
Purpose of using the tools	Social networking(18)	Information sharing for work (1)			
Challenges in using the tools	No personal computer / Internet access (12)	No time because of school, children or work (9)	No money Not working (2)	Health issue (1) Slow Internet Speed) (1)	No electricity (1) Personal issues (1)
Number of people trained after the programme	42 women & 4 men				
Method of training	Verbal (14)	Practical (25)			
Do you read other people's blogs?	Yes (3)	No (19)			

(Note: W.TEC staff could not get responses from one participant, who has moved away since the project ended, but percentages are still calculated using a total of 24 participants.)

Results of 6-month evaluations

All the evaluations showed that despite the positive feedback received immediately after the programme; 6 months later many participants were not regularly using many of the tools learnt.

The online and phone evaluations showed that the greatest numbers of participants (58.3%) were using social networking sites at least once a week, while only 8.3% were using blogs weekly.

The top challenge in using these tools included having no or limited access to a computer and the Internet (50% did not have computers at work or home). This is largely because Internet connectivity is still expensive and not universally available. While cybercafés are an alternative form of access, for almost all the women without access (83.3%) this was not an option. Reasons given for this

include costs and the high rate of online scams being perpetuated in some cafés and the resulting police raids, which made the women feel uncomfortable or unsafe. Lack of time was a close second for many women (37.5%) and this is unsurprising given the multiple roles of managing a home, raising children and working that Nigerian tradition expects women to play.

The women who benefited from NFS were keen to share their knowledge. At the interview time, the NFS participants had trained at least 46 people (42 women, 4 men), i.e. had almost

doubled the impact of the programme.

During the phone evaluation, the women shared the belief that the training had an impact on them, even if there was no immediate evidence of this.

W.TEC privately observed that in the 6 months following the end of the NFS programme (August 2008 – January 2009), the project blog was the number 1 entry page on the W.TEC website, with an average of 2,934.5 visits each month. A year after the project (July 2009), the NFS blog remains the most visited part of the website with 2,643 visits, suggesting that many people are still finding the blog content relevant.



A participant posts to the project blog

Lessons Learnt

W.TEC has drawn some lessons and recommendations from this programme for women looking to use web 2.0 tools and other ICTs in their work:

Women need to firstly understand the basics of using the computer and Internet, otherwise introductory trainings need to be provided for them

While web 2.0 tools have many benefits for promoting and mobilising for women's rights, they are still challenging to use in Nigeria due to the limited and expensive infrastructure (computers, the Internet, software and other components), as well as low connectivity speeds which

decrease the quality of the users' experience and makes some tasks more difficult, such as watching or uploading videos. Therefore, the use of more 'offline' tools (i.e. that are not only available on the Internet) needs to be explored.

- The tools need to be fairly user-friendly, readily available and easy to integrate into existing work or home routines. The popularity of social networking sites suggests that tools need to provide the opportunity to engage with an active community, while not always requiring much effort from them – for instance, being able to write a brief message



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in another member's space or view a member's photographs compared with the work of composing a blog post.

- There need to be more safe and comfortable spaces with access to ICTs for women
- The short term benefits of technology programmes typically include increased feelings of confidence, though generally the impact might not be immediately evident. The effect of technology trainings for women is usually multiplied, as women tend to share their knowledge with others

Conclusion

While web 2.0 tools have the potential to transform women's lives by breaking information barriers and creating channels for knowledge transfer, factors such as inadequate access to the technology and lack of skills among women delay this process.

Access to ICTs is also affected by prevailing values and situations, which can influence who is able to use these tools.

Therefore it is important that women have more opportunities for learning and using ICTs and perhaps more importantly that women know how to use the tools to promote their rights so that we can move towards a more equitable society, where men and women have equal access to opportunities, information and power.

We believe that implementing the following, which are based on the lessons learnt from this project, will lead to a more sustained use of web 2.0 tools by women:

- Ensure that the women being trained are already comfortable using the computer and the Internet
- Focus on just a few tools (ideally, no more than 3) and devote more time for practice with the facilitators present, rather than giving the women money to practice on their own time
- Start off with very easy-to-use tools that quickly engage the women within a community, but which do not require much commitment of time from them (such as a social networking site)
- Stick with tasks that do not require very high bandwidth, until high-speed Internet connectivity is widely available to more women (such as writing text-based posts on a blog)
- Demonstrate how 'offline' tools can be used with web 2.0 tools; for instance, typing up posts using a word processing tool, saving them and publishing when the women get access to the Internet
- Rather than following the course curriculum in a linear manner, identify each woman's information needs at the



A participant is presented with a prize for outstanding performance at the graduation ceremony

beginning of the programme and use the curriculum as a loose guide on how to meet their individual needs using web 2.0 tools. This means that workshop sizes should be small (for instance, no more than 10).

- Identify each woman's circle of influence (for instance, family, local community, colleagues) at the beginning of the programme and all through the workshop, discuss and highlight how the impact of the tools can be extended to them
- Discuss and identify available Internet access points for the women to use after the programme has ended. ■

References:

1. Hafkin, N. (2008). *Case Study: The Philippines and Thailand Enabled women in knowledge societies*. *i4d: Information for Development*, July 2008, from <http://www.i4donline.net/articles/current-article.asp?Title=Case-Study-The-Philippines-and-Thailand&articleid=2039&typ=Features> (last checked by the author August 2009)
2. Huyer, S., Hafkin, N., Ertl, H., Dryburgh, H. (2005). *Women in the Information Society*. In 'From the Digital Divide to Digital Opportunities: Measuring Infostates for Development.' Ed. G. Sciadis. Montreal: Orbicom. http://www.orbicom.ca/medialprojets/ddi2005/index_ict_opp.pdf (last checked by author August 2009)
3. *Networking for Success Project Blog*: <http://www.w-teconline.org/infoblog> (last checked by author August 2009)
4. Radloff, Primo, and Munyua (2004). *The Role of Information and Communication Technologies in the Development of African Women*, Melville, South Africa: Association for Progressive Communications (APC)
5. Wikipedia. Web 2.0. http://en.wikipedia.org/wiki/Web_2.0 (last checked by author August 2009)

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iREACHing the unreached

Information and Communications Technologies (ICT) can empower women by improving access to education, health, government and financial services.



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Gender empowerment and ICT4D

Women's involvement in and ability to benefit from ICT is primarily a matter of social justice. There are also potential economic benefits, but the focus of this paper is on human development. Exclusion and inequality faced by women, is associated with capability deprivation, restricting their capability to enjoy the kind of life they have reason to value, e.g. to work outside their homes (Neville, 2007, Sen, 2000). This deprivation also affects children of those who are excluded.

For several reasons, associated with the general role of women in communities, they do not benefit from ICT to the same extent as men. The male dominance in ICT is reflected in the use of and benefits from ICT (Huyer et al., 2005). Despite important gender issues arising when considering women as users, employees, including the many women who work in call centres, and entrepreneurs, there is only scant attention to gender issues in ICT research (Walsham 2005). In calling for 'participation and active involvement of girls and women in the decision-making process of building the Information Society' (WSIS, 2005, point 90d), the World Summit for the Information Society recognised the importance of greater female inclusion.

There is a strong link between women, ICT, and the Millennium Development Goals (MDGs). ICT can facilitate achievement of several of the MDGs, e.g. MDG 3, to promote gender equality and empower women (UNDP, 2005). There are several examples where ICT has been an important tool for women's empowerment and where women are the primary drivers in using ICT for development purposes. In some cases, e.g. Grameen Phone in Bangladesh, women derive income from

ICT. Similarly, most of the operators and volunteers at the MS Swaminathan Research Foundation's Village Knowledge Centre are women from local villages. In addition to the empowering influence of their involvement, the decision by women to participate was in itself an element of self-development (Kanungo, 2004). This has also been the case at iREACH.

iREACH - background

Gender awareness and empowerment are key elements of Informatics for Rural Empowerment and Community Health (iREACH), an ICT4D pilot project in Cambodia, funded by International Development Research Center (IDRC). In 2006, IDRC awarded the Ministry of Commerce in Cambodia a three-year grant of USD 1.3 million - later extended by one year, to establish iREACH. Informed by a community-based micro-telco model (Ó Siochrú & Girard, 2005), key objectives of iREACH are to build evidence and capacities to help inform Cambodia's rural ICT and telecommunications policies, improve community capacity through ICT training, and develop service content and enterprises. In addition to the pilot sites at Kep and Kamchai Mear (KCM), iREACH has a central office in Phnom Penh. Each pilot site consists of a headquarters (HQ), surrounded by nine village hubs connected to its HQ via wireless. Internet access is available at each village hub via a satellite connection at the HQ.

Some important characteristics distinguish iREACH from most ICT4D pilot initiatives piloted over the past decade or so, including the distributed nature of the network, strong focus on research and policy input and the attention to capacity building on all aspects associated with operating a telecommunications business. An emphasis on gender equality, livelihood

matters, and governance issues also characterise this project. As is the case with all IDRC funded projects, gender equality and empowerment of women in the context of overall community development play an important role. This is reflected in the way both genders have participated in the development process of iREACH, as management committee members, staff, volunteers, and users. Gender equality was a key criterion in the election of management committee members, with special processes established to achieve proportional gender representation.

Villagers can use the hubs to learn how to use computers, search the Internet, send e-mails, talk on Skype and participate in training on topics designed to improve the well-being of community members. Training topics have included nutrition, family violence, substance abuse, the importance of sending children to school, protection against mosquito-borne diseases, and improved farming techniques. Community members also gather at the hubs to listen to daily news broadcasts through computer loudspeakers.

Users by gender

As shown in Table 1, women users represented over 40% of total users at Kep during 2008/2009. However, the proportion of female users dropped to 33% during the first four months of 2009/2010. This reduction has occurred despite an increase in average monthly female users by 93% during the same period. However the number of male users has increased more significantly. The female ratio among students has remained at the same level.

Table 1: Users by gender at iREACH Kep

	Students			Total Users		
	Male	Female	%Female	Male	Female	%Female
1 May 2008 - 30 April 2009						
Total Users	850	599	41	1649	1176	42
Average users per month	71	50		137	98	
1 May 2009 - 31 August 2009 (4 months)						
Total users	525	344	40%	1536	755	33%
Average users per month	131	86		384	189	
% increase in average monthly users	85%	72%		179%	93%	

Participatory research – gender issues

In February 2009, a research team conducted participatory research, aimed at understanding whether and how iREACH has contributed to communities (Grinfeld, et al. 2009). The research, comprising 149 participants (42% women), users and non-users in 22 focus groups, representing different stakeholders across wide age ranges, at both pilot sites, canvassed a wide range of issues. This was the first wave of a longitudinal study, scheduled to occur on an annual basis over the next two years. A common theme in just about every group was the recognition of iREACH's contribution to gender empowerment.

The gender equity approach to the management committee elections influenced how community members viewed iREACH.



Women and children seeing how Skype works (Cambodia)

Photo Credit: Sokleap Hak, iREACH, Cambodia

Participants in all groups were aware that iREACH encourages women to participate in its activities. One way of doing this, as reported in one of the groups, was for the community facilitator at a hub to do home visits to encourage women to attend regular training. As a result, a group of women in that village attended a typing course once a week.

Several women, school age and above, have developed skills in using computers, including typing and finding information by themselves, skills many of them did not think they would be able to acquire. iREACH represents a new opportunity for learning for women who lack basic education. They have become aware of the potential of knowledge to improve their livelihoods, e.g through new farming skills. Some women aspired to use their ICT skills in working with NGOs and for teaching computers to others.

It also emerged that previously women had nowhere to go outside their homes and therefore rarely ventured out, other than to attend to necessities. Using iREACH as a meeting place, in combination with the information and communication opportunities at the hubs, several participants noted that the lives of female users have become easier, more enjoyable and equitable. In her study of the Akshaya initiative in the Indian state of Kerala, Madon (2004) also found that women who for cultural reasons had not previously been allowed out of their homes could frequent the centres with the consent of their families. Once there, they could socialise and network with each other.

The contribution of iREACH to gender empowerment from an education perspective was reflected in the many female students using iREACH hubs for their homework, to learn Khmer and English typing, and for finding additional information. As shown in Table 1, 40% of students using iREACH hubs are women. One female student had become somewhat of a legend after finding an explanation on the Internet to a mathematical formula her teacher had been unable to explain. In addition to the youth group, participants in the village and commune leader group mentioned this incident. There were some very outspoken female students in the youth group in KCM, explaining how the resources of iREACH had helped them in their studies.



Older women using Skype in Cambodia

An account by a female member of the management committee of how she had been empowered to withstand pressure to sell land at an insufficient price demonstrated empowerment of a more general nature. The member admitted that prior to her involvement with iREACH she did not know how to find out the monetary value of her land and lacked the courage to withstand pressure from a powerful person.

Without being included as a specific talking point in the question framework, and raised independently by two groups in KCM (the all male commune council and village leader group and the women's group) was the issue of what men think about women's participation in iREACH. There was no indication in either group that men were worried about losing control or power from women becoming more empowered. The consensus among participants was that, although sometimes worried about the security of women leaving their homes, men are supportive of their wives attending iREACH and the opportunity for learning this represents. This appreciation was conditional on women not neglecting their home duties. Participants in the KCM women's group added a different perspective related to the training on domestic violence in which they had participated. Equipped with this knowledge, some women reported how they had lectured their intoxicated husbands when returning home from iREACH.

Some women were involved in innovative uses of iREACH's facilities. One woman was regularly singing with a man in another hub over the network. Several women participated in an experimental mushroom growing plot at one of the hubs. However, there was no indication that women, or men for that matter, had used iREACH for diversifying their livelihoods. Several women considered training in farming practices and dissemination of market price information had improved their farm incomes.

Many of the women who did not have time to attend, benefitted from information obtained by their children and others attending iREACH, as someone in the KCM women's group commented: 'we delegate to our children to learn and bring home knowledge'.

Other studies have found incidents of such "proxy" usage (e.g. Ulrich 2004).

No socio-cultural issues emerged that would prevent women from making use of iREACH per se. The only exception was the reluctance of women to sit close to monks. According to participants in one of the groups, with increasing number of monks attending hubs at pagodas, many women shy away. There is however no strong evidence for this view in user statistics. At 44%, the average proportion of female students using hubs at pagodas was slightly higher than the average for all hubs, which was 40-41%, as shown in Table 1. There was great disparity in the proportion of female students at the different pagoda hubs and in one hub it dropped from 42% in 2008/09 to 15% during May-Aug 2009.

Challenges and key lessons

At the start of the project, it was very difficult to attract women to iREACH, let alone encourage them to stand for the interim management committee elections.

However, after having been involved with iREACH for some time, many women were comfortable contesting in the management committee elections and there was strong competition for the female quota.

Initially, women who attended iREACH meetings did not participate actively in discussions and rarely expressed their views. More recently, they have become quite vocal and very active at meetings and in activities, such as planning and hub monitoring. This did not happen by itself, but was the result of significant capacity and confidence building.

The iREACH environment of learning by doing has also been instrumental in achieving this high level of female participation. There is no point having capacity building programmes without opportunities where the skills can be applied. Having been actively involved in day to day activities, planning, project implementation, and evaluation, female staff, management committee members, and young volunteers are now motivated and have the skills to contribute to iREACH and their communities.

iREACH's model of involving women has been considered so successful locally that it is now being mainstreamed by local authorities in the area. A key lesson is that the more women are encouraged to be involved and given opportunities to participate at the initial stages of a project, the more active they become, whether as management committee members, volunteers, and/or users.

However, the drop in the proportion of female users over the past four months (despite a healthy doubling of average monthly female users) demonstrates that gender equality and empowerment requires constant vigilance, particularly in societies where gender power relationships are still fragile. This also validates the importance of keeping and analysing user statistics. With regular monitoring, the need for action to restore gender balance can be identified at an early stage.

Concluding remarks

Although it is not possible to generalise findings from the qualitative research to the overall gender empowerment influence

of iREACH, the consistency of responses relating to gender empowerment from focus groups representing diverse stakeholder interests imbues confidence that iREACH has had a significant impact.

This impact has not been automatic – there are many examples where similar projects may further entrench gender inequalities - but, given the frequent references to iREACH’s gender policies and practices, it is reasonable to conclude that these have played a major role. The relatively high proportion of female users of iREACH is another indicator that iREACH’s practices have borne fruit. By referring to gender empowerment training and programmes implemented by other NGOs, the participants acknowledged the importance of the wider context within which iREACH operates. In subsequent research we intend to focus on developing and monitoring indicators on gender equality and empowerment. These indicators would be developed through participatory research to ensure they are relevant for the local population. ■

References:

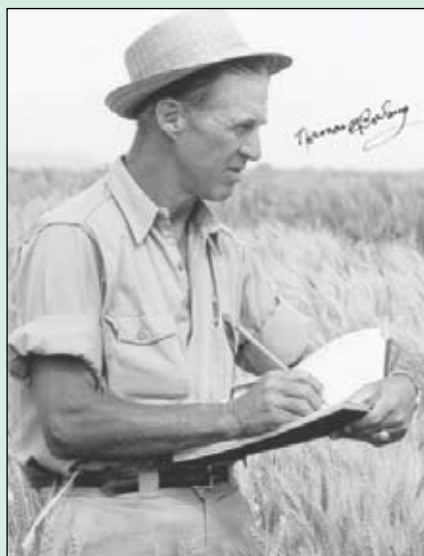
1. Grunfeld, H., Hak S., Long D., Tara P., Dara S., Chanda P, Pen R., Ann C. (2009) *What Villagers think of iREACH, Report on participatory evaluation conducted in February 2009.*
2. Huyer, Sophia. (2003). *Gender, ICT and education. Unpublished document. Retrieved on August 1, 2009 from <http://archive.wigsat.org/engenderedICT.pdf>*

3. Huyer S. Hafkin, N, Ertl, H, & Dryburgh, H.. (2005). *Women in the Information Society, in Sciadas (ed.) (2005) From the Digital Divide to Digital Opportunities: Measuring Infostates for Development. Orbicom. Montreal (Quebec), Canada.*
4. Kanungo, S. (2004). *On the emancipatory role of rural information systems. Information Technology and People, 17 (4), pp. 407–422*
5. Madon, S. (2004). *Evaluating the development impact of e-governance initiatives: an exploratory framework. The Electronic Journal on Information Systems in Developing Countries, 20 (5), 1-13.*
6. Nevile, A. (2007). *Amartya K. Sen and social exclusion. Development in Practice, 17 (2), pp. 249 – 255.*
7. Ó Siochruí, S. & Girard, B. (2005). *Community-based networks and innovative technologies: new models to serve and empower the poor. UNDP.*
8. Sen, A . (2000). *Social exclusion: concept, application and scrutiny. Social Development Paper No. 1, Manila: Asian Development Bank.*
9. Ulrich, P. (2004). *Poverty reduction through access to information and communication technologies in rural areas: an analysis of the survey results from the social impact assessment conducted by the Chinese Ministry of Science & Technology and the United Nations Development Program. Electronic Journal of Information Systems in Developing Countries, 16(7), 1-38.*
10. UNDP (United Nations Development Programme). (2005). *Promoting ICT for human development in Asia: Realizing the Millennium Development Goals. Regional Human Development Report: New Delhi. Elsevier.*
11. Walsham, G. (2005). *Development, global futures and IS research: a polemic. Journal of Strategic Information Systems 14 (1), 5–15.*
12. WSIS (World Summit on the Information Society). (2005). *Tunis Agenda: for The Information Society, document: WSIS-05/TUNIS/DOC/6(Rev.1)-E.*

A Tribute to Norman Borlaug

Nobel Laureate Norman Borlaug, also known as the father of Green Revolution, passed away in the US state of Texas at the age of 95 on September 12th, 2009. The man, who revolutionised agriculture production across the globe by his innovation of hybrid high-yield crops, has left behind a glorious legacy of research and development that helped the poor and saved hundreds of millions from death by starvation. Even today, the widespread hunger, food insecurity and malnutrition reflects that the world does not produce enough to feed the entire humanity, this problem was more acute in the 1960s. As a solution to food insecurity, when faced with the problem of growing food insecurity, Norman had a very simple solution in mind, just grow as much food as possible, employing whatever technology that was available.

The Green Revolution more than doubled the global food production between 1960 and 1990 with Asia, Africa and Latin America, in particular, being



the primary beneficiaries. He believed that human misery begets instability and social unrest and advised upcoming generation of scientists to innovate for reducing human misery and help make the world a better place. He also contributed immensely to the Indian Green Revolution and worked closely

with policy makers and practitioners to improve crop production in the country. The Indian state of Punjab which has now turned into the breadbasket of India of sorts, is one of the prime examples of how Norman’s research into agriculture helped the second most populous nation of the world go from being a food-aid “basket case” to being a largely self-sufficient nation in terms of cereal grains production. Human beings are mortal but their ideas and work are immortal. He will always be remembered for his deep commitment to a famine free global society. .

Norman Ernest Borlaug was born on March 25th, 1914 in northeastern Iowa, USA. He studied at the University of Minnesota and later worked for DuPont and then joined the the Rockefeller Foundation’s Mexican hunger project in 1944. He was awarded the Nobel Peace Prize in 1970 for agricultural innovation and the development of high-yield crops. He was also awarded the highest US civilian award, the Congressional Gold Medal, in 2007.

Millennia 2015

Millennia 2015 intend to help women who have neither power nor resources to access the knowledge society.



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Women represent about half of the world's population, yet many of them can't imagine they could benefit from ICTs for Development to build a global sustainable future because they live in war, in slavery, in deserts, in hunger or lack access to basic human rights. On the other hand, many women experience a high quality of life through their careers, family, and general well-being, even if gender equality is still a real concern.

With Millennia 2015, we are attempting to use ICT in order to durably contribute to the well-being of all citizens around the world. Millennia 2015 gathers all women and men concerned by these questions in order to think, to decide and to act at the horizon 2015.

The Destree Institute is a European research centre based in Wallonia (Belgium), with a special expertise in foresight, ICT, the information society and governance. In 2007, we developed the concept of Millennia 2015, a "think and action tank" to enhance the driving force of women with the title "Women actors of development for the global challenges" with ICT and the information society as tools to connect women from all around the world.

Millennia 2015 is a foresight research process, structured in 3 sessions:

- Liège 2008: "Information Transfer" (http://www.millennia2015.org/Actes_2008) Exchange and transmission of data as well as of analysis already collected or built is used to inform the participants or to question the society.
- Paris 2011 (UNESCO): "Knowledge Processes" Interactive building processes, step-by-step, for an innovative knowledge and a strategy made of precise actions.
- New York 2015 (United Nations): "Intelligence Platforms"

Collective dynamics with exchange of real field experiences and recombination of tools realized in order to learn together as well as to launch innovative initiatives.

The Community of Millennia 2015 comprises of experts (both women and men) from all the continents and from the United Nations (more than 30 countries in 2008, 300 participants from all continents in 2009). The main tool is the collaborative portal <http://www.millennia2015.org>. We will transform the information collected into shared knowledge to develop an interactive and multilingual knowledge database.

The interaction with Millennia has already been activated with many partners around the world. Regional sessions of Millennia will be organized. Millennia 2015's main funding partner is the International Organization of Francophonie. Our most active collaborator is The Millennium Project (<http://www.millennia2015.org/Partners>).

Millennia 2015: i4d on "Gender and ICT's"

A conclusion of the first session of Millennia 2015 is that Women are actors of development and architects of the future. We intend to help women who have neither power nor resources to access the knowledge society.

Millennia 2015 has already be presented to important international networks: in Liège (first Millennia international conference), Tunis (ICT for Education, International Organization of Francophonie); Brussels (World Association of Women Entrepreneurs); Washington, Minneapolis and Chicago (The Millennium Project and the World Future Society); Lyon, France (European Commission, ICT 2008); Brussels (European Commission, Paradiso FP7 Programme, ICT for a global sustainable future).

Seven goals were identified for Millennia's community to prepare the 2011's session

- 1 Understand present and possible alternative futures in key domains of society:



Speakers at the Millennium 2015 Liege Conference 08 March, 2008

- politics (to respect and enforce women's rights),
 - education (developing a framework for promotion of education for women,
 - eradicate illiteracy, encouraging girls to study science, mathematics and new technologies, as drivers of economic and social development, that means drivers of change in the status of women),
 - employment (breaking the glass-ceiling),
 - development (empowering women as actors of social change), health, (in partnership with the World Health Organization),
 - access to ICT tools, information and knowledge;
- 2 Promote a culture of respect, of diversity and of peace;
 - 3 Acknowledge the ability of women as drivers of social change and as mediators for a culture that promotes peace;
 - 4 Recognize women as bearers of rights, as actors of changes and as builders of alternative futures,
 - 5 Develop training and research (by, for and about women), in order to enforce equality between men and women in all respects and to formulate new concepts;
 - 6 Enhance our critical, exploratory approach, in coherence with society, trying to measure the obstacles and the progresses: it is important to create a State of the Future Index (SOFI) on the status of women and to organize foresight workshops



- 7 Build networks around major issues on the United Nations Agenda, in partnership with the European Commission, in respect of cultural and linguistic diversity.

An ambitious process for women and development at the horizon 2015

In order to achieve a global sustainable future for all citizens (women and men) around the world, we have to collect the information and to analyze it, adding awareness to knowledge in order to bridge the divides. The "Methodology to Achieve Millennium's Goals in 2015" we have proposed has been adopted in partnership with the Millennium Project Planning Committee in Washington (http://www.millennium2015.org/files/files/M15_Documents/2009_07_09_Delahaut_M_A_Destatte_Ph_Millennia2015_Methode_Prospective_v3.pdf- File soon presented in English).

Pera Wells, Secretary General of the World Federation of United Nations Associations (WFUNA) hopes that, "In our work together for Millennium, we can contribute to the cause of strengthening the capacities of international organizations and global networks to advance the status of women throughout the world". (http://www.millennium2015.org/2008_Closing_Plenary_2).

Eleonora Masini, professor Emeritus in the Faculty of Social Science of the Rome Gregorian University and former chair of the Millennium Project Italy Node, considers "the motivation of Millennium as crucial because we know that women can make a difference in society and, to do it we must develop the capacity of looking ahead". (http://www.millennium2015.org/2008_Opening_Plenary_2).

The 2011 Steering Committee has been working since 8 March 2009. The process is on going and we plan to create an impact on the political agenda at all levels. We welcome the United Nations Global Alliance for ICT and Development Partners who will contribute to Millennium 2015 foresight research process. ■

For more information on Millennium 2015, please visit - <http://www.millennium2015.org>, <http://www.institut-destree.eu>

ICT for illiteracy eradication

Gender equality is more than a goal in itself. It is a precondition for meeting the challenge of reducing poverty, promoting sustainable development and building good governance.

- Kofi Annan



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ICTs can enhance human development by their application to economic, political and social processes and creating new opportunities. ICTs create new economic and employment opportunities, new education prospects, more access to e-government services, and increased access to knowledge, all of which accelerate the process of human development¹. However, after exploring gender power relations in ICT platforms and understanding the inequality that persists, it would be doubtful that ICT4D projects would equally benefit women, a segment of the society that does not have equal access to ICTs.

Therefore, ICT4D projects should be gender sensitive. Admitting the fact that ICTs are not gender neutral, development projects based on ICTs should put this factor into consideration when targeting projects beneficiaries. Gender specific projects should be promoted; targeting women who cannot, due to various factors, have access to these technologies. Capacity building trainings directly targeting women and tailored according to their social and financial circumstances should be increased. Business training which targets women and provides them with knowledge relevant to their business to increase their productivity, manage small businesses, sell products, and seek new economic opportunities, should be promoted. Facilitation of ICTs for distance learning and training can resolve the obstacle of women being less available for seeking such services out of their homes due to household responsibilities or due to cultural barriers².

One of the ICT-TF's main projects that endorse gender equity and focuses on using ICTs to promote education is ICT for Illiteracy Eradication (ICT4IE). According to official statistics provided by the Central Agency for Public Mobilisation

and Statistics (CAPMAS), the number of illiterates in Egypt is 17 million among the general population with women constituting around 70% of the illiterates. The prevalence of illiteracy among women, particularly in very conservative rural and remote areas, and the demonstrated discomfort among many older students in traditional illiteracy eradication classrooms, gave rise to the idea of mobilising multimedia technology in an effort to produce educational content on a CD set that can be used in eradicating illiteracy. This set which consists of 3 CDs (2 for illiteracy eradication, and a CD that provides the student a crash course to orient him/her for preparatory level schooling) can be used in the privacy of the trainees' home, in a community development centre, or at an NGO office (visit: http://www.youtube.com/watch?v=avtrTyZ-_HE)

The CDs course is similar to the GALAE (General Authority for Learning and Adult Education) official course which means that it enables the students to enter the GALAE exams and be IE certified. The multimedia course is for duration of 4 months compared to 10 months by the traditional way. It has been applied on 5218 illiterates till now, about 50% from them are women. 85% passed the IE exams and were certified. The impact of the course on their lives which brought about many positive changes have been documented in the form of success stories, examples of which are given below. Following up with the programme graduates, many success stories have been collected that revealed radical changes in the graduates' lives as a result of completing the ICT4IE programme (see success stories).

Furthermore, one of the groups that are targeted in the ICT4IE project is the rural women and women in deprived areas. Although partnerships were made with

more than 350 NGOs in urban, rural and remote governorates as well as IT clubs to have access to the maximum number of illiterates (women and men), due to social customs and traditions, women were still unreached since they are not allowed to leave home to attend illiteracy classes in the NGO or IT club in their governorate.

To overcome such an obstacle, innovative solutions that recognise local norms were needed. ICT Trust Fund has implemented a local project to produce new ICT infrastructure that helps in increasing access to ICT for the local community. This tool, called 'Tabluter', is based on the traditional wooden table known in Egypt as the tablya. The tabluter is a customised ergonomic embedded computer on a table. The embedded computer is a single CPU that runs for four independent users. Each user is equipped with his/her own screen, keyboard, mouse and sound card. The Tabluter is situated in an individual home where IT classes and illiteracy eradication classes are being held.

The Tabluter offers IT empowerment to rural and remote communities, particularly women. It offers them a unique chance to gain access to ICT from the comfort and privacy of their homes thus respecting community traditions which has been standing in their way to cross the digital divide and eradicate illiteracy.

Converting Challenges to Opportunities

TAs stated earlier, if ICT4D projects become gender sensitive, giving women equal opportunities to develop, not only would women reap the benefits of ICTs, they will also be used as a tool to further women's empowerment. Once ICT4D projects become gender sensitive, women will be able to pursue their right to development including opportunities to organise economic activities, increase access to informal and continued education and improve information to serve public health. Furthermore, gender sensitive ICTs could be used as a tool for challenging gender inequalities and empowering women in a number of ways including: building on women capacities; using ICTs to promote gender equality; increasing women's access to public information and governmental benefits and services; and voicing women's opinions and perspectives³.

Aware of the fact that computers are not ubiquitous in the county, ICT-TF and MCIT always investigate ways to reach out to all target beneficiaries keeping in mind the issues of gender, remote areas, technical issues, etc. By adapting the surrounding environment to make ICT tools affordable and accessible to all citizens nationwide, the following solutions have been developed:

The IT-Clubs Initiative: The Ministry equipped more than 1892⁴ NGOs, telecentres, Community Learning Centers (CLCs)⁵, universities, and youth centers with computer labs equipped with computers, printers, networks, access to the Internet, and most importantly, well-trained instructors.

- **The Mobile IT Club Initiative (MITC):** The MITC is a vehicle that is equipped with computers that travel to remote areas to provide access to technology and entrance to cyberspace. The unit is not merely a piece of equipment but is a comprehensive programme for members of the community to equalize services to metropolitan residents.



The Tabluter is a table with a shared computer.

Courses are offered for computer literacy, Internet access, business skills, and more.

- **The Computer for Every Home Initiative:** It is a national programme called 'Egypt PC 2010 – Nation Online'. The main improvements include the provision of loans via normal credit banking procedures (alongside the use of telephone lines as collateral); it aims to cover 3 million families by the end of 2010, with greater focus on citizens in the C and D economic brackets. This would represent coverage of at least 25% of Egyptian families. Egypt PC 2010 focuses on three categories of PCs: Family; Desktop Mid/High-End; and Laptop. The Family Category offers two models starting at LE⁶ 1,585 with monthly installments of LE 43. The Desktop Mid/High-End Category, intended for professional/specialized use, offers two models starting at LE 2,900 with monthly installments of LE 84. The Laptop Category, for professional/specialized or personal use, offers two models starting at LE 3,990 with monthly installments of LE 114.

Even if women don't have PCs, they can either use any nearby IT-Club or share in the Computer for Every Home Initiative, or even use the 'tabluter' if their customs prevent them from accessing PCs outside home.

Activities – Past, Present and Future

To date, the ICT4IE CDs has been applied on 5218 illiterates; about 50% of whom are women. 85% passed the IE exams and were certified. In addition, 50 rounds of training of trainers (ToTs) have been conducted and 500 trainers have been certified. The CDs have been distributed among 450 IT-Clubs and NGOs. One NGO in Minya governorate successfully taught 1200 illiterates with the CDs, 900 of whom passed the GALAE exams.

Furthermore, an MOU with National Council for Childhood and Motherhood (NCCM) was signed in order to eradicate the illiteracy of 300 Seeped-education children in 3 governorates

- **Assuit** (80 children completed their training on ICT4IE program; 90% of them successfully passed GALAE exams),
- **Aswan** (80 trainer enrolled) , and
- **Sohag** (currently, in the registration phase).

Sustainability of the project

Keeping in mind the national importance of this literacy programme and an agreement signed with the GALAE, the project's activities will continue. Financially, the activities are supported by different institutions like the security forces, the NCCM and other parties working in this domain. A MoU has been concluded between MCIT and GALAE with the objective of using ICT4IE to eradicate illiteracy of 10,000 illiterates in 10 governorates with the highest literacy rates annually. This promises huge achievements for illiteracy eradication in Egypt in coming years.

On the other hand, a plan is underway to develop a portal which provides distant learning opportunities using the ICT4IE materials. The localization for Arabic language for different Arab countries is easy and available.

Conclusion

Although ICTs are neutral in essence, they are influenced by the host cultures. And since gender inequality is still persistent in many cultures, evidence and statistics suggest the existence of a gender digital divide. This gender digital divide is also reflected in ICT4D projects which are designed to target everyone, however, girls and women are not equally benefitted from them. The

challenges posed by the current situation of gender and ICT can always be transformed to opportunities. There are numerous ways in which ICT for development projects could be gender sensitive in order to offer maximum beneficial results. The increased access to ICTs by women will help the development and empowerment of women, hence societies in general in several ways. ■

References:

1. Marcelle, Gillian. "From Conceptual Ambiguity to Transformation: Incorporating Gender Equality and Women's Empowerment in the ICT arena" United Nations Division for the Advancement of Women (DAW). 2 December 2002. <http://www.un.org/womenwatch/daw/egm/ict2002/reports/Paper-GMarcelle.PDF>
2. "Gender and Information & Communications Technology". USAID. http://www.usaid.gov/our_work/cross-cutting_programs/wid/ict/index.html
3. Gurumurthy, Anita. "GENDER and ICTs: Overview Report". Institute of Development Studies. September 2004. <http://www.bridge.ids.ac.uk/reports/CEP-ICTs-OR.pdf>
4. http://www.mcit.gov.eg/club_tech.aspx
5. Schools working after school time as community learning centers, providing the neighbouring communities with ICT tools such as PC labs with Internet connectivity and capacity building programmes with cost recovery fees
6. LE - Egyptian Pound which stands for Livre égyptienne

ICT4IE Success Stories

Reaching the Far

Getting a job and keeping it is often a problem. In order to make ends meet one has to be determined, flexible, highly competitive, and be prepared to grab any opportunity that comes. One struggling mother who has done just this is Amal Fathy Mohamed from Menya. She is a 31 years old widow with two kids. She left school at the third primary grade in order to work in the Post Institution as an archiving employee and help her family.

Early on, Amal knew that she would have to stand out from her peers if she was going to capitalise on her dreams. She recalls: "As a result of an agreement being signed between the project and the Post Institution, I had the chance to join the Illiteracy Eradication (IE) classes in April 2005. Although I live 25 kilometres away from where the IE classes were held, I became very much interested because I found myself not only reading and writing but also using a computer and surfing the Internet. Because of the programme, my employer is able to put enormous confidence in me to carry out any duties promptly and efficiently using ICT"

ICT4IE Ambassador

Enrolling in an Illiteracy Eradication Training is known to change your life for the better. And sometimes it can allow you to make the lives of others better too.

Heba Mohamed Abdel Hamid, a 25 years old beautiful young woman, is a kind and outgoing person. She made a visit to Elcshandweel Community Development Association where she had capacity building programme to enhance her education through the ICT4IE programme and boost her knowledge and personal skills.

Her eagerness to learn more convinced her to buy a computer. After thinking a lot about the monetary issues she decided to utilize the "Computer for every home" initiative and got a computer and opened up a new world of knowledge and hopes for better employment opportunities and a better life.

But the good news didn't end there. Heba played a vital role in promoting ICT awareness among her family members as well as her friends as she started to eradicate their illiteracy too. Currently, she works as a co-trainer at the same association. The right training

can make all the difference in securing a bright future.

New vistas have been opened

Mrs. Gamalat Mohamed, a handsome woman of about 45 years, married with two kids, is a kind and outgoing person. In spite of her daily domestic chores, she made time to visit to a Community Development Association where she had enrolled in an illiteracy eradication programme to enhance her reading and writing skills in order to gain general knowledge and personal skills. As a result, new vistas opened for her with a promising future.

Currently, she is enrolled in a formal education school and wishes to continue her higher education and get a Bachelors degree in the field of commerce. Mrs. Gamalat played a vital role in promoting ICT for illiteracy awareness among her family members as well as her friends. She also works as a trainer in the general cooperative production of the handmade products.

Her story shows that even in hard economic circumstances, the right education can make all the difference to securing a bright future.

Reflections: Engendering ICT4D

In this paper we focus on the impact of the explosion of digital techniques, and its effect on society.



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Introduction

At all levels we see technological changes occurring in a rapid pace. In Information and Communication Technology we observe an exponential growth in the development of new technologies for quite some years already, especially in areas like: connectivity, information dissemination, information devices, robotics and wireless technology.

ICT from a driver seat position

The World Wide Web has conquered the Western world with an enormous speed in the past decade. Like a tsunami wave it has rolled out itself in each and every corner of society, leaving few spots untouched. A special characteristic of the Internet is that from its very beginning it has been a technology that promotes sharing (of knowledge, information, resources, etc.)

As a consequence of all these technical innovations, we have noticed a remarkable explosion of new Information and Communication Technology applications (ICTs). Some of the striking examples of which are applications in the context of health care, agriculture, transport, housing, commerce, water and energy. Many of these areas are especially important for women, as they are most active in society and therefore leading caretakers of economic development. For instance, the mobile phone plays a central role and has already shown a very positive impact in these developments. This way of applying new technologies is very interesting in developing countries. These countries that are now gradually hooking up with digitalisation will not follow the trail set by the Western society, they will more or less leapfrog, integrate and adapt existing technologies to the needs of their own society.

Major societal changes

An important characteristic of Web technology for our purposes is the availability of enormous amounts of information and the dramatic increase of communication options on the Internet. Consequently, the phenomenon of (professionally) working at home (or anywhere) all of a sudden becomes a realistic alternative for many, and long-distance collaboration shows to be a successful option for business and individuals. It has been argued, discussed and supported globally how important this is for developing countries generally, and more specifically for the deprived and vulnerable groups like women in a rapidly changing society.

The new technology gradually leads to changes in:

- juridical concepts (copyright, etc.)
- individual and social practices (searching information, collaboration, roles, etc.)
- individual and social concepts (time, space, community, reputation, etc.)
- individual and social values (security, trust, virtue connected to roles, reciprocity, etc.)

By the changing intuitions of these concepts, rooted values in life will undergo changes, and new strategies unfold to optimize these values in daily life. Eventually it will lead to a substantial change in attitude, and thus (in terms of Hofstede (see Shore & Vekatachalam, 1996) to the “collective programming”, or so to say the cultural “software of the mind”, of individuals in their society. In other words, it will lead to substantial changes in cultural patterns in society and restructuring of the traditional way of sharing life. Typical questions are:

- What do we know, how do we learn?
- How do we share, and what?

- How do we collaborate, and with whom?
- How do we balance between the various values?

These changing values obviously will have a major impact on the basic structure of our society, and will lead to a renegotiation of what is called 'the gender contract' (Hirdman, 1990).

A Revolution, digitize and customize

One effect of the industrial revolution was the introduction of proletarian family with its (nowadays) familiar traditional role patterns (Berg & Hudson, 1992). At first job opportunities were available for women and equal work was offered in factories. But due to heavy labour, long working hours and unequal payment, women opted out of participation in the labour market. The traditional role of women as house keepers, and care takers and men as the income provider was a fact. These role patterns guarantee posterity in the post-industrial society. Only few women would be given the opportunity to penetrate into higher education and schooled jobs. Besides, the industrial revolution has led to a significant increase of the population, due to the delayed drop of birth rate as response to a reduced death rate caused by improved conditions. This has been described as the Plateau Model.

As a consequence of the new technology, we see that the developed world order has transformed into the so-called information society (Leavers, 2004). In this model, the digital revolution leads us to the network society. Underdeveloped countries have not experienced the industrial revolution as the western world has, and may be marked as traditional societies. They are expected to enter the digital revolution heading straight into a networked society.

As we argued in the previous section, the technological developments will require a new gender contract. Besides, an impact on population size is most likely to happen. Economic growth, better working conditions, and increasing participation of women on the labour market, fulfilling better positions as independent income providers, the fertility rate will drop. This can already be seen from figures in the EU. As mortality rate will not drop in that pace, using again the Plateau Model, we may expect to see the reverse effect, a decline on the population size as caused by the industrial revolution. In EU25 we already see (like in the industrial revolution) a changing relation between labour and family, and consequently this population distribution change (Institute for Family Policies, 2008).

Global participation and sharing

As the world becomes more digitally interdependent, access to digital networks and technology becomes critical and moves from a luxury to a necessity. In order to participate in the global developments of the new technology, and of more recent time the digital revolution, there are a number of conditions to be fulfilled to become and stay a member of the world community (Shenkar & Luo, 2003). Country competitiveness is a consequence of its productivity, which is dependent on economic growth and stability.

Just providing universal access is not enough. To take full advantage of the benefits of the digital world, all citizens worldwide must be able to participate, to contribute, and to influence. They need a voice in how technology and the political, social, and economic policies that govern it evolve. Those that do not have this will be confined to the role of "recipients" forced to accept the choices made by more influential participants who might have little knowledge of or concern for the needs and priorities of others.

Societal change and gender

These changes have an impact on the level of policy making. Modern information and communication technology will change decision-making practices and therefore lead to an evolution of the democratic model. These issues are to be discussed in the context of the trias politica political model. This also leads to a discussion of Human Internet Rights, as pointed out by ICT Policy & Internet Rights (APC, 2008) according to the model of Human Rights, and their gender related effects (Yu, 2002).

"Prediction is very difficult, especially about the future."
- Niels Bohr

Conclusion

In our paper we have been led by the 'Plan of Action' from the Commonwealth Secretariat in Beijing (Commonwealth Secretariat, 2005), with as special target the speed up process of the empowerment for women. In this plan is formulated that government and other actors have to introduce an active and visible 'gender mainstreaming' policy in all their policy documents and programs.

We conclude that gender issues require special attention in the context of these rapid changes. The challenges are on the issue of creating an environment conscious society in which a harmonious cooperation between both genders is of great importance for economic development, particularly in the domain of ICT. ■

References:

1. APC. (2008). *APC Internet Rights Charter for social justice and sustainable development*. (Association for Progressive Communication). Version at 09 13 2008, from APC.org: <http://rights.apc.org/charter.shtml>
2. Shore, B., & Vekatachalam, A. R. (1996). *Role of national culture in the transfer of information technology*. *Journal of Strategic Information Systems*, 4, 19-35.
3. Institute for Family Policies. (2008). *Report on the Evolution of the Family in Europe 2008*.
4. Yu, C. (2002). *ICTs and Gender Equality - Women's Rights and the Internet. Workshop on The World Summit on The Information Society: The Asian Response*, (pp. 22-24). Bangkok.
5. Berg, M. & Hudson, P. (1992) *Rehabilitating the Industrial Revolution, The Economic History Review, New Series, Vol. 45, No. 1. (Feb., 1992), pp. 24-50.*
6. Hirdman, Yvonne (1990), *The Gender System: Theoretical Reflections on the Social Subordination of Women, The Study of Power and Democracy in Sweden, English Series, Report no.40, Uppsala: Maktutredningen.*

Using ICTs against climate change

Advanced ICT systems are already being used to streamline the measurement and enforcement of carbon offsets, financial flows and carbon credits for international investors.



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A review of current research and documentation shows that there are few comprehensive materials that look at women's use of and access to ICTs in the context of farming and climate change. Comprehensive studies on ICTs and climate change - by specialist institutions such as the International Telecommunication Union (ITU), appear to continue to omit consideration of small user groups, farmers and women.

Tsunami information did not get to people in time

A good example of the use of ICTs for disaster relief is the establishment of a tsunami early-warning and mitigation system for the Indian Ocean, following the tsunami of 26 December 2004, operating under the aegis of the United Nations Educational Scientific and Cultural Organisation's (UNESCO) International Oceanographic Commission. A similar system has existed in the Pacific Ocean since 1965 and the Indian Ocean system is based on 25 seismic stations, 26 national tsunami centres and three deep ocean sensors, with messages sent by satellite phone. It became operational in June 2006. However, when it was needed for real the following month as a result of the Java earthquake, no message was relayed to coastal areas of Indonesia and hundreds of people were killed by the ensuing tidal wave. In a test conducted on 24 January 2007, the average delay between a message being sent (by SMS and email) and a response received ranged between a minimum of two minutes (seven countries) and 31 hours (Indonesia), with three countries failing to respond at all. UNESCO has admitted that more coordination among governments is needed.

(Sources: Adapted from IOC/UNESCO, <http://ioc3.unesco.org/indotsunami/>, and



Hillside organic farm

BBC, <http://news.bbc.co.uk/2/hi/asia-pacific/5191190.stm>)

Our recent literature review indicates that despite the lack of dependable data on the impact of climate change on agriculture, the issue is gaining more attention as climate issues attract more urgency. At the same time, it is clear that the treatment of climate change and agriculture needs to be localised in order for it to be of any value to farmers and policy makers alike.

Economies of scale mean that innovative initiatives in either agriculture or in ICT applications tend to be limited to the large-scale. The Guyana mapping initiative, for example, had not considered its potential value for small-holder farmers. Climate-risk insurance schemes in Jamaica are limited to large-scale coffee and cotton cash crop producers.

Advanced ICT systems are already being used to streamline the measurement and enforcement of carbon offsets, financial flows and carbon credits for international investors. General Intelligence Service (GIS) mapping systems and climate simulation software are also developing rapidly to keep up with scientific research and analysis of climate change. Examples where ICTs are placed in the hands of small-scale farm holdings or vulnerable sections of society, however, are few and

far between. This is where information bottlenecks can have calamitous effects for people. Accurate flooding simulations for New Orleans had been presented to the United States Government one full year before Hurricane Katrina struck the city, but no action was taken by the authorities to prepare for this likelihood, with fatal consequences for many of the local populations. All the sophistication of climate simulation software and forecasting models is lost if neither state nor citizen are able to see it, discuss it and plan for it.

Both the relaying of instant messages during emergencies and the process of longer term planning will require that 'networked information' is no longer limited to governments and to institutions but must be made available to the public domain through multi-levels of access and distribution points with farmers and farms as active actors and spaces.

Now, more than ever, there is a direct correlation between security of livelihood and holistic and complete information. Those who are marginalised from information or who have incomplete information are disengaged from taking decisions about their long term security. The confluence of rural poverty and environmental degradation are well documented - and environmental degradation and poverty become more widespread often because information and its documentation is lacking. 'Security' now means not just food security and livelihood security, but also the security of sustained natural resource resilience, of the predictability of information, of the provision for those in need in the community (such as the frail and elderly) and of financial insurance to cover times of need and recovery.

In traditional small holder society, crop diversity was not an accident of history or geography, but a product of management and stewardship of particular cultures and communities. Many First Nation groups across North America for instance, grew a combination of corn, beans and squash (referred to as the 'three sisters') whose converging properties took care of both soil and crop. Farmers need to be able to build upon these traditional agricultural systems relying on historical information and their farm 'memory' of risks and trials while adopting new practices based on scientific data and our current understanding of the climate system. In other words, the evidence of climate change needs to be made a part of farmers' future planning scenarios and realities, and needs to be expressed in terms familiar to them.

Based on our field experience, it is clear that women are not only keen to get information, they are swift to apply what they learn and are pragmatists when it comes to securing assets, natural resources, capital and markets for the livelihoods of their communities. At the same time, women farmers who are looking to improve their livelihood security also often face:

- Incomplete information and poor access to data and intelligence;
- Limited recourse to regulations or legal instruments that support their interests;
- Limited access to services including credit, computer access, land tenure;
- Limited access to insurance or disaster relief benefits; and
- Limited negotiating power as a result of the above.

With the diffusion of wireless into rural areas in the Caribbean region, information communication technologies



Taking the laptop onto the organic coffee farm to present visual materials to the farmers

(ICTs) could provide an important set of tools for addressing information gaps because they have the potential to allow women to be part of the communication value chain and to break through information bottlenecks. In the digital age, sources of information should no longer be 'top-down' nor single-sourced. They are multidimensional and multi-sourced which is why it is especially dangerous when myths, misperceptions or incomplete information abound. In discussions at Networked Intelligence for Development (NID) training workshops,[i] several women farmers noted how they use their cell phones to pass along daily psalms to their family and friends; in times of crisis or emergency it is very likely that similar methods of transmitting messages and warnings would take place.

ICTs are and will continue to be an integral part of any climate change management plan. In general, there are three main aspects of communication that ICTs can be used for:

Localised information: Time sensitive, simplified and multiplied localised information is the bedrock to planning for and managing climate change. Farmers depend on daily weather reports or the Farmer's Almanac to forecast weather, now that farm security is increasingly linked to the ability to forecast or anticipate climate change, dependable, localised and current information is needed. The micro-climatic nature of the Caribbean weather means that information needs to be drawn from a range of sources for it to be valid and useful to farmers.

Data collection, record keeping and transparency: Verification, benchmarking and measuring agricultural, natural resource and climatic data requires a solid commitment by scientists, farmers and analysts alike to share information and data. This means a continual flow of information – a feedback loop – from ground up to satellite and back down. The old system of extension service from the urban to the rural is no longer valid. At the same time, it is clear that government legislation needs to be updated to conserve forests and farmlands alike and to respond to the needs of land management in the context of climate change. There is, furthermore, a clear link between organic farming and its record-keeping, transparency and data collection aspects - organic farmers are already acclimatised to these processes and are required to do so. They, therefore, are very likely to be in the vanguard of localised data collection such as weather data collection systems.

Networking, cooperation and advocacy: distribution and engagement of information among farmers, within communities, across islands and countries will strengthen the regions' resilience and capacity to handle the crises that we can expect with climate change. Local media, community radio and phone use are increasingly important as new ways of sharing and learning about these momentous shifts. Radio is a 21st century media solution as it couples up with other technologies such as Global System for Mobile Communications (GSM) phones and Short Messaging Service (SMS) technology. A radio and text messaging mash-up allows any villager with a cell phone to respond to what they hear on relevant community issues and broadcast it over radio in low literacy/limited Internet environments.

All facets and aspects of the above, from the very local cell phone call to the Global Positioning System (GPS) – are much simplified and made possible by the range of potentials that ICTs place at our disposal.

Through interactions and engagement with women farmers, it is abundantly clear that ICTs need to be further diffused into rural areas, and diffused deliberately among women users. These women are eager not only to use wireless phones for a host of personal reasons, but are keen to learn to use the Internet; to share information, stories and images; and to become engaged participants in the digital age as knowledgeable farmers. The participants at a recent climate change pilot workshop in Jamaica were introduced to a number of online tools to measure farm carbon footprints, and could see how potential uses of ICT tools could track and measure climate change – which would have an immediate impact on their own activities and decisions if they had access and connectivity.

Many of our global environmental issues are directly related to the Earth's natural resource base. According to James G. Speth^[ii], today's major global scale challenges include climate disruption, losing forests, losing land, losing freshwater, losing marine fisheries, losing biodiversity, and over-fertilization with nitrogen (leading to large areas of dead soil and ocean). All of these challenges and losses are inter-linked and inter-dependent, resulting from modern methods of land use and the relentless exploitation of resources for consumption and profit. Poverty aggravates the issue; the chopping away of coastal sea grape or mangrove swamps for coal for personal use damages the coastline's natural defense systems against the ravages of hurricane-related erosion. The long-standardised and established principles of land use methods need to be 'unlearned' and reversed, the vested interests of an entrenched agro-industrial system^[iii] and its system of subsidies dismantled, and by the same token, those people who could be the natural stewards of land and natural resources need to be recognised, valued and empowered to take new strides in the context of climate change.

Three fundamental conclusions arise from our field research:

1. Field research shows that small-holders in general and women farmers in particular are generally left out of emerging discussions and decisions around farming, food security and climate change. This needs to be redressed.
2. Comparative research has proven that compared to non-



Taking the laptop onto the organic coffee farm to present visual materials to the farmers

organic farming systems, organic farming methods positively address a range of factors related to climate change. Organic farming, however, is not mentioned in the Intergovernmental Panel on Climate Change (IPCC) 2007 report and continues to be isolated from mainstream agricultural discourse. This also needs to be redressed.

3. Interactions and communications with farmers, small holder farmers and women farmers prove that they are a critical part of the solution to contain greenhouse gas (GHG) emissions. They are not mere receivers of information or instruction but are valuable record keepers, watchful data collectors, and on-the-ground pulse takers of the impact of climate change on the biosphere. This needs to be recognised and supported.

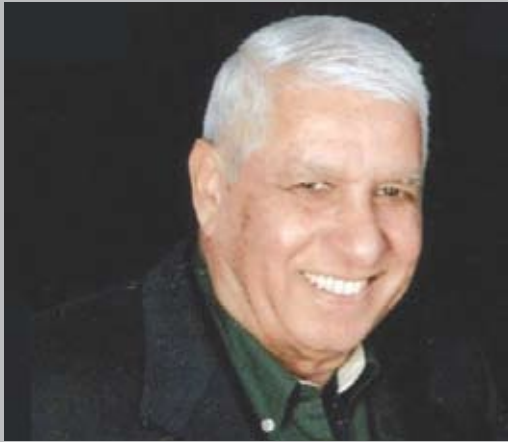
Conclusion

In a nutshell, various experiments for integrating microfinance and ICT have been undertaken and even more numbers are going to come in the future. The issue however, is to enable the MFIs to meet their goals by helping them have maximum outreach, be sustainable and be transparent in their business and processes. ICT can only be an enabler, and not the driver, and the real success of MFIs has to be measured vis-a-vis their social performance and not by their ICT/technology readiness and preparedness. ■

References:

1. Robinson, Marguerite S, 'Microfinance: the Paradigm Shift from Credit Delivery to Sustainable Financial Intermediation', in Mwangi S Kimenyi, Robert C Wieland and J D Von Pischke (eds), 1998, *Strategic Issues in Microfinance*, Ashgate Publishing: Aldershot
2. *Microfinance: An Introduction* by R Srinivaan and M S Sriram in *Round Table, IIMB Management Review*, June 2003, (Pg-52-53)
3. Hari Srinivas, *The Global Development Research Centre (GDRC)*, <http://www.gdrc.org/icm/data/d-snapshot.html> accessed on 29-05-2009
4. *Report of the Steering Committee on Microfinance and Poverty Alleviation, The Eleventh Five Year Plan, (2007-08 - 2011-12)*, Development Policy Division, Planning Commission, New Delhi, May - 2007, Pg-28

India and the Kyoto Accord



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The science of global warming is intensely debated at present in the news media as well as among the world scientific community. This article briefly summarizes the present state of the global warming science and concludes that the basic hypothesis of Anthropogenic Global Warming (AGW) and human-induced climate change remains far from settled. The article further analyzes India's participation at the upcoming UNFCCC (United Nations Framework Convention on Climate Change) meeting in Copenhagen, Denmark to discuss (greenhouse gas-GHG) emission targets for the post-2012 phase of the Kyoto Accord.

Introduction

The science of global warming and climate change is perhaps the most challenging science of our time and offers a tremendous opportunity for further development of ICT (Information and Communication Technology) within India as well as at international levels. The scientific debate on the science is now spilled into news (TV and print) media where large numbers of articles, reports and scientific commentaries are reported and discussed frequently. The world wide web also provides easy access to a number of scientific and informative papers, etc., on the science of global warming. Among the most commonly discussed issues are increasing concentrations of human induced carbon

dioxide (one of the main greenhouse gases which trap outgoing radiation from the earth's surface) leading to warming of the earth's atmosphere and subsequent deleterious impact on human societies. Many environmentalists (especially in USA and Canada) have labeled carbon dioxide as a pollutant and are pushing for stricter government (local and federal) control on carbon dioxide. Among the envisaged adverse future impacts are increasing frequency of extreme weather events like heat waves, droughts/flood, etc., and the possibility of escalating sea-level rise leading to catastrophic flooding of low-lying land areas of the world. The Intergovernmental Panel on Climate Change (IPCC, a United Nations' body

of scientists established in 1988) has been providing periodic assessment of earth's climate and its most recent climate change documents (IPCC 2007) discuss various scenarios of future climate change and possible adverse impacts. These future projections of adverse impacts of climate change are based on computer-based climate models developed at a number of research organisations world-wide. Several recent studies have questioned the basic AGW hypothesis and many other issues and this has led to growing uncertainty among many scientists about the validity of future climate projections by computer climate models. Further, recent research now suggests that the global warming of the 1980s and 1990s may be due to natural

climate variability and not due to human-induced carbon dioxide. The current thrust of the debate appears to be more on developing (GHG) emission targets and less on the reality of climate change science with scientists on both sides of the debate stuck in their rigid stance. The following sections present a brief summary of the global warming debate with a closer look at some of the important issues.

A brief survey of the present debate

The present debate on the global warming science may have begun with a landmark paper by Revelle and Suess (1958) in which the lead author (late) Roger Revelle, an eminent American geophysicist, stated that ‘humans are carrying out a large-scale geophysical experiment through world-wide industrial activity that could lead to build-up of CO₂ greater than the rate of CO₂ production by volcanoes’. Revelle and Suess estimated the human-added CO₂ in the 1950s and expressed concern that this continued build-up of carbon dioxide could impact the earth’s climate in future. Revelle was also instrumental in establishing the first carbon dioxide measuring station at Mauna Loa in Hawaii in 1956. Another carbon dioxide measuring location at the Antarctic was established later and today there are over two dozen such observing stations. Based on these measurements, it is now well established that the atmospheric carbon dioxide concentration has increased from a value of about 330 ppmv (parts per million by volume) in 1956 to about 380 ppmv today. It must be noted here that the earth’s atmosphere consists of nitrogen (~78%), oxygen (~21%) and argon (~0.93%), while carbon dioxide makes up for just about 0.03% of the total atmospheric gases. It is also worthwhile to remember that the atmosphere-ocean system is continuously exchanging carbon dioxide which is estimated at about 150 billion tons (Giga-tons OR Gt) annually while the human-added CO₂ is about 15-20 billion tons, just about 10-12% of total carbon dioxide exchange between atmosphere and ocean.

The publication of Revlle/Suess paper sparked rapid development of a number of computer-based climate models which attempted to simulate the impact of increasing future concentration of carbon dioxide on the earth’s mean temperature. Using steadily increasing concentration of carbon dioxide based on some assumed emission scenarios, some of the earlier climate models developed in the 1990s estimated mean temperature increase of between 1.4C to 5.8C by the end of 2100 (IPCC 2007). The most recent study (Knutti et al 2008) examines a suite of climate models and a best guess value of 2.8C with a range of 1.7C to 4.4C is obtained for the mean temperature increase by 2100. Many climate modelers now estimate the mean temperature increase for a doubling of the present value of carbon dioxide concentration (ex. from a present value of about 350 to a value of say 700 or about) over the next fifty to one hundred years and this value is often referred to as climate sensitivity. Several recent studies (e.g., Lindzen 2007; Schwartz 2007) now suggest that this climate sensitivity obtained by a number of climate models is too large and a more realistic value may be just about 1C to 1.5C. The proponents of the AGW (Anthropogenic Global Warming) hypothesis insist that the climate sensitivity is as large as 3C, which could produce severe adverse impacts on humans and hence a need

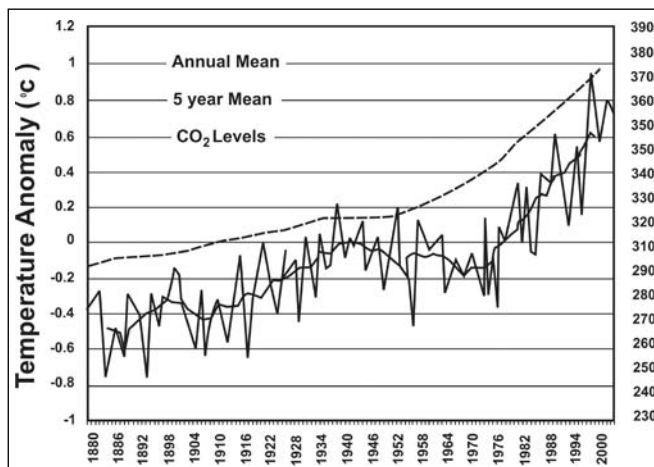


Figure 1: Global mean temperature anomalies (base:1960-1990) in conjunction with atmospheric CO₂ growth 1880-2000. Note two distinct warming periods, 1910-1945 and 1977-2000. Also note the cooling from 1945 to 1975 when the atmospheric CO₂ increased rapidly.

to curb the future growth of carbon dioxide. The present thrust of the debate is to limit the growth of human-added carbon dioxide to no more than about 450 ppmv which according to climate modelers will restrict the mean temperature increase to just about 2C by the end of the twenty-first century. Besides the debate on limiting future GHG emissions, there are several other scientific issues which are closely examined below:

- 1. Global warming and CO₂ link:** More and more studies now suggest strongly that the link between the recent warming of the earth’s surface and increasing concentration of carbon dioxide is elusive and not well established. The earth’s mean temperature variation from 1880 through 2000 and the corresponding changes in the carbon dioxide concentration

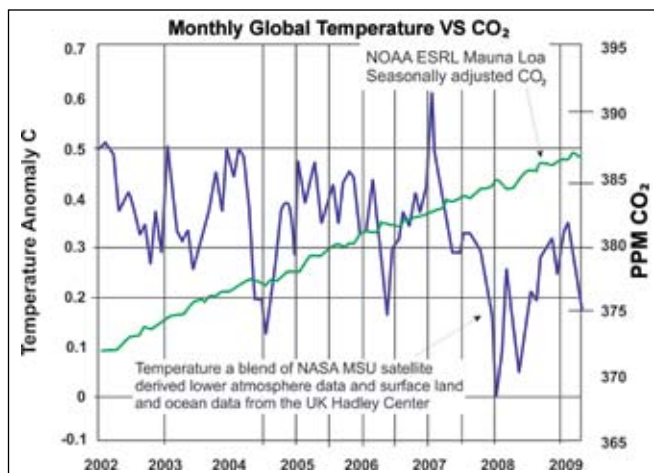


Figure 2: Global mean temperature trends vs. CO₂ growth since 2002. Note the mean temperature is declining while the human-added CO₂ concentration continues to increase.

are shown in Figure 1. This graph shows very little correlation between CO₂ rise and the mean temperature trend. The earth’s mean temperature witnessed two distinct periods of warming, one from about 1910 till 1945 and the second from

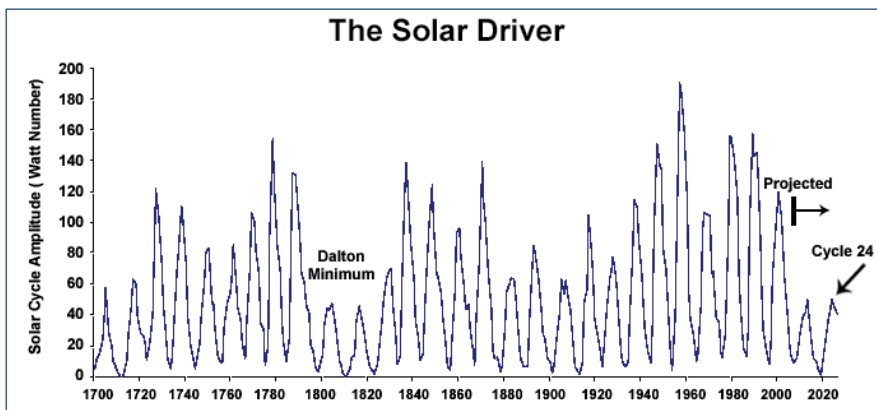


Figure 3: The solar cycles from 1700 till 2000, showing the Dalton Minimum during 1800-1825 and the upcoming cycle 24 which is expected to significantly weaker.

1977 till about 2000. The mean temperature shows a definite cooling from 1945 till about 1977 when the atmospheric carbon dioxide concentration increased rapidly. Figure 2 shows mean temperature and atmospheric CO₂ trends for recent years, 2002-2009. These trends show no correlation at all! Thus the global warming/CO₂ link remains elusive and not well established.

2. **Global warming and extreme weather:** A careful analysis of available weather and climate data show no discernible link between the two. In a number of studies Khandekar (2002, 2004, 2005) examines extreme weather data for Canada and elsewhere and concludes that weather extremes have not increased in recent years. Khandekar also shows that even during the period 1945-1977 when the earth's temperature was declining in general, the extreme weather events occurred with about the same frequency. The global warming/extreme weather link, according to Khandekar et al (2005) is 'more a perception than reality, this perception being fostered by recent awareness of extreme weather and its frequent reporting by news media'.
3. **Global warming and sea-level rise (SLR):** This is one of the most contentious issues in the global warming science today. Present observational technology has allowed closer inspection of the Greenland and the Antarctic ice shelves. Several recent observational studies seem to suggest that these ice shelves are at present melting faster than previously thought and this could lead to escalated SLR in the next few decades. An estimate of SLR is provided in a recent comprehensive paper (Wunsch et al 2007) in which the authors obtain a value of about 1.6 mm/yr for the sea-level rise based on data from 1993-2004. Other recent studies suggest no escalated SLR at present. The best guess value of sea-level rise is now estimated to be about 2.0 mm/year (~20 cm over 100 years) and this value does not appear to pose significant threat to low-lying areas like Bangladesh, the Maldiv Islands or other small islands in the South Pacific.
4. **Global warming and solar variability:** This is another hotly debated issue at present and there is now a growing consensus among many solar scientists that the earth's climate over geological time scales of millions of years and

also over shorter historical times of past several hundred years is driven primarily by solar variability than by variations in the atmospheric carbon dioxide. Variations in sun's energy at the top of the earth's atmosphere are intimately linked to the cyclical behaviour of the sunspots which vary with an approximate 11-year cycle. Recent studies (Soon et al 2003) provide excellent documentation of the earth's climate linked to sunspot variations during the Little Ice Age (approx 1650-1850) when most of Europe experienced a significantly colder climate than present. In Figure 3 are shown the cyclic variations of sunspots which were at a minimum during the Maunder Minimum (~1625-75) and also during the

Dalton Minimum (~1825-1850) during which the earth's climate was significantly colder than today especially over Europe and parts of North America. According to many solar scientists the next two solar cycles (Cycle 24 and 25) may be significantly weaker in terms of fewer sunspots and this could lead to significantly cooler climate of the earth, especially in high-latitude countries like Canada and northern Europe.

5. **Global warming and atmosphere-ocean CO₂ exchange:** As mentioned earlier, the earth's atmosphere-ocean system continuously exchanges carbon dioxide and about 130 to 150 billion tons of carbon dioxide are exchanged on an annual basis. Further, the world oceans release large amount of carbon dioxide into the atmosphere at higher temperatures and absorb carbon dioxide at lower temperatures. Studies reported in recent literature now suggest that the rapid growth of CO₂ in the earth's atmosphere after the World War II was due to the steep rise of the earth's temperature during the preceding period, 1910-1945. Thus, human-added CO₂ may not be significant when compared to atmosphere-ocean exchange. According to Prof Tom Segalstad of Norway, the world's oceans contain 50 times more carbon dioxide than the atmosphere hence the main source of atmospheric carbon dioxide is the atmosphere-ocean exchange and not human-added CO₂.
6. **Arctic climate:** The Arctic climate is complex and still not fully understood. Several studies reported in recent literature suggest that the Arctic Basin appears to be influenced by low frequency atmospheric circulations with a period of approximately 70 to 80 years. Excellent temperature data from 1875 till 2000 (collected by Dr Polyakov at the University of Alaska USA) show that the Arctic was at its warmest during the 1930s and following several decades of gradual cooling, the Arctic has once again warmed in recent years to about the same level of warming as in the 1930s. Thus, the warming and cooling of the Arctic does not appear to be linked to atmospheric carbon dioxide concentrations.
7. **Carbon dioxide, a staff of life and not a pollutant:** The concept of carbon dioxide as a pollutant is misleading and needs to be corrected. Carbon dioxide is a staff of life for plants and world forestry. It also serves as an excellent

fertilizer in world-wide agriculture. Satellite imagery shows a definite enrichment of world forests in recent years as a result of increased concentration of carbon dioxide. The present concentration of carbon dioxide (about 380 ppmv) is far too small to be of any direct concern to human health. Unless the atmospheric concentration of CO₂ reaches a value of 3000 ppm or more (an extremely unlikely scenario), there is no direct health hazard from CO₂ concentration.

There are several other issues (e.g., role of the world's oceans and their circulation changes on earth's climate) that are being debated at present. When all these issues are put together, an emerging consensus is developing that the science of global warming and climate change is far from settled. There are several uncertainties in the science and in future projections of climate change impacts which need to be examined carefully.

The Kyoto Accord and India's Participation

The Kyoto Accord is an international treaty signed in Kyoto, Japan in 1997 to control and reduce world-wide GHG emissions and in particular industrial carbon dioxide. The Kyoto Accord was officially launched in 2005 and the first phase of the Accord (which exempted developing countries like India, China and others) will come to an end by 2012. The upcoming meeting of the UNFCCC to take place in Copenhagen in early December 2009 will debate the participation of developing nations in the post-2012 phase of the Accord. At this point in time almost all the developing nations have expressed strong reservations to be part of Kyoto after 2012. India and China are among the two 'Top' nations being pressured by the EU (European Union) countries in particular to accept some unspecified emission targets. India's present carbon footprint is a mere 1.5 tons per capita, which is very small compared to about 10 tons for the EU countries and about 20 tons for Canada and the USA. At the climate change meeting in Bonn, Germany held between 15-19 June 2009), the developing nations (India, China, Brazil, etc.) proposed that the developed countries (Annex-1 countries) must accept a reduction target of 40% from their 1990 emission value by the year 2020, before developing nations can accept any definitive targets. Based on newspaper articles in India and elsewhere published in recent weeks, the debate over emission targets is already 'heating up'.

Concluding Remarks

A close scrutiny of the global warming science strongly suggests that the science is far from settled. There is an urgent need to re-assess the science and determine more precisely, the role of human-added carbon dioxide in future climate and its possible adverse impact on human societies, globally. Based on a recent study (Kripalani et al 2003), the Monsoon-dominated climate of India may be minimally affected by present climate change in future. In another recent paper, Khandekar (2008) has suggested 'improved seasonal climate prediction' as suitable adaptation strategy against possible adverse impact of summer Monsoon over India. In view of this, it is imperative that India, China and other developing nations ask for a re-assessment of the global warming science at the UNFCCC meeting in Copenhagen before committing to any GHG emission targets. ■

References:

1. IPCC 2007: *Climate Change 2007: The Physical Science basis. Contribution of the working Group I to the fourth assessment report of the Intergovernmental Panel on Climate Change*, edited by S Solomon et al, Cambridge University Press 856p.
2. Khandekar M L 2002; *Trends and changes in extreme weather events: An assessment with focus on Alberta and Canadian Prairies. Report prepared for Government of Alberta Ministry of Environment Edmonton Alberta* 56p. ISBN:0-7785-2428-0
3. 2005: *Extreme weather trends vs dangerous climate change: A need for critical reassessment. Energy & Environment* 16 p.327-331
4. 2005; *The global warming debate; A review of the state of science. Pure & Applied geophysics* 162 p. 1557-1586
5. 2008: *India's future climate: No cause for alarm. I4d online August 2008* p. 24-26 (www.i4donline.net)
6. Knutti R et al 2008: *A review of uncertainties in global temperature projections over the twenty-first century. J of Climate* 21 p. 2651-2663
7. Kripalani R H, A Kulkarni, S S Sabde and M L Khandekar 2003: *Indian monsoon variability in global warming scenario. Natural Hazards* 29 p.189-206
8. Lindzen RS 2007: *Taking greenhouse warming seriously. Energy & Environment* 18 p. 937-950
9. Revelle R and H E Suess 1957: *carbon dioxide exchange between atmosphere and ocean and the question of an increase in atmospheric CO₂ during the past decade. Tellus* 9 p.18-27
10. Schwartz S 2007: *Heat capacity, time constant and sensitivity of earth's climate system. J of Geophysical Research* 112 D24S05 doi:10.1029/2007JD008746
11. Soon WW-H and S H Yaskell 2003: *The Maunder minimum and the variable sun-earth connection. World Scientific, Singapore*, 278p.
12. Wunsch C, R M Ponte and P Heimbach 2007: *Decadal trends in sea level patterns: 1993-2004. J of Climate* 20 p.5889-5911. ■

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Call for Papers/Articles for greenIT (www.i4donline.net)

To address pertinent climate justice issues and concerns, i4d magazine has launched an exclusive section called greenIT from June 2008 onwards. greenIT will currently feature as a four-page climate supplement and will eventually be converted into a full-fledged print magazine. greenIT of i4d magazine encourages a wide range of submissions in the form of articles, review papers, anecdotes, success stories, case studies etc. from climatologists, decision-makers, climate scientists, environmentalists and community stakeholders. An ideal feature article should be between 1500 and 3000 words, lucidly written and well-supported with data and current trends. Graphs and pictures should be sent in high-resolution (360 dpi) .jpeg, .gif, .tiff or .bmp formats. Case studies/review papers should be between 750-800 words and supported with relevant statistics. For further details on editorial guidelines kindly refer to : http://www.i4donline.net/Editorial/Editorial_Guidelines.asp.

ICT enabled food supply chains

The value chain in agribusiness system involves not only the farmers, but also a wide range of intermediaries including the Government and other organisations.



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Introduction

With changing food consumption patterns, growth of organised food retailing, and favorable government policies, agriculture offers great potential in India. However, there are opportunities existing in the world market as well for export of both fresh and processed agricultural produce. This has been possible due to the changing global economic scenario especially with the opening up of world markets after the WTO regime. Hence, in recent years, the sector has attracted the attention of corporates, farmers, policy-makers and academicians from all over the world. On the market side, the sector faces challenges due to the presence of global players in distribution and commercialization channels along with sophisticated consumer demands for healthy, environment friendly and differentiated products. On the production side, the scope of agribusiness is changing from family-owned small businesses to large firms engaged in production and distribution chains.

Agriculture has become more industrialized, competitive and even more technology and management intensive. Besides these trends, the Government is confronted with the challenges of instituting legislation, agricultural financing and market regulations, building marketing infrastructure, contract farming etc. Alongside, core marketing issues such as branding and distribution too pose critical challenges to stakeholders.

This article discusses the changing agricultural supply chains as well as the challenges they are facing in light of growth of organized food retailing and international trade. It further suggests how ICT-enabled supply chains can help remove marketing inefficiencies and develop farmer-market linkages in the system.

Agricultural supply chain in India

The value chain in agribusiness system involves not only the farmers, who are the primary producers, but also a wide range of intermediaries such as arhtiyas (commission agents), wholesalers and stakeholders including the Government and other organisations.

On the input side, there are seed/ pesticides/ agri-machinery /fertilizer industries whereas in case of output, are the fresh produce marketing channels and the food processing industry and further upstream across the supply chain, the wholesalers, the supermarkets and other distribution channels. Providing services to these agribusiness activities are the banking industry, consulting firms, future markets, auction houses, transportation, logistics, telecommunication firms etc. On the technology front, research institutions are involved in research and development to make agriculture more competitive. Other involved institutions are the NGOs, international institutions and environment policy makers. The Government plays a central role in the whole system acting as a catalyst in fostering research, diffusion of knowledge and providing financing and market regulation mechanisms. Finally, there are consumers whose expression of demand derives the strategies along the chain.

The supply chain issues

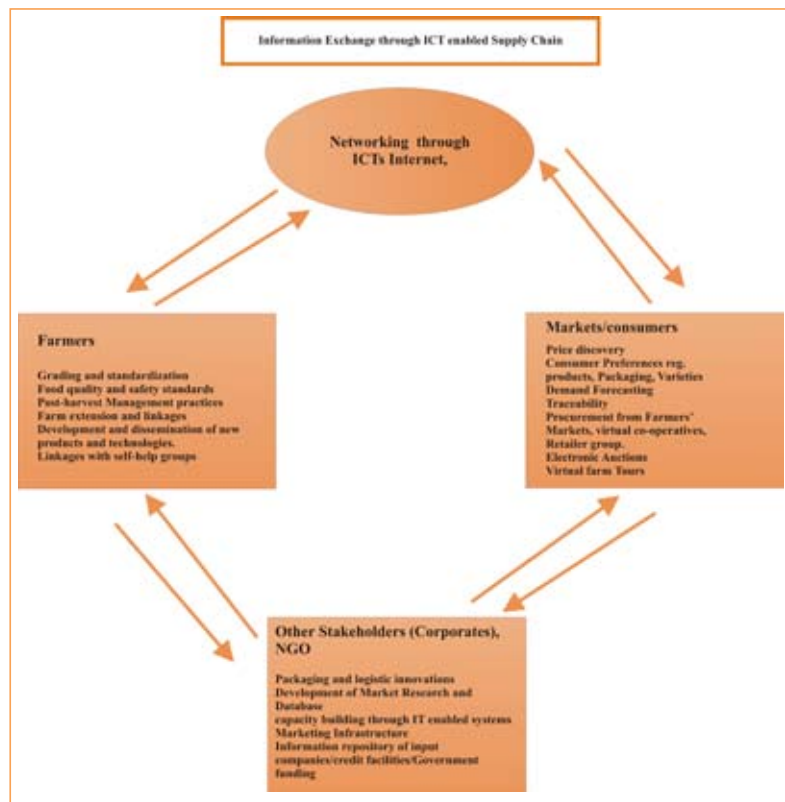
Indian agriculture is constantly on the move and the changes that have taken place during the last decade are taking it towards a more efficient and competitive system. New technologies have ushered in at all the steps in value chain such as high density plantation, irrigation, tissue culture, play-houses, poly-tunnels, protected horticulture, organic farming,

IPM, INM etc. In marketing also, the environment is changing due to increasing domestic as well as international demand. On the domestic front, there have been shifts in consumer tastes and preferences including their rising concerns for quality and safety. Branded fruits with new and attractive packaging such as individual wrapping, shrink wrapping etc. have also found their place on the shelves. Organised retailers have entered the market with fresh as well as processed produce such as FOOD WORLD, GODREJ, MOTHER DAIRY Fruits and Vegetables. The whole selling is being transformed from unorganized markets to the big markets such as SAFAL wholesale market in Bangalore. The Government has also announced a number of policies that will promote agri-business such as, amendments in the Agricultural Produce Marketing Committee (APMC) Act, contract farming, Rural Godown Scheme, National Rural Employment Guarantee Scheme, Marketing Infrastructure Scheme, etc. The recent budget for 2009-10 has also seen a generous flow of funds to agriculture as well as rural areas.

However, there are many challenges to be met, before Indian food chains can actually harness the domestic as well as international opportunities. These are the availability of quality food, reduction of post harvest losses, farmers' access to market intelligence, consumers' preferences as well as better price for farmers. These challenges mainly pertain to providing access to relevant knowledge across the supply chain, which will benefit all the stakeholders including farmers and consumers. Thus, the role of IT can not be ignored in agriculture marketing which needs quick disposal due to perishable nature of the products. The agricultural marketing system in India is dominated by intermediaries, which make the system prone to malpractices such



as incorrect weighing of commodities, incorrect information, and other unfair trade practices. The use of information and communication tools for price discovery gives farmers more information about their choices, a higher profit margin on their crop produce and access to information that improves their productivity, all of these benefits combine to give farmers more control within the system.



ICT-enabled supply chains

Many initiatives are already running in the country, which are helping farmers by providing timely and relevant market and price discovery information of various agricultural commodities. Initiatives such as GRASSO, WARNA, e-Choupal and AGMARKNET are working in these areas. e-Choupal, an initiative of ITC Ltd., has leveraged IT to deliver real-time information and customized knowledge to improve the farmers' decision making ability by aligning the farm output with market demands, and to improve productivity, aggregate demand like a virtual producers' cooperative and access high quality farm inputs at lower costs. The model works at providing market prices from various mandis and also about ITC procurement centres and allows the farmers to take decision on where they want to sell their produce. e-Choupal, along with the Choupal Sagar (the procurement centre cum mall) act as a direct marketing channel with more efficient price discovery and lower transaction costs in output marketing. Reuters Market Light, a project of Thomson Reuters, is also providing highly personalized and relevant information about markets and commodity prices through an SMS based service. Airtel has floated its

scheme Fish Friend for providing price information to fish farmers in coastal states

Besides price discovery, there are many more solutions IT can deliver to build farmer-market linkages. Today, a farmer has to keep himself updated with knowledge about various export markets and their requirements. Customized portals can actually connect these two important links while eliminating the role of traditional intermediaries who hardly add any value to the information chain. The two-way flow of information between consumers as well as the farmer groups can facilitate trade, where consumers/importers can have access to information on aspects such as traceability, good agriculture practices, and quality standards followed by producer groups. Additionally, the farmers may get themselves acquainted with the export specifications of different countries, e.g. pesticide residue limits, etc. Information Technology can also assist in logistic as well as procurement management to increase the efficiency of supply chains. Worldwide Retail Exchange is the largest Internet-based business to business (B2B) exchange for food retailers and their suppliers with annual transactions of \$9bn.

An ICT-enabled system can link the farmers with the food retailers through a system which sends out orders, verify the receipt of orders by suppliers, schedule of delivery and provides data on sales to enable inventory management. The farmers/group of farmers can have access to the database pertaining to retailers' shelves and upload their stock positions of commodities available as well. The retailers'/consumers' choice on various categories/

An ICT-enabled system can link the farmers with the food retailers through a system which sends out orders, verify the receipt of orders by suppliers, schedule of delivery and provides data on sales to enable inventory management.

brands/varieties can also be known to the producer groups.

Conclusion

It is implied that ICT-enabled supply chain can actually build the farm-market linkages by providing timely and appropriate information to the farmers. However, the challenges such as choice of technology (Internet, mobile, VoIP), cost-benefit aspects, integration of various stakeholders, revenue-generation modules as well as capacity building of beneficiaries cannot be ignored while designing these models. The strengthening of our supply chains through ICT infrastructure can surely lead our way to the second Green revolution through market-led extension. ■

References:

- Sharma, M.L., Sikka, B.K., Singh S. & Narula, S.A.; (2005), "E-Marketing of Apples in Uttaranchal" Conference Proceedings of Indian Society of Agricultural Marketing, Pantnagar, published in Indian Journal of Agricultural Marketing, Vol. 19, No.2, Conference Spl.,229-237
- Narula, S.A, Sikka, B.K., Singh S. &.; (2005), "Strategic Planning Framework for Hortibusiness in Uttaranchal the TOWS Matrix Approach " Conference Proceedings of Indian Society of Agricultural Marketing, Pantnagar, published in Indian Journal of Agricultural Marketing, Vol. 19, No.2, Conference Spl.,218-227
- Narula, S.A., Sharma, N. (2008) "Implementing ICTs in Agribusiness" i4d, September, 20-22 available at www.i4donline.net/September08/September08.pdf
- Narula S. A., (2008) "Leveraging ICT to Link Farmers to Markets: A Case of Indian E-Business Models" Paper presented in International Conference on Technology and Innovation in Marketing held at IMT, Ghaziabad, India during 18-19 April, 2008; published in Rajat Gera (Ed.) "Technology and Innovation in Marketing", Allied Publishers, New Delhi
- Narula, S.A. (2009) "Social Networking.....For Farmers " i4d, February, available at www.i4donline.net/February09/February09.pdf

Vox Populi eINDIA 2009

"The power point presentations made during the session have been hugely informative. Conferences such as these help in bringing together ideas from across domains. The discussions have proved to be useful and relevant in today's context where ICTs have become a buzzword for future growth."

K. Shashikant, Student, eINDIA2009 Delegate

It was pleasure participating in eINDIA 2009 and sharing our experiences in the Telecentre Track. I would like to thank all the organisers to provide the wonderful platform for sharing. I look forward to your detailed report on the telecentre track for adding inputs.

About the feedback on Telecentre Forum track, I have few suggestions which may always add to the glory of eINDIA like:

- Experiences of Telecentre Operators should also be brought in to this forum if not physically then may be in virtual or e-form for better interactions.
- Identified Case Studies of Govt. Initiatives from various nations supporting Telecentres.
- Some printed material on best practices in Telecentres for common sharing.
- As a partner to the above initiative, AISECT would always participate into the above. Nice meeting you after a long time and keep in touch. Kindly send me the photographs and Video if possible of our tracks."

Shilpi Varshney, Project Director, AISECT

Innovating according to market need



Camille Mazo

Director

APAC, Unlimited Potential Group, Microsoft

Technological innovation must be supported by sustainable business models if the economies of Asia are to close the digital divide

While much of the news this year has been about economic woes, not least of all in the technology industry, a couple of stories brought to my attention that not everything is doom and gloom in Asia. The first was from an Organisation for Economic Co-operation and Development (OECD) report that suggests spending on research and development in Asia is on a par, and about to outstrip, that of the US and Europe. This is great for people like me, and the hundreds of thousands of ICT workers across Asia, because it means not only that there is more investment than ever before in my field of work, but also that there is a market need to funnel research funds through Asia – companies wouldn't be putting these funds into R&D if there wasn't a bottom line impact. Once the economy picks up, and it will, Asia will be well-placed to take advantage of these investments in ICT.

Businesses are realising more and more the market potential of the five billion people globally who have not yet had access to technology, many of whom live in the villages and small towns of rural Asia, Africa and Latin America. Not only that, there are a lot of very clever people in those regions working out clever ways to close the digital divide. Governments are putting funds and infrastructure behind that work as they realise that, to take advantage of the inevitable economic upturn, they will need both entrepreneurs to create new businesses and a technologically skilled workforce to staff them. Innovations, developed in the regions in which they will be applied, by people who live with problems of technology access every day, makes a lot of sense to me.

The second story was about a report from a technology analyst firm showing how PC sales are being affected by the

economic downturn. While the technology industry is working to turn this around – and it will – a consequence is that the market is also looking for lower cost alternatives for technology access – for example, in Singapore one in every ten laptops sold now is a so-called Netbook, a lower cost, stripped down, mini-laptop capable of impressive if somewhat basic, processing and internet connectivity.

So what do these two stories tell me? First, that increasingly, innovation for emerging markets is best led by the emerging markets themselves. People who have grown up in, and who understand, the environments where they are trying to solve problems will always trump well-meaning attempts from elsewhere. Second, this tells me that any attempt at innovation, in the short term, needs to be framed by market realities. Longer term, innovation can shape market realities, but short term,

we need to innovate according to market needs, or to put it another way, give the people what they want.

There are two challenges to overcome: the first is that we all sometimes confuse what we want with what we need. Microsoft surveyed 8,000 people in emerging markets and found their most pressing needs for technology often revolved around entertainment and surfing the Internet. Why not? Just because you live in rural Indonesia it does not mean that you see technology any differently to someone living in central Berlin. This tells me that the technology industry hasn't been doing a very good job of making itself relevant to smaller businesses in those markets. Clearly, these 8,000 people had identified the role of technology in addressing their social communications needs; we as an industry hadn't succeeded in helping them see the power of technology to address the needs of their work lives; skills, training, improved business efficiency, education and, ultimately, improved economic opportunity.

I heard an analogy that summed this up very well - that anyone can get a bunch of money together and install technology like a satellite dish in a school or a village, but if you can't find a way to sustain that - pay the bills, get people to use and maintain it - then you just end up with a weird dish on top of a building and no one can remember why it's there.

This brings me to the second challenge, one that Microsoft's Unlimited Potential programme is trying to solve, which is to apply innovations to market need. You might have the most elegant technology the world has seen, but if it does meet the needs of a farmer in Bangladesh then it won't do a lot of good. I recently read a blog from a Zimbabwean journalist that provoked a lot of thoughts for me - the blogger was effectively rejecting mobile phones as only a temporary solution to bridging the digital divide and believed we should concentrate on getting laptops to each community. As laudable as this view is, it ignores two important realities - that mobile phones are among the most ubiquitous technologies globally, and often the first point of contact in rural and underserved communities; and second, that finding a sustainable business and production model to build laptops in sufficient quantities and offer them at the right price is still something the industry is trying to work out. Can we wait that long?

My own experience has shown that shipping PC applications to mobiles can be fruitful. Take the example of the Sugarcane Corporation in Vietnam. What the farmers in that collective really need is up to date information on the sugarcane market, when trucks will arrive to take their produce away and so on. With the internet being the best repository of such information and PCs being out of reach of most farmers, mobile phones have filled a vital gap. Farmers receive market updates on their mobiles from a centralised server. What has encouraged me the most about this approach is that we have recorded farmers logging in for information even during odd hours of the night. This proves mobiles can be an excellent low cost alternative to PCs where



Children using Microsoft MultiPoint

there is a market need.

We should certainly shoot for the stars and indeed try to get one computer to every child, but we should also not ignore the realities of the markets we are working for and accept that educating and skilling children, and adults, is not just about a computer. Perhaps people prefer to start their technology journey in a shared environment with people on hand to ask questions and help with problems, so supporting iCafe networks might be one approach. Another might be to temporarily ignore the problem of getting multiple laptops into a classroom, and use a technology like Microsoft MultiPoint, that enables children to connect more than 30 mice to a PC and learn collaboratively with the teacher overseeing on a screen.

Microsoft MultiPoint is actually an example of that we call Shared Resource Computing, where multiple users share a small amount of PCs simultaneously. The economics speak for themselves, which is why this is fast becoming a popular option for education ministries and the schools they administer across the developing world. And while economically multiple users sharing one PC represents good value, it also represents good teaching practice. We have found in tests of our multiple user scenarios in schools that children are more active and engaged when they all have a mouse to play with and have to complete tasks. Furthermore, they start to learn collaboratively, helping each other along in the process. Teachers are also able to track students more effectively and pay special attention to those that need it. Learning therefore shifts from passive "chalk and talk" to active collaborative learning. So, interestingly, an economic reality drives an innovation that actually creates a healthier learning environment for students.

It would appear that, even as we struggle through the worst economic situation for decades, there are opportunities to put in place the foundations for a solid base for emerging markets in the upturn, when it comes. Innovation is firmly rooted in Asia and we have a proud tradition. Now we need to apply as much creativity in our business models to make those innovations relevant, accessible and affordable to those who need them. ■

Helping bridge the digital divide

Mobile services are helping to boost local economies, deliver social services like m-healthcare, e-education, improve democracy and generally raise the standards of living independent of foreign or state aid.



George Paul
Director – Marketing and Strategy
Ericsson India Pvt. Ltd.

World leaders have long recognised that the technology gap – or so-called ‘Digital Divide’ – between the world’s richest and poorest nations is a symptom of wider inequality. However, technology is also recognised as an enabler to close the gap – in economic, social and political terms.

Real-life examples from all corners of the developing world show how technology in the form of mobile networks is providing voice and data connectivity to improve billions of lives. ICT and mobile communications is also increasingly being recognised by governments and the UN for the critical role it is playing in helping to achieve the Millennium Development Goals.

Not dependent on foreign or state aid, mobile services are being run by operators as sustainable, profit-making businesses. They are helping to boost local economies, deliver important social services such as m-healthcare, m-education, improve democracy and generally raise standards of living.

In fact, in many markets the first point of entry to the digital or Internet world is expected to be the mobile phone. At the same time, continents like Africa and Latin America have challenges in the form of low GDP per capita coupled with low population density, which significantly impacts the business case for wide-area network deployment. However, the case for mobile communication is strengthened if one refers to recent research in this area which shows that the average developing nation sees its economic growth rise by 1.2 percent for every 10 percent growth in the number of mobile phone subscribers.

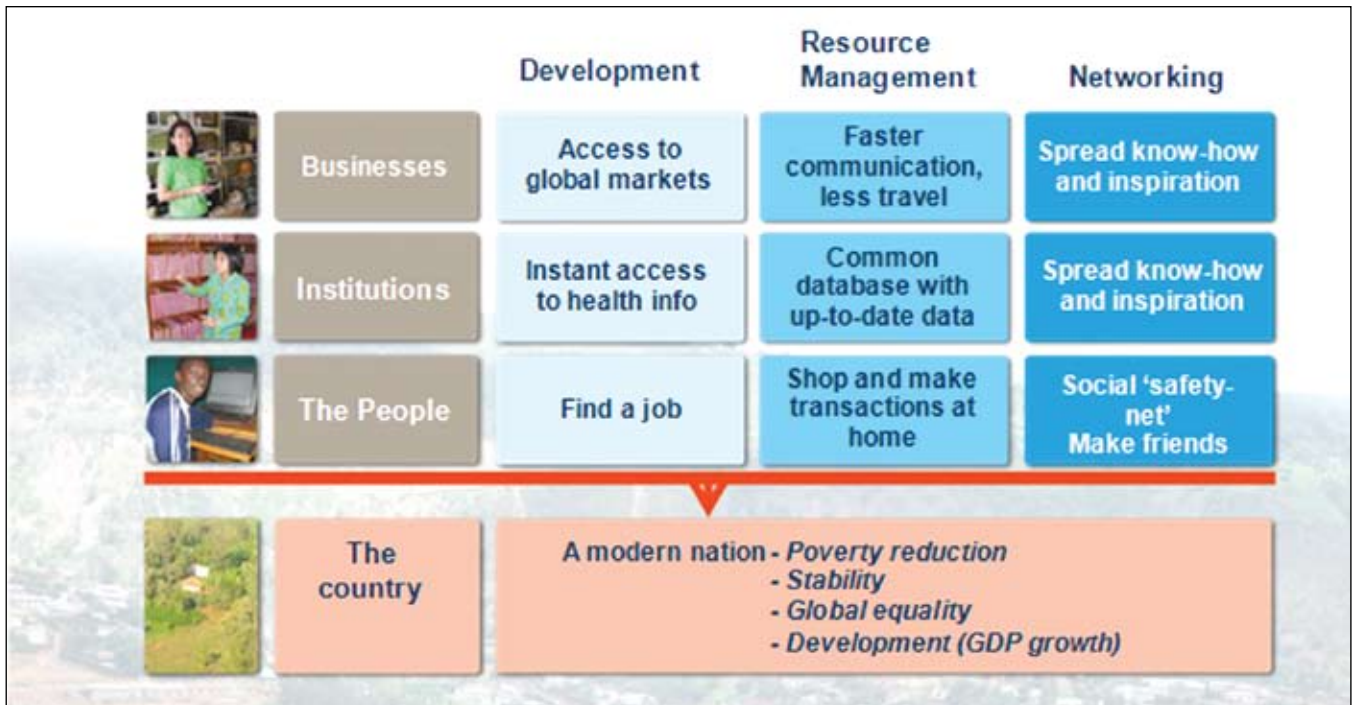
However, ensuring sustainable and affordable mobile services and applications remains a daunting challenge and it is imperative, that any sustainable solution offer twin benefits of high-speed and low

total cost of ownership, both in terms of capital and operating expense.

Operators can reduce cost of rollouts and offer affordable services only if spectrum allocations are globally harmonised and innovations are used for lowering power consumption across the network. These measures, in tandem with the operator’s own business strategy in rural areas can help them meet the above challenges. For deployments outside the electricity grid, alternative energy sources such as solar and wind are becoming increasingly popular. These solutions are now technically and economically viable and have been deployed already in Africa and Asia as fuel prices soar.

Underlining the global success of telecom is the 3GSM family of standards which has ensured that there are huge economies of scale benefiting the affordability of systems, services and devices. The world already has nearly 4 billion mobile subscribers and GSM-based mobile phones are now available for less than USD 20. Simultaneously, WCDMA phones are also dropping in price. Close to 1500 devices – be they phones, USB dongles, modems, PCs and even cameras – support High Speed Packet Access (HSPA, a software upgrade for WCDMA 3G networks) providing high data bandwidth. The array of devices will continue to increase substantially over the coming years.

Mobile broadband has high potential in emerging markets, since it brings access and speed where other solutions are non-accessible or slow due to absent or inferior infrastructure. Furthermore, mobile broadband provides ubiquitous coverage, not disconnected islands of hotspots, with seamless fall-back to other technologies in the 3GSM family of standards e.g. EDGE and GPRS. Mobile broadband is fast. HSPA already delivers 7.2Mbps and



Source: Ericsson market research in Indonesia and South Africa

will advance soon to 42 Mbps with HSPA Evolution. The next year will see the initial release of Long-Term Evolution (LTE), the next step in mobile broadband and the first true global telecommunications standard that can deliver speeds beyond 100Mbps/second. The whole idea of 'evolution' is inherent in the 3GSM family as each new technology is backward-compatible with previous ones, ensuring cost-efficient roll-out and operation of networks for operators.

But does broadband really matter for many of the world's poorest people?

Industry research and even the ones by Ericsson show increasing evidence that enabling of basic services is a key driver in social and economic development. A new report assessing m-content in Uganda and India by the Commonwealth Telecommunications Organisation (CTO), in cooperation with Ericsson, reveals that the demand for services is not being fully met. The report also

shows that while healthcare and job-related services will top the list of in-demand services in Uganda in foreseeable future, others such as Internet over mobile, remittances and m-banking may also see a significant spurt in demand during the coming years.

In line with realising its vision of being the prime driver in an 'all communicating world', Ericsson is also engaged in several hands-on projects including supporting the initiatives of The Earth Institute (Millennium Villages project) and the United Nations towards achieving the Millennium Development Goals (MDG) in their efforts to bring the benefits of telecommunications to the underserved people of society and contributing towards growth and development in Africa. The Millennium Development Goals (MDGs) are the world's time-bound and quantified targets for addressing extreme poverty in its many dimensions by 2015.

Similarly, Ericsson's partnership with the Millennium Villages, along with mobile operators Zain and MTN will work to bring mobile communication and the Internet to approximately 400,000 people in 10 African countries and provides a model framework for development efforts. Lessons from the villages so far show that data and Internet play a key role in development, in enabling services that are relevant to health, education, small business development, farming, fishing etc. In fact, a simple health application enables people to register births and deaths; other applications assist local health workers to provide m-health services and obtain timely advice from doctors. Upgrading existing networks from GSM, through EDGE to HSPA allows more advanced applications and increased number of users.

The findings from a similar Indian pilot (Gramjyoti Rural broadband project) conducted in late 2007 across 18 villages and 15 towns adjoining Chennai in Tamil Nadu echo similar results when Ericsson delivered advanced telemedicine services such as ECG, blood pressure and heart beat measurements, tele-consultation and basic medical check-ups, including live interactive check-ups and



A villager being checked using telemedicine during Gramjyoti project



reporting to the people covered under the survey. The population that received the benefits had no primary education, the average income was USD 1/day, and they previously had no access to secondary or tertiary medical care. From its modest beginning, this revolutionary initiative is currently being scaled up over thousands of villages in India, with the intention of reaching 200,000 villages.

But why, despite all its inherent benefits, has mobile broadband not taken off?

This is where there is now an urgent need for policy instruments for support. Regulators and Governments need to play their part. For example, access to appropriate spectrum clearly affects the business model positively; clear regulatory frameworks reduce investor anxiety; continued liberalisation of other telecoms sectors will encourage roll-out of fibre, international gateways and submarine cables necessary to provide transmission capacity and access to the rest of the world. Governments need to consider how to encourage demand through ICT literacy campaigns, the reduction of taxation on the sector and integration of Government systems to enable e-delivery of Government services.

The statistics speak for themselves. With close to 4 billion mobile subscriptions in the world, and network coverage extending over 80 percent of the world population, mobile communications is undoubtedly, the best tool to use for bridging the urban-rural digital divide.

Ericsson's commitment to delivering broadband for all – as shown by our commitment to projects such as the Millennium Villages and Gramjyoti– is in line with our strategy of bringing 'Communication for all'. It demonstrates how Ericsson's core business brings social and economic benefit to society, and aligns with Ericsson's belief that communication is a basic human need - no matter where people live or what their social status. With the rapid deployment of affordable mobile networks and broadband technology everywhere, Ericsson is working to make that basic human need history everywhere. ■

For further information please go to:

<http://www.ericsson.com/telecomexpansion/>

For more information on the Millennium Development Goals, visit

<http://www.unmillenniumproject.org/goals/index.htm>

Vox Populi eINDIA 2009

“Thank you for a very interesting conference! For me, who have been many times to Sri Lanka but never to India, it was very interesting. I also got some new contacts for future work and I'm more than pleased.

Peter Mozelius, Pedagogue and Lecturer, Department of Computer and Systems Sciences, Stockholm University, Sweden

“It was a great opportunity to share knowledge at Telecentre forum, as well as thanks for your hospitality. We will continue to assist through e-Asia too. Please keep few days free for Sri Lanka rural telecenter tour, Echo day and knowledge sharing workshop (we call this e-Grassroots).”

Niranjan Meegammana, Project Director, Shilpa Sayura Foundation, Kandy, Sri Lanka.

“I am pleased to say that the turnout at the event was much better than I had expected! The presence of Charles Clarke at the event helped to raise its international profile, with his speech during the opening ceremony being quite visionary and relevant. The Prometheus stall at the exhibition was strategically well placed, and we were pleased at the number of visitors at our expo. It gave the whole event an international and sophisticated feel.”

Peter Ormerod, Vice President, Prometheus

“I enjoyed the session. A lot of interesting ideas were exchanged. Report from the field was also discussed.”

S. N. Goswami, MD and CEO, Media Lab Asia, Delhi

Mobile scientific computing

Mobile technological tools are being used today to collect basic information in the health, world climate, geophysics, ecology, and other sectors to exchange information, and to access scientific computing among many services. The potentialities of this mobile technology need to be spread out on a larger scale in the academia in particular, and in the society as a whole so that its benefits can become widely accessible for further development. This is an issue that needs more attention and promotion, especially in less developed areas of the world.

Simply put, mobile science here refers to access to online services directed to worldwide scientists (such as e-Journals, seminar podcasts, lectures, conferences, on-line collaboration services, distance learning, video conferencing, remote data acquisition, etc.) from a mobile device such as mobile phones, laptops connected to 3G networks via USB devices, iPods, palms, etc. Today, the majority of new generation phones can access the web in some way. There is evidence that mobile web access is also growing fast in developing countries. According to the ITU-International Telecommunications Union, there are 2.4 billion mobile phone subscribers around the world outpacing fixed-line Internet users, with more than 1,000 new users added every minute. More than 59% of them live in developing countries, making mobile phones the first telecommunications technology in history to have more users there than in the developed world. Mobile phone shipments grew to 930 million units last year. Cell phone usage in Africa is growing almost twice as fast as any other region and jumped from 63 million users two years ago to 152 million today (see, <http://eprom.mit.edu/whyafrika.html>). On the other hand, the possibility of connecting with a

low-cost notebook (like Netbooks) to the Internet via broadband UMTS networks at low subscription prices is growing world-wide.

Data forecasting indicates that in only a few years half of the planet's population will have access to the Internet through a mobile device (cell phones, laptops, etc.) This means that a majority of the world's population will access electronic contents via their mobile devices. And this means that international organisations like the ICTP in Trieste and others around the



Following a scientific lecture from www.ictp.tv on a mobile device.

world need to think about what this means for their scientific community and its on-line users (as, for example, for the new participants of the on-line ICTP diploma courses at <http://www.ictp.tv> accessible now via mobiles). In this regard, an international workshop will be carried out in June 2010 at ICTP (e-mail: smr2149@ictp.it) to guide the scientific community in developing countries into the potentialities of the newest mobile scientific computing possibilities and the creation of tailored scientific contents for mobile devices (via, for example, Google Android OS) and paid particular attention towards innovation within a scientific environment. The aim is to train participants in, for example, mobile scientific computing using SpaceTime (<http://www.spacetime.us>), one of the most powerful cross-platform mathematics software developed for computers and

mobile devices with real-time 2D, 3D, and 4D graphing and MobileCASÂ® for computer algebra and calculus. Discussions will also focus on the fact that costs of data access to mobile device can be overcome if valuable e-content and services are offered. It is imperative to learn how to optimise the use of mobile technology tools to retrieve scientific data and how to promote their scientific initiatives and findings to a potentially larger audience than today.

Opera Software (<http://www.opera.com>), the company that makes one of the most popular web browsers, tracks the use of its product and reports rapid growth in mobile-web browsing in developing countries. According to Opera data, the number of web pages viewed by users of its software in 2008 over 3 billion, a 300% increase compared to 2007. According to its monthly reports, the fastest growth was in countries including Russia, Indonesia, India and South Africa. While this is a proxy for actual mobile web usage, it is nonetheless an indicator that mobile web access is rapidly increasing. ■



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Perspectives from the Union Budget

Agriculture is of paramount importance for both economy and society. The performance of the agriculture sector influences the growth of the Indian economy.



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The transformative impact of Information and Communication Technologies (ICTs) has challenged the traditional notion and practices of agriculture development and has introduced new ways of information delivery and its applications have been constantly changing the course of development in agriculture and its allied sectors. During the second half of the twentieth century, green revolution brought a lot of changes in Indian agriculture, like, mechanisation, reliance on exogenous inputs that are land extensive, labour saving, capital and energy intensive. The benefits of green revolution are tangible and increased food production has substantially reduced food insecurity and made many developing countries self-sufficient in feeding their population at the national level. Green revolution has also begat some problems which are detrimental to sustainable agriculture and the environment. Of late, water stress, extensive uses of fertilizers and pesticides, soil degradation, a few to name, have posed serious challenges for agriculture sector across the developing world. Therefore, we should look towards new technological interventions to go beyond the modern agriculture/green revolution which can also address issues and challenges of modern agriculture.

In case of India, agriculture is of paramount importance for both economy and society. The performance of the agriculture sector influences the growth of the Indian economy. Agriculture and allied sectors account for 17.8 per cent of the Gross Domestic Product (GDP) in 2007-08. Notwithstanding the fact that the share of this sector in GDP has been declining over the years, its role remains critical as it accounts for about 52 per cent of the employment in the country. Apart from providing food and fodder,

its importance also stems from the raw materials that it provides to industry. The prosperity of rural economy is also closely linked to agriculture and allied activities. Agriculture sector also contributed towards 12.2 per cent of India's exports in 2007-08 (Economic Survey 2008-09, 171).

Today, the agriculture sector faces challenges from various fronts ranging from climate change, globalisation, lack of adequate markets for farmers, access to credit, natural calamities and so on. In most parts of India, agriculture is dependent solely on rains. In such a context, the paper attempts to analyse the role of ICTs in development of agriculture in India and how it can promote growth and ensure sustainability in this sector and provide required information at the right time to poor farmers. How would we address the issues pertaining to the new and emerging problems in agriculture? How information can be provided at the appropriate time to farmers so as to minimise the risks from extreme weather events, provide them a stable market for their produce, enhance their livelihood opportunities, stimulate growth without harming the environment, share knowledge about best practices, strengthen their social network to enhance business opportunities and so on.

ICTs and Agriculture: Hope or Hype

The development thought of the 21st century emphasizes on rational arguments and technological skills to wipe out poverty and enhance development. According to such arguments, politics, the economy, science and technology can all be brought together to make the world a better place (Tim Unwin 2009, 7). Therefore, an integrated approach is the best way to promote inclusive development. In the contemporary course of development,



ICTs have become crucial for every aspect of development from stimulating growth, enhancing productivity, poverty reduction, strengthening social and political institutions to information delivery and bridging the digital divide. It is rightly called a transformative technology because it has potential to bring change. In the particular case of the agriculture sector, ICTs can be applied in multiple ways.

Enhancing productivity and sustainability

Raising productivity of farmers, particularly smallholders, is a necessary condition for increasing incomes and improving livelihoods among the rural poor in most developing countries including India. This increased productivity is essential for both household food security and to agriculture-based growth and poverty reduction in the larger economy. Smallholder farmers who comprise 78 per cent of the country's farmers, own only 33 per cent of the total land and produce 41 per cent of the country's food grains. Their productivity is limited due to a variety of constraints including infertile soil, unpredictable rainfall, as well as lack of access to productive resources, markets, financial services, or infrastructure. The sector is also marred by the lack of information about market prices, available crop varieties, modern production techniques, and methods of disease management and information that pertains specifically to local conditions. Smallholders also lack timely information sources such as news reports or early warning communications about weather, pest and disease outbreaks, and other seasonal risks, and about services that could help address them. Improving the information, communication, transaction, and network resources available to farmers and to the markets, organisations, and institutions they interact with is essential to making smallholders agriculture more productive (Kerry McNamara 2009, 1). Since majority of smallholders are poor, the information should be made available at an affordable price and should be easily accessible and in local language.

Providing market access and business opportunities

Awareness of up-to-date market information on prices for commodities, inputs and consumer trends can improve farmers' livelihoods substantially and have a dramatic impact on their

negotiating position. Such information is instrumental in making decisions about future crops and commodities and about the best time and place to sell and buy goods. Some initiatives have been taken to provide information to the farmers regarding market access and agriculture development in India, for example e-Krishi in Kerala, Gyandoot project in Madhya Pradesh, Warana Wired Village project in Maharashtra, Information Village project of the M S Swaminathan Research Foundation in Pondicherry, iKisan project in Andhra Pradesh, Bhoomi project in Karnataka, etc. Some exclusive agriculture portals have been created such as Haritgyan.com, Krishiworld.net, Agriwatch.com, Plantersnet.com, etc.

Capacity-building and empowerment

Farmers and other communities involved in agriculture and allied activities can be facilitated through the various applications of ICTs which will strengthen their capacities and better represent their constituencies while negotiating input and output prices, land claims resources rights and infrastructure projects. ICTs enable rural communities to interact with other stakeholders and end the isolation. Good connectivity opens new national and global perspectives, unlocks the numerous opportunities for isolated communities in rural areas and also enriches the social capital at the community and individual levels in farmer communities which helps to develop new businesses and information sharing. ICTs can make the system more accountable, efficient and transparent. With help of Global Positioning Systems (GPS) linked to Geographical Information Systems (GIS), digital cameras and the Internet, rural communities can document and communicate the conditions on the field in more efficient ways. ICTs can be instrumental in providing credit and other rural banking facilities even in the remotest areas. New initiative of Mobile banking further reduces the cost and brightens the prospects to reach the isolated communities (Jac Stienen Viitanen et.al 2009, 2).

Apart from these, ICTs helps disseminate information regarding weather forecasting. Indian agriculture largely depends upon weather and uncertainties associated with it always undermine the sense of security in the farming communities. If the efficient system of information delivery is in place which ably provides adequate information at the appropriate moment, it will substantial help to avert the risk and strengthen sense of security in farmers.

Targeting marginalized groups

Most rural poor people lack the infrastructure and resources to access information. ICTs could benefit all stakeholders including the civil society, in particular the youth and women. Other disadvantaged groups that could be targeted include the disabled and subsistence peasants (Hilda Munyua 2000, 2).

Generating employment

Through the establishment of rural information centres, ICTs can create employment opportunities in rural areas by engaging telecentre managers, subject matter specialists, information managers, translators and information technology technicians. Such centres help bridge the gap between urban and rural communities and reduce the rural-urban migration problem. The

centres can also provide training and those trained may become small-scale entrepreneurs (Hilda Munyua 2000, 2). It has been argued that Common Services Centres would create 4,00,000 jobs in rural India and stimulate entrepreneurship at the local level of the society.

Challenges to create effective information delivery system

Though some of the ICTs initiatives such as e-Krishi, Bhoomi have achieved remarkable success in India, there is still, a huge potential to harness ICTs for agriculture development and well-being of farmers. The success of isolated projects across the country highlights the potential of ICTs to transform the course of development. If we take a bird's eye view, we can easily say there is lack of conducive atmosphere to optimum uses of ICTs for development.

First and foremost, there is lack of basic infrastructure in terms of electricity, access to Internet, skilled workforce for expansion of ICTs facilities in rural areas. Its been more than six decades since India's independence and only 44 per cent of the country's rural households could be given access to electricity and more than 1,00,000 villages have not been electrified yet. Digital penetration in the rural areas is abysmally low, that is less than one per cent penetration in rural areas. Despite communication revolution, rural tele-density (phones per 100) is still quite low at 12.62 per cent, against urban tele-density of 81.3 per cent. The overall tele-density as of end of December 2008 was 33.23 per cent. Therefore, the role of ICTs should be viewed in isolation, optimum use of it warrants a conducive atmosphere. Awareness about the ICTs is very low among the farmers regarding facilities provided by the ICTs. It has been also seen that all initiatives taken in India has come from the top which simply highlights the low level of awareness rate of villagers. Rural illiteracy, particularly among women and other marginalised sections of the society, also act as a hindrance in the wider spread and utilisation of the available ICT tools. As a result, rural areas also lack adequate human resources to ensure more meaningful participation in rural and agriculture development, and to pave way for the creation of a critical mass of people that effectively harness ICTs in India. Training and capacity building must be an integral part of all ICT projects.

Secondly, theoretically speaking, ICT is not the panacea in itself. It is only an enabling tool for development and its impact depends upon the other factors which determine the course of development. Thirdly, local content creation is also another problem. Information available through ICTs is mostly in English, which the majority of rural communities cannot read. Information must be provided in local languages and facilities should be provided so that farmers can access and understand it.



Fourthly, ICTs are capital intensive technologies that require huge investments. Since agriculture sector is still not very attractive for private investment, therefore expansion of ICTs in rural areas would largely depend up on the initiatives taken up by the government. Fifthly, financial viability of the ICTs projects is also low. Many ICTs projects started in rural India have not been sustainable in term of finance.

New Initiatives: Changing the face of rural India

Generally, there are two main ways of promotion of ICTs in agriculture sector; direct and indirect. The direct way is the one in which we can see the tangible initiatives that have been introduced, and the indirect way is the one through which the policies and steps that would indirectly contribute to the ICTs and agriculture can be analysed. Though Government of India has not proposed any new direct step in budget 2009-10, a slew of measures have been proposed to revamp agriculture and rural infrastructure to bridge the rural-urban divide. There is a major rise in government spending for schemes such as National Rural Employment Guarantee Scheme (NREGS), Bharat Nirman (a four-year business plan for rural infrastructure), Rajiv Gandhi Grameen Vidyutikaran Yojana (scheme for rural electricity infrastructure and household electrification) and Indira Awas Yojana (housing scheme). All this is to further stimulate demand in rural India, which has also been responsible for the perking up of many industrial sectors. Under the Rajiv Gandhi Grameen Vidyutikaran Yojana, Government has planed to electrify every village by the end of this year and every rural household by 2012. It has also been planned to increase productivity of assets and resources under NREGS, convergence with other schemes relating to agriculture, forests, water resources, land resources and rural roads. To improve the credit availability, Government of India has planned to provide short-term agriculture loans up to INR Three lakh, which would be available at lower rates interest (seven per cent) to the farmers. The Government has not only raised the agriculture credit flow by 13.25 per cent, from INR

2.87 to INR 3.25 lakh crore, but also extended additional interest subvention of 1 per cent on short-term crop loans, aiming to tackle the economic slowdown and countering the adverse impact of the delayed monsoon. The budget has also proposed a 30 per cent increase in the funds allocated to the Rashtriya Krishi Vikas Yojana and a 75 per cent increase in the outlay for the Accelerated Irrigation Benefit Programme. These initiatives would certainly have a positive impact on agriculture and its allied sectors.

The major ICTs projects such as State Wide Area Network (SWAN), State Data Centre (SDC), National e-Governance Plan (NeGP), e-District would also bridge the digital divide and help to provide various services including promoting agricultural development. NeGP is the most important programme that has been started by the Government of India for the promotion of ICTs for rural development. Government has decided to open one lakh Common Service Centers in rural India to bridge the digital divide, promote decentralisation, transparency and accountability in the bureaucratic system and local governance, enhance governance at grassroot level of the society, provide more information and create more opportunities for economic development and rural employment, provide public services deliveries and so on.

Despite the fact that no new major initiatives have been

proposed in the 2009-10 budget, the ongoing projects have the potential to change the rural trajectories of India if they are implemented in their true spirit. If the Government attempts to improve the basic infrastructure and create conducive atmosphere, even ongoing projects will yield the desired result.

Conclusion

The rural scenario of India is changing as basic infrastructure improves. But it is still insufficient. Many challenges old and new are yet to be addressed. Due to delayed and insufficient rainfall, growth in agriculture sector is likely to decline and increase the miseries of farmers further. Since most of Indian agriculture is rain fed and uncertainty and unpredictability of weather makes it more risk prone, it affects the marginal and smallholder farmers the most. The necessity of ICT intervention is substantially increased to provide the right information and support at the appropriate time to minimise their risks. Interest and necessity would be addressed in meaningful role of ICTs in agricultural sector of the country. Outreach and impact of ICTs can be increased substantially if panchayats are further involved in the promotion of ICTs in their jurisdiction.

Banks may do well to remember that they have a business imperative in converting the periphery into the mainstream. ■

References:

1. Nirvikar Singh (2006), "ICTs and Rural Development in India", paper 624, Department of Economics, UCSC, University of California, Santa Cruz, accessed on 16th July 2009, available at <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1068&context=ucsecon>
2. Tim Unwin (ed.) (2009), *ICT4D: Information and Communication Technology for Development*, Cambridge: Cambridge University Press
3. JJac Stienen et.al (2007), "How ICT can make a difference in agricultural livelihoods", the Commonwealth Ministers Reference Book-2007, accessed 17 July 2009, available at <http://www.iicd.org/files/ICT%20and%20agricultural%20livelihoods.pdf>
4. Anita Kelles Viitanen (2005), "The Role of ICT in Governing Rural Development", IFAD, accessed on 17 July 2009, available on <http://www.ifad.org/innovation/presentations/ict.pdf>
5. UNDP (2005), *Promoting ICT for Human Development in Asia: Realizing the Millennium Development Goals*, New Delhi: Elsevier
6. Government of India (2009), *Economic Survey 2008-09*, Ministry of Finance, New Delhi, available at <http://indiabudget.nic.in/es2008-09/esmain.htm>
7. Kerry Mcnamara (2009), "Improving Agricultural Productivity and Markets: The Role of Information and Communication Technologies", *Agriculture and Rural Development Notes*, The World Bank
8. Shaik N. Meera et al (2004), "Information and Communication Technology in Agriculture Development: A Comparative Analysis of Three Projects from India", *Network Paper No. 135, Agriculture Research and Extension Network: ODI*, http://www.odi.org.uk/networks/agren/papers/agrenpaper_135.pdf
9. Hilda Munyua (2000), "Information and Communication Technologies for rural development and food security: Lessons from field experiences in developing countries", *Sustainable Development Department: Food and Agriculture Organisation of the United Nations*, <http://www.fao.org/sd/Cddirect/Cdre0055b.htm>
10. World Bank (2008), *Agriculture for Development, World Development Report 2008*, Washington: The World Bank, <http://siteresources.worldbank.org/INTWDR2008/Resources/2795087-1192111580172/WDRover2008-ENG.pdf>
11. Robert Chapman and Tom Slaymaker (2002), "ICTs and Rural Development: Review of Literature, Current Interventions and Opportunities for Action", *Working Paper 192*, London: Overseas Development Institute, accessed on 22 July 2009, available at <http://www.odi.org.uk/resources/download/1985.pdf>
12. OECD (2005), *Good Practices Paper on ICTs for Economic Growth and Poverty Reduction*, accessed on 23 July 2009, available at <http://www.oecd.org/dataoecd/2/46/35284979.pdf>

Vox Populi eINDIA 2009

It was indeed a great pleasure to participate in eHealth India 09 conference at Hyderabad. I would like to convey my thanks to the Organizers for their hospitality and to resource personnel for sharing their professional thoughts and high level deliberations; and also for the exhibitors for introducing me to their quality products. Looking forward to regular professional interactions.

Wg Cdr (Dr) Sanjeev Sood, Station Medicare Centre, Air Force Station-Ratanada, Jodhpur, Rajasthan

I thought that the attendance was better than the 2008 event and more knowledgeable. The quality of speakers and discussion topics too were better. All in all, a commendable job, for sure.

Dr. S. B. Bhattacharyya, Vice President (Clinical Services), Karishma Software Ltd.

eINDIA2009: Glimpses

eINDIA 2009, India's largest Information Communication and Technology (ICT) event, was held from 25th - 27th August at the Hyderabad International Convention Center, Hyderabad. It provided a unique platform for knowledge sharing in different domains of ICT for development and facilitated multi-stakeholder partnerships and networking among governments, industry, academia and civil society organisations of different countries. The objective was to bring together ICT experts, practitioners, business leaders and stakeholders of the region onto one platform, through keynote addresses, paper presentations, thematic workshops and exhibitions.

The eIndia event started with a gala inauguration ceremony with Smt D Purundeswari, Minister of State for Higher Education, Ministry of Human Resource and Development, Government of India, as the chief guest.

The welcome address was given by the President, Centre for Science, Development and Media Studies (CSDMS), Dr M P Narayanan. In his speech, he welcomed the honourable minister and other eminent dignitaries to the 5th edition of the annual ICT conference and exhibition. He expressed his appreciation to the Government of India for recently announcing measures to boost economic growth in the country. "CSDMS, along with the entire Information Technology industry, wholeheartedly welcomes these initiatives and extends its full support to the Government of India in all possible manners to tide over the tough economic climate." He said that the foundations for emerging stronger from the recent downturn is to invest in areas that focus on improving a country's productivity and competitiveness. He emphasised that investments in National Information Infrastructure and Human Capital Development, together which is known as Digital Infrastructure, will have a positive impact on employment generation and building efficiencies into the system.

In her speech, Smt D Purundeswari congratulated CSDMS on a job well done in organising the international ICT summit which was a sign of India's growing role in the world ICT and development networks. The eINDIA platform in the past has always ensured that it brings into focus the policy needs of the country, be it in terms of education, healthcare, e-governance ICT, or other development domains. Smt Purundeswari announced the launch of a National Information Highway Authority (NIHA) with the main aim of increasing various e-activities of the government like e-governance, e-learning and e-health, etc. Through this body, the government aims to promote an assortment of e-activities, since different ministries and departments had partly restricted its penetration as they deal with them. Now, as the apex body for such initiatives, NIHA would clear and monitor all future projects and budgets. NIHA would become an ideal vehicle to promote such initiatives effectively in a time-bound manner.

S R Rao, Additional Secretary, Department of IT, Ministry of Communication and IT, Government of India in his speech elaborated on the potential of India's growing economy and the valuable role that IT will play in further fueling the process. According to him, the 21st Century is known as the Century of Knowledge. It is clear that technological revolution has impacted several sectors. The Indian economy has been relatively insulated from the recession tide due to the dominance of the rural sector in the economy. As the



Smt D Purundeswari inaugurating eINDIA2009 conference

rest of the world reels under the effects of the global economic meltdown, India has come up with a robust 6.8% growth rate. He announced that it is the intention of the government to reach out to the length and breadth of the country in the next three years by connecting it through technology. IT has enormous potential for bringing about revolutionising changes in diverse aspects of the economy. It is the openness and willingness of the government and the citizens to accept these changes that will help transform the economy.

Reshan Dewapura, COO, Information and Communication Technology Agency (ICTA), Sri Lanka, in his speech elaborated about ICTA and eASIA2009. He stated that ICT is becoming an increasingly powerful tool for participating in global markets, promoting political accountability, improving the delivery of basic services and enhancing local development

opportunities. However, without an innovative ICT strategy many people will be left behind. The Information and Communication Technology Agency of Sri Lanka is the single apex body involved in ICT policy and direction for the nation. Wholly owned by the Government of Sri Lanka, ICTA is the implementing organisation of the e-Sri Lanka Initiative. About eASIA2009, he informed, “Information and Communication Technology Agency (ICTA), Sri Lanka and CSDMS, India have joined hands to organise the 4th annual eASIA 2009 Conference and Exhibition in Colombo, Sri Lanka to celebrate the year 2009 as the year of ICT and English as declared by HE Mahinda Rajapaksa, President, Sri Lanka and to promote growth of ICT4D, through consultative dialogue, strategic planning, knowledge networking and business partnering.” Spanning over three days, eASIA 2009 will comprise unique thematically inter-related conferences, in the domains of e-Governance, Digital Learning, e-Health, Telecentres and Emerging e-Technologies. The platform would be used to discuss best practices, access to digital divide, economic and social opportunities for the rural masses. The platform would discuss trends in emerging eTechnologies, media technologies, knowledge dissemination, information and connectivity.

The eASIA 2009 brochures were presented to the Chief Guest and the dignitaries giving way to the official launch of eASIA2009 in India.

Charles Clarke, Member of Parliament and Former Education Minister and Home Secretary, United Kingdom, emphasised on the importance of distance education which has now become a reality for a large part of the population. He praised the positive approach of the Government of India and of State Governments like Andhra Pradesh for programmes such as the Sarva Shiksha Abhiyaan (Education for All). These initiatives demonstrate that key decision-makers in the country are indeed committed to a strong and resilient future for India in this changing world. Implementing problems like erratic power supply are major impediments to the effective implementation of the process. Making the digital content accessible in their mother tongue is another impediment with India having more than 22 official languages. These challenges remain to be addressed even as we acknowledge that it is through ICTs that distance mode of education can be effectively implemented and the Gross Enrolment Ratio(GER) can be improved to 15% as has been penned by the Planning Commission.” He emphasised on the need to raise the quality of education through greater investment from individuals, companies, communities and countries. He said that there is a fear among the teaching community that technology will be replacing them. Therefore, it is urgently required to make this concept clear that technology is not a substitute for the teacher, but an additional tool to make the process more student friendly. He expressed hope that the three day eINDIA conference and deliberation will help churn out ideas on the ways and means of bringing ICTs closer to the education sector. He appreciated CSDMS’ efforts for organising the event year after year, bringing different stakeholders together from the industry to the academia.

Subhash C Khuntia, Joint Secretary, Ministry of HRD, Government of India, provided details of the government’s efforts in bringing IT closer to the masses. By integrating technology in

a wide array of services including health, education, governance and banking facilities, the provision of all these essential services can be made simpler, faster and more citizen friendly. For both the government and private sector, one of IT’s main direct benefits is in increasing efficiency by economising on resource use in the operations of firms as well as in market transactions. Private providers therefore have a role in delivering IT-based information services that are complementary to government services, as well as in providing conventional private goods and services. IT has varied applications in it, through which the development of the rural area can be possible. “The government intends to spread the reach of IT to remote villages. Each village with a population of 1000 or more will have a banking facility enabled through IT. Good public private initiatives will be promoted by the government”, he stated. However all these efforts need the combined efforts of the private sector, state government, academics, experts, business community, civil societies and the citizens. IT is one field where public private partnerships have a great role to play. “The eINDIA conference, which begins today, will bring together stakeholders to deliberate on ways in which the potential of ICTs can be unleashed in the development sector and help reduce poverty”, he said.

Prof V N Rajasekhar Pillai, Vice Chancellor, Indira Gandhi National Open University (IGNOU), India, underscored the importance of IT in several sectors including skills training and improving the quality of education. He stated that in the last 6 years, the country has seen tremendous changes in the field of education. Universalisation of primary education has always been on the agenda. On similar lines, steps towards the universalisation of secondary education are in progress. The Right to Education



Charles Clarke, Member of Parliament and Former Education Minister and Home Secretary, United Kingdom

bill is a step towards this process. There is a need to address the persistent challenges in education whether it be increasing the Gross Enrolment Ratio(GER) or the question of quality education and teachers training. In this context, potential of ICTs and the role that it can play becomes important. The provision of ICT education through Edusat is one unique and innovative initiative which is being used effectively, thereby enhancing the quality and quantity of education. IGNOU has been looking at various options of using ICTs for enhancing the quality of education. Another major area where the Government has to concentrate on is in the field of creation of skills. Prof Pillai stated that only 5% of the Indian workforce is equipped with skills relevant to industry needs. In the context of mass poverty in most developing countries, the critical role of training in furnishing critically needed skills to improve productivity, incomes and equitable access to employment opportunities seems particularly obvious and straightforward. With a 40% shortage of skilled manpower globally, there is a huge opportunity for India to invest in training and skilling manpower, thereby bringing inclusive and sustainable growth. Integration of ICTs can help address the issue. He announced that it is on the agenda of IGNOU to set up 5 institutes for the advancement and training of teachers in 5 regions across

the country. IGNOU is partnering with several state governments for improving the quality of teachers training in ICT.

Valedictory Session... Impressions of participants who made it happen

The grandeur of eINDIA2009 fanfare concluded with the Valedictory session which brought together the organisers, speakers, delegates, exhibitors and sponsors, from India and abroad, to introspect and put forth their thoughts and ideate over the culmination of the event.

The curtains went down on eINDIA2009 with panache at the conference finale, on 27th August, after 3 days of jam-packed itinerary and back to back business sessions. The concluding assembly was chaired by Dr Ravi Gupta, Convener of eINDIA2009, with the panel consisting of all dignitaries who had collaborated with CSDMS to make the event a grand success. Major highlights of the event were summed up and the audience was taken through a brief journey, that of eINDIA2009 - from its inception to its epoch making stage. The efforts and the hard work; the enriching role of delegates and speakers; the enthusiasm of the exhibitors; and the poignant role of the participants were all ceremoniously acknowledged and applauded. ■

For full coverage of eINDIA2009 visit: www.eINDIA.net.in

Vox Populi eINDIA 2009

“It has been my privilege to be associated with the eINDIA2009 and eAgriculture sessions for three years in a row. The discussions have brought together diverse perspectives which have been explored and ruminated on. One impressive observation was that this year, there were lesser number of power point presentations, with the focus more on speaker-audience engagement. The outcome of the sessions in this format proved to be much more valuable and interactive. Dr Ravi Gupta and his team have done a splendid job at the event.”

Dr Gopi Ghosh, Assistant FAO Representative, New Delhi

“Participating at the School Leaders’ Conclave and the School Education Forum was a pleasure. I have been a part of eINDIA since the last 4 years and the notable and positive difference this year was the wider representation of school teachers and principals. The presence of the practitioners at the conference has helped highlight the real problems and challenges encountered during teaching-learning process and ways and means of addressing the same.”

Simmi Kher, Director, The Indian Heights, India

“The exhibition was an eye opener. I have always known that there are a range of education and learning solutions available in the market, but had wanted a practical demonstration of the same. The exhibition did that for me. I now know whom to approach for the practical needs of our teacher and the school requirements.”

Mr S R Rao, Educationist, Visitor at eINDIA2009 Exhibition

“Congrats to the eINDIA team for making the show a grand success. Their months of hard work have been instrumental in making it happen. I would also like to thank digitalLEARNING awards for felicitating and honouring the shared computing initiative in Andhra Pradesh.

We are keenly looking forward to participating in eASIA2009 and thereby taking our collaborations further.”

Monali Handa, Marketing Manager, N Computing

“The display of various ICT infrastructure and content development solutions have been commendable. At the same time, the government needs to set up standards for the software and hardware products in education and other fields. There has to be a customised measure for the proper and effective utilisation of such solutions. The conference has highlighted the need for bringing together various stakeholders in ICTs and making efforts to bridge the digital divide across domain.”

Kiran Rao, eINDIA2009 Delegate

What's on

Africa

28-30 October 2009
IDIA2009 Conference
South Africa

<http://www.developmentinformatics.org/conferences/2009/3rd.html>

25-28 March 2010
3rd International Conference on ICT
for Africa 2010
Yaounde, Cameroon
<http://www.icitd.org>

Australia

15-18 November 2009
2009 Asia Pacific Conference on Child
Abuse and Neglect
Perth, Western Australia
<http://www.napcan.org.au>

20-25 March 2010
World Congress of Internal Medicine
Melbourne, VIC
<http://www.wcim2010.com.au/>

Bangladesh

17-19 December 2009
International Conference on the
Developments in Renewable
Energy Technology
Dhaka
<http://www.icdret.uui.ac.bd>

Europe

15-17 October 2009
Glocal - Inside Social Media
Skopje
Macedonia
<http://www.glocalconference.com>

22-23 October 2009
Gender, Media and the Public Sphere
Coimbra, Portugal
<http://mediagender.wordpress.com/>

15-17 July 2010
8th International Conference on
Information Communication
Technologies in Health
Samos Island
Greece
<http://www.ineag.gr/icictb>

India

14-16 September 2009
Indian Environment Summit 2009
New Delhi
<http://www.iesummit.net/>

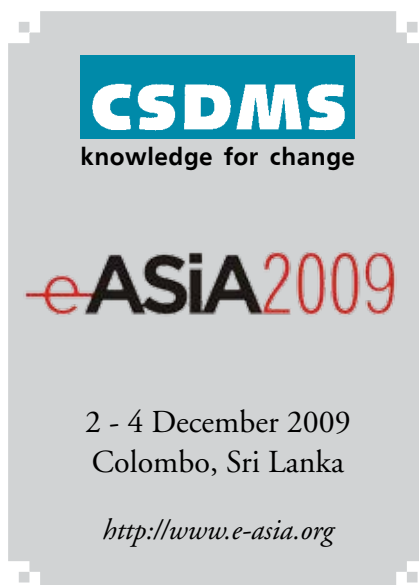
9-11 September 2009
National Seminar on "ICT for
Agriculture and Rural
Development"
Pasighat, Arunachal Pradesh
<http://www.modevillage.in>

18-20 January 2010
International Conference on New
Frontiers in Biofuels
New Delhi
<http://www.newfrontiersinbiofuels.org>

10-12 March 2010
ICTs and Development An
International Workshop for Theory,
Practice and Policy
New Delhi
<http://www.iitd.ac.in/events/ICTD2010/>

Malaysia

3-4 November 2009
4th International Conference on E-
Commerce
Penang
<http://ecdcconference.com>



20-22 November 2010
3rd International Conference of
UNESCO Chair Higher Education for
Sustainable Development
Penang
<http://www.besd09.org>

1-2 June 2010
National Conference on Knowledge
Integration in ICT
Putrajaya, Selangor
<http://www.kuis.edu.my/ictconf/>

Singapore

14-16 September 2009
Agriculture Outlook Asia 2009
Grand Hyatt
<http://www.terrapinn.com/2009/agriasia>

Thailand

4-6 October 2009
3rd Vaccine Global Congress
Bangkok
<http://www.vaccinecongress.com>

Turkey

19 March 2010
International Conference on
eGovernment and eGovernance
Antalya, Turkey
<http://www.icegeg.info/>

United States

4-7 October 2009
HighEdWeb 2009: Open. Connected
Milwaukee, WI
<http://www.highedweb.org/2009>

26-30 October 2009
mLearn 2009 - 8th World Conference on
Mobile and Contextual Learning
Orlando
Florida
<http://mlearn2009.org>

28-30 October 2009
International Conference on Information
Technology (ICIT 2009)
Chicago
<http://www.waset.org/wcset09/chicago/icit/>

United Kingdom

28-29 September 2009
Energy From Waste
London
<http://www.smi-online.co.uk/events/overview.asp?is=5&ref=3142>

Future Directions

Where women have used ICTs for their own purposes, they report increased knowledge and self-esteem. This seems to be almost universally true for different socio-cultural contexts – from China to Ethiopia, from Peru to India. (Hafkin 2002c, Gurumurthy 2004). ■

Gender-aware Guidelines for Policy-making and Regulatory Agencies Recommended by the ITU Task Force on Gender Issues

General

- Facilitate and promote the establishment of a Gender Unit within the Regulatory Agency, the Ministry and/or as an inter-agency effort.
- Review, revise or develop new regulations, circulars, issuances and procedures to remove any gender bias.
- Promote gender analysis as part of the policy process.
- Develop and establish systems to gather gender statistics.
- Promote dialogue with other national entities like other ministries, regulatory bodies, etc.

Human Resources

- Ensure equal hiring opportunities for all women and men, regardless of race, ethnicity, class and age.
- Ensure that a certain percentage, targeting 50 per cent, of all supervisory and management positions are occupied by women.
- Develop campaigns to attract women professionals (particularly for technical and decision-making positions).
- Develop and ensure the existence of appropriate support systems for professional women and men.
- Ensure that there are no wage disparities between the genders and establish a policy to eliminate any such gaps.

Training

- Ensure equal access to training opportunities.
- Promote gender-awareness training opportunities for women and men.
- Support technical and management programmes that train women professionals and create internship programmes with educational institutions.

Licensing Activities

- A certain percentage of licences should be awarded to woman-owned companies and/or companies with women in top management positions.
- Develop and market licensing procedures where potential women owners can have access to the information.
- Promote the development of business assistance programmes and partnerships with expertise in assisting women entrepreneurs.
- Develop licence award criteria based on social responsibility of the business as well as universal access objectives of the proposed venture.
- Ensure that licences awarded contain certain conditions to promote gender analysis and mainstreaming for the particular company.

Source: Jorge 2001.

Source BRIDGE development - gender
Gender and ICTs Overview Report
Anita Gurumurthy
www.bridge.ids.ac.uk/reports/CEP-ICTs-OR.pdf

Glimpses of eINDIA 2009



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